BEFORE THE

NORTH DAKOTA PUBLIC SERVICE COMMISSION

In the Matter of Montana-Dakota Utilities Co.,

a Division of MDU Resources Group, Inc.

2016 Electric Rate Increase Application

Case No. PU-16-666

DIRECT TESTIMONY

OF

RICHARD A. POLICH, P.E.

ON BEHALF OF THE

NORTH DAKOTA PUBLIC SERVICE COMMISSION

ADVOCACY STAFF

February 24, 2017

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Public Service Commission

PSC 1

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Q. Please state your name and place of employment.

A. My name is Richard A. Polich. I am employed by GDS Associates, Inc. ("GDS"), and my office is located at 1850 Parkway Place, Suite 800, Marietta, Georgia 30067.

Q. What position do you hold?

A. I hold the position of Managing Director.

Q. On whose behalf are you submitting this testimony?

A. I am submitting this testimony on behalf of North Dakota Public Service Commission Advocacy Staff ("Staff").

Q. What is your educational background?

A. I graduated from the University of Michigan - Ann Arbor in August 1979 with a Bachelor of Science Engineering Degree in Nuclear Engineering, and a Bachelor of Science Engineering Degree in Mechanical Engineering.

In May 1990, I received a Master of Business Administration from the University of Michigan - Ann Arbor.

Q. Please describe your work experience.

A. In my role as both employee and consultant, I have had over 37 years of work experience in the energy sector, performing duties and services for a myriad of companies and organizations, and representing the interests of private and public constituencies throughout the country.

In May 1978, I joined Commonwealth Associates, Inc., located in Jackson, Michigan, as a Graduate Engineer and worked on several plant modification and new plant construction projects.

In May 1979, I joined Consumers Power Inc. (now called Consumers Energy), located in Jackson, Michigan, as an Associate Engineer in the Plant Engineering Services Department.

In April 1980, I transferred to the Midland Nuclear Project and progressed through various job classifications to Senior Engineer. I also participated in the initial design evaluation of the Midland Cogeneration Plant.

In July 1987, I transferred to the Market Services Department as a Senior Engineer and reached the level of Senior Market Representative. While in this department, I analyzed the economic and engineering feasibility of customer cogeneration projects.

In July 1992, I transferred to the Rates and Regulatory Affairs Department of Consumers Energy as a Principal Rate Analyst. In that capacity, I performed studies relating to all facets of development and design of Consumers Energy's retail gas and electric rates and electric wholesale rates. During this period, I was heavily involved in the development of Consumers Energy's Direct Access program and Consumers Energy's Retail Open Access program. I also participated in the development of Consumers Energy's revenue forecast.

In March 1998, I joined Nordic Energy, LLC ("Nordic"), located in Ann Arbor, Michigan, as Vice President in charge of marketing and sales. My responsibilities included all aspects of obtaining new customers and enabling Nordic to supply electricity to those customers. In May 2000, my responsibilities shifted to Operations and Regulatory Affairs. My Operations responsibilities included management of supply purchases, transmission services, and development of new power projects. My Regulatory Affairs responsibilities included overseeing regulatory and legislation issues for the company.

In March 2003, I formed Energy Options & Solutions, based in Ann Arbor, Michigan, as a consulting concern focusing on providing engineering services and regulatory support. Through my work with Energy Options & Solutions, I gained extensive experience consulting in the areas of project development and economic analysis with renewable energy companies across the country, including: Noble Environmental Power located in Centerbrook, Connecticut; Third Planet Windpower, LLC located in Palm Beach Gardens, Florida; TradeWind Energy, LLC located in Lenexa, Kansas; Windlab Developments USA located in Canberra, Australian Capital Territory, Australia; and Matinee Energy Inc. located in Tucson, Arizona, among others.

Other examples of my consulting work have included evaluation of the Arkansas Weatherization Assistance Program for the Arkansas Energy

Office, and providing the West Michigan Prosperity Alliance with an evaluation of the business opportunities for Western Michigan businesses in the renewable energy business sector.

In 2007, I served as primary author of the report on the economic impacts of renewable portfolio standards and energy efficiency programs for the Department of Environmental Quality – State of Michigan.

In 2011, I joined KEMA, Inc. ("KEMA") located in Burlington, Massachusetts, as a Service Line Leader responsible for developing its renewable energy consulting business. While at KEMA, I performed multiple renewable energy studies for the Electric Power Research Institute, including a renewable energy options study for the country of Saint Maarten (a constituent country of the Kingdom of the Netherlands). I also assisted Lake Erie Energy Development Corporation in its successful application to the U.S. Department of Energy for a multi-million dollar grant to develop an offshore wind project in Lake Erie.

In 2013, I joined CLEAResult located in Little Rock, Arkansas, as Director of Operations. My primary responsibility involved supporting program operations in assisting the company's Arkansas unit to successfully meet a 400% increase in energy efficiency goals that it managed for Entergy. I was also responsible for managing the company's natural gas energy efficiency programs in the State of Oklahoma.

In 2015, I joined the Georgia office of GDS Associates, Inc., a consulting group focusing on utility engineering and consulting services, as Managing Director in its Generation Services area.

A copy of my Curriculum Vitae is attached hereto and incorporated herein as Exhibit PSC-1.

Q. Do you have any professional registrations?

A. Yes, I am a registered Professional Engineer in Michigan and hold a LEED Green Associate credential from the U.S. Green Building Council.

Q. Have you published any papers?

A. Yes, I have authored the following publications:

- Engineering and Economic Evaluation of Offshore Wind Plant Performance and Cost Data, 2011, Produced for the Electric Power Research Institute, KEMA, Inc.
- Island of Saint Maarten Sustainable Energy Study, 2012, Produced for the Cabinet of Ministry VROMI, KEMA Inc.
- A Study of Economic Impacts from the Implementation of a Renewable Portfolio Standard and an Energy Efficiency Program in Michigan, 2007, Produced for the Michigan Department of Environmental Quality
- Alternative and Renewable Energy Cluster Analysis, 2007, Produced for the West Michigan Strategic Alliance and The Right Place

Q. Have you testified in any other regulatory proceedings?

A. Yes, I have testified before the Michigan Public Service Commission on multiple occasions as a representative of Consumers Energy, and on behalf of Energy Michigan. I testified before the North Dakota Public Service Commission ("Commission") on behalf of the Staff in Case No. PU-15-96, "In the Matter of Northern States Power Company's Advance Determination of Prudence for its 345 MW Power Purchase Agreement with Mankato Energy Center". In January 2016, I testified on behalf of SunEdison, Inc. in Docket No. 2015-0022 before the Public Utilities Commission of Hawaii, In the Matter of the Application of Hawaiian Electric Company, Inc. Hawai'i Electric Company, Inc., Maui Electric Company, Limited and NextEra Energy, Inc. for Approval of the Proposed Change of Control & Related Matters" (NextEra sought to purchase Hawaiian Electric, et all.). Attached hereto and incorporated herein as Exhibit PSC-2, is a list of proceedings detailing my prior participation as a testifying witness.

Testimony Purpose and Summary

Q. What is the purpose of your testimony?

A. The North Dakota Public Service Commission Advocacy Staff ("Staff") hired GDS Associates, Inc. ("GDS") to provide an analysis, recommendations and testimony in regard to Montana-Dakota Utilities

Co., a Division of MDU Resources Group, Inc. (MDU) 2016 Electric Rate Increase Application. My testimony will cover five areas, including; Proposal for overall rate of return; Adjustments to electric rate base; Cost of Lewis & Clark Reciprocating Internal Combustion Engine Project ("RICE Project"); Decommissioning Expense; and Revenue Requirement.

Q. Please summarize your testimony.

A. My testimony addresses MDU's overall rate of return, adjustments to plant in service and revenue requirement. I am recommending that the Commission base MDU's rate increase using the 2017 Projected Test Year based upon 2016-year end actual cost of service provided in Discovery Response 1.1. I further recommend the Commission approve an overall rate of return of 6.789% on plant in service based upon an 8.53% return on equity. My testimony includes several disallowances in MDU's proposed plant in service resulting in a Project 2017 Rate Base of $520,229,030, excluding wind resources. Last, I am recommending the Commission approve adjustment to MDU revenues (see Exhibit PSC-3) as follows:

1. Base Rate Revenue Increase: $515,316
2. The Renewable Rider Decrease: $1,775,588
3. Transmission Cost Adjustment Revenue Decrease: $674,367

Q. What are your other key Commission recommendations in this proceeding?

I am recommending the following additional changes to MDU's rate increase request:

1. MDU's proposal for collection of decommissioning funds to be used for the decommissioning of existing plants should be rejected. The accounting treatment proposed by MDU places all the risk with the North Dakota ratepayers and all the rewards with MDU. MDU would be allowed to claim the revenue from the decommissioning expense as revenue and profit without any corresponding liability, resulting in additional shareholder profits. In the event of MDU over collection of funds to finance decommissioning, ratepayer's refunds would be less than the amount paid in to the fund (see page 26 of my testimony). This change reduces MDU annual revenue requirement by an estimated $1,900,145.
2. MDU capitalization for recovery of losses on employee housing, should be disallowed. First, accounting treatment for this type of cost should be as an O&M expense in the years in which the cost occurred. Second, if this was not for temporary housing associated with employees being temporarily located at a job site, it is not recoverable. Third, MDU had other options of

supplying employees with housing which would have resulted in less cost (see page 30 of my testimony). This change reduces MDU annual revenue requirement by an estimated $95,003.

3. Reduced incentive compensation and bonuses by 60% of the amount MDU forecasted to be consistent with Commission decision in Case PU-10-124 (see page 31 of my testimony). Incentive compensation and bonuses are established to improve company performance with the intention of benefiting company shareholders. Ratepayers should not be required to pay these costs because they do not provide any benefit to ratepayers.
4. $ 12.27 million of MDU's cost for the Lewis & Clark RICE Project should be disallowed. This project was almost 70% higher than costs for similar types of generation resources. MDU's justification of an expedited project completion schedule, is not valid because MDU had opportunities to mitigate the situation and/or alternative options (see page 32 of my testimony). This change reduces MDU annual revenue requirement by an estimated $1,460,482.

Q. How is your testimony organized?

A. I have organized my testimony into the following sections:

1. **Overall Rate of Return** – Calculation of return on equity (ROE) and overall rate of return (ROR).
2. **Decommissioning Expense** – Address MDU's request to include cost of decommissioning of future retired generation facilities in rate base.
3. **Other Adjustments to Electric Rate Base** – Recommendations for adjustments to costs incorporated into electric rate base.
4. **Lewis & Clark RICE Project** – Review of the need, timing and cost of this generation resource.
5. **Revenue Requirement** – Calculate MDU's revenue requirement and revenue deficit

Q. Have you prepared any Exhibits?

A. Yes, the following is a list of Exhibits included with my testimony:

EXHIBIT	DESCRIPTION
PSC-1	Richard A. Polich Curriculum Vitae
PSC-2	Regulatory Proceedings Testimony List
PSC-3	2017 Projected Operating Income and Rate of Return
PSC-4	DCF Calculation
PSC-5	Example of Flotation Cost Over Recovery
PSC-6	Decommissioning Cost to Montana Ratepayers
PSC-7	List of Similar Small Power Project Costs

Q. Are you sponsoring any Revised Statements?

A. Yes. Since we are recommending basing MDU's rate increase on a 2017 Projected Test Year based upon 2016-year end actuals, all of MDU's Filed Statements need to be revised. I am sponsoring those statements I used in developing my revised plant in service and income statement. This includes Statements A, B, G, I and J.

Overall Rate of Return

Q. What is the definition of cost of common equity?

A. The cost of common equity or Return on Equity (ROE) is often defined as the compensation the market demands in exchange for owning the asset and bearing the risk of ownership. It is a percentage applied to the common equity portion of a utility's capital to calculate the utility's potential gross profit. It is a component of a utility's Rate of Return (ROR), which also includes interest on debt and dividends on preferred stock.

Q. What was the basis for your method of calculating the ROE?

A. There are several legal cases which establish the criteria and standards for determining the ROE. The criteria incorporated into my calculations were based upon standards set in the U. S. Supreme Court decisions in *Bluefield Waterworks & Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679 (1923) ("*Bluefield*"), and *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944) ("*Hope*"). This

establishes that ROE should be commensurate with the returns on investments in other enterprises having corresponding risks and should be sufficient to assure confidence in the financial integrity of the enterprise so as to maintain its credit and to attract capital.

Q. Describe your approach to determining the appropriate rate of return on common equity for MDU.

A. My first step was a review of MDU's witness, J. Stephen Gaske's testimony, exhibits and review of various discovery responses regarding cost of common equity based upon his Discounted Cash Flow analysis. Second, I have reviewed the cost of common equity testimony of witnesses in other MDU proceedings and various decisions of regulatory agencies. Last, I conducted my own analysis based upon data that better reflects the requirements of investors willing to risk capital in the equities market.

Q. Do you agree with the methodology used by Mr. Gaske in his direct testimony?

A. Mr. Gaske's use of Discounted Cash Flow ("DCF") analysis is the appropriate model for calculating return on common equity. I do not agree with his approach to the determinates used within that model or his calculations. Specifically, his selection of utilities used in the DCF calculation was too small, resulting in a statistically inferior sample set (see page 23 of my testimony). Mr. Gaske's application of a flotation cost

(see page 15 of my testimony) adjustment factor is inappropriate. In addition, he used the wrong quarterly dividend growth factor multiplier (see page 14 of my testimony).

Q. Is the 10.0% ROE presented by Mr. Gaske a just and reasonable ROE for MDU?

A. No. First, Mr. Gaske's assumption that the market does not already factor in investor anticipation of increased interest rates is not realistic, as I discuss in my testimony, starting on page 18. Second, the flotation cost adjustment is inappropriate since MDU has no intention of raising additional capital from common stock issuances and these costs are already included in MDU's current capital structure. Third, Mr. Gaske chose a select group of utilities which were based upon unnecessarily restrictive criteria resulting in a very small sample size.

Q. What DCF methodology have you employed in calculating an appropriate ROE for MDU common equity?

A. I have employed a readily accepted methodology utilized in various state and federal regulatory proceedings. I applied the Federal Energy Regulatory Commission (FERC) two-step DCF methodology, as outlined in FERC Opinion No. 531, to a representative group of national utilities. The DCF model is based upon the principle that rational investors evaluate the risks and expected returns of securities in capital markets and establish a price for a particular security which adequately

compensates them for the risks they perceive. The DCF model incorporates the proposition that the total return received by shareholders consists of dividends and capital gains, and these are measured in terms of the current dividend yield plus the expected rate of dividend growth. The DCF Formula is as follows:

$$k = (D/P)\ (1 + 0.5g) + g$$

Where:

k: Total return to investors

D: Dividend on common stock

P: Price of common stock

g: Expected long-term dividend growth rate

The "D/P" term provides the dividend yield. The "g" term is calculated based upon a weighted average of two-thirds short-term growth rate and one-third long-term growth rate. The short-term growth rate is based upon analysts' five year forecasted earnings projections. The long-term growth rate is the projected long-term US economic growth rate. The "(1+.05g)" multiplier to the dividend yield reflects typical utility quarterly dividend payments.

Q. Do you agree with Mr. Gaske's quarterly dividend multiplier?

A. No. Mr. Gaske's use of a dividend multiplier of (1+.0625g) is inappropriate. First, the use of a dividend multiplier of (1+.05g) is the recognized normal method of adjusting the dividend yield for quarterly dividend payments.

Markets reflect the timing of dividends in stock prices, resulting in dividend yield calculation of the DCF calculation also reflecting the timing of dividends. Mr. Gaske's argument of inflating the dividend multiplier to reflect an average of the timing for the payment of dividends results in double counting for market timing.

Q. How did you determine the long-term US economic growth rate?

A. The long-term US economic growth rate I used is based upon an average of long-term GDP data from Energy Information Administration, Social Security Administration and HIS Global Insights. The expected long-term US economic growth rate used in my DCF calculation is shown in Exhibit PSC-4.

Q. Why do you feel it is inappropriate to include a "flotation Cost Adjustment" in the ROE calculation?

A. In Mr. Gaske's testimony (page 20, lines 4-9), he defines "flotation costs" to be the cost associated with the issuance of "*new common equity*". Mr. Gaske then goes on to state that his "flotation cost adjustment" should be applied to "... the entire common equity investment ..." (Mr. Gaske's testimony, page 21, line 8). This inclusion of flotation costs in the ROE calculation would result in double recovery of costs and compensate MDU for costs they are not likely to incur. In addition, the 3.2% flotation costs Mr. Gaske used (Mr. Gaske's testimony, page 20, line 13), is not realistic because the cost of new equity depends upon the amount of equity being

raised and the manner in which it is being raised. In fact, MDU stated in Discovery Response 5.1 that in 2015 it received 115 million in equity which did not incur any issuance costs. The flotation costs of MDU's 2014 common stock offering was approximately 1% (Discovery Response 2.9), much lower than Mr. Gaske's 3.2%. Applying the 3.2% flotation cost adjustment would result in MDU receiving revenues from North Dakota ratepayers for costs it had not incurred.

Mr. Gaske's position that flotation costs should be applied to existing equity because there is the potential for the company to issue new common equity is also double recovery. Any flotation costs for existing common equity has already been paid for by MDU ratepayers and is reflected in MDU's capital cost structure. In the event MDU elects to issue future common equity, MDU can request recovery of the cost of issuing new common equity in a future rate proceeding. MDU stated in Discovery Response 2.9 that flotation costs have not been included for recovery in previous rate proceedings and the equity recorded on its books is net of issuance costs.

Last, utilities very seldom issue new stock to raise common equity, funding operations and capital requirements from earnings and recovery of initial capital investment through their rates. MDU's current capital requirements do not appear to indicate a need to raise additional capital, because the amount recovered in rates through depreciation will cover the cost of

expected capital improvements. In Discovery Response 2.9 states that MDU does not have any plans to issue new common equity to support operations. In addition, MDU's debt to equity ratio is well within the expected D/E ratio of public utilities, thus additional equity is not needed. In summary, MDU is unlikely to incur flotation costs of issuing new equity in the near future. If they do issue new equity, MDU can attempt to recover the common equity issuance costs through a future regulatory proceeding.

Q. Would Mr. Gaske's flotation cost adjustment recover the appropriate amount of flotation costs?

A. No. The multiplication of the investor required return by the flotation cost adjustment is wrong mathematically and would result in MDU over recovering the flotation costs by 64%. I have provided an example of the flotation cost recovery proposed by Mr. Gaske in Exhibit PSC-5. The over recover occurs because the 3.2% flotation cost adjustment to is applied each year over the life of the asset. Using Mr. Gaske's approach of multiplying the ROE by the flotation cost adjustment and applying over the life of asset would result in ratepayers paying the total actual flotation costs by the end of year 16. This leaves the utility an additional 24 years of excess flotation costs recovery which results in unjustified profits. The ratepayer is much better off paying the flotation costs at the time the MDU incurs the need to increase equity. *It is my recommendation that the Commission should never include a flotation cost adjustment in the*

calculation of cost of capital because it will always result in excessive recovery of flotation costs.

Q. Do you agree with Mr. Gaske's position that current market conditions are artificial and not normal?

A. No. Mr. Gaske's position is based primarily upon the Federal Reserve's Open Market Committee (FOMC) monetary policy as of September 16, 2016. First, the Federal Reserve raised interest rates by 25 basis points on December 14, 2016. Second the FOMC has indicated it is inclined to raise rates up to three times this year. Third, the consumer-price-index has risen faster over the last few months, indicating a return to normal inflation levels. Fourth, markets reflect not only existing data but anticipated market performance. An indication of market anticipation can be seen in Treasury Bond yields, where the 10-year bond yield has risen from 1.63% in February of last year to 2.51%, a 54% increase in bond yields. Markets are reflecting anticipation of increased Federal Reserve interest rate hikes and higher inflation rates.

Last, the definition of "normal" markets is the equivalent of arguing who is the best baseball player of all time. The conditions of the game of baseball at the time the game is played is a key determinate in the performance of a player. Changes in the game of baseball make it impossible to determine how a player in the 1940s would perform in today's game, too many aspects of the game have changed. The situation is the same with

financial markets and company performance. Market conditions are always "normal" during the time at which those market conditions exist. Yes, things like market manipulation by a few players, can skew a market for a short time, but by definition the market still defines the normal condition at the time of that market. Today's investors are more sophisticated, have access to more data and more analytical tools than ever before. They have the ability to find unusual circumstances within markets and can exploit those conditions, but usually only for very short period of time.

Today's market conditions reflect future expectations of performance of the US economy and investors are pricing those factors into utility stock value. In addition, while some have suggested that the current relatively low capital costs are somehow aberrational or artificial, prominent economists like former Federal Reserve Chairman Benjamin Bernanke, former Treasury Secretary Lawrence Summers, and Nobel Prize winning economist Paul Krugman dispel these suggestions and express views in line with the expectation for continued relatively low long-term capital costs. For example, in his March 30, 2015 blog entitled "Why are interest rates so low?" Dr. Bernanke explained:

> ***Low interest rates are not a short-term aberration,*** but part of a long-term trend. As the figure below shows, ten-year government bond yields in the United States were relatively low in the 1960s, rose to a peak

> above 15 percent in 1981, and have been declining ever since. (Emphasis added.)

The figure that Dr. Bernanke presents is a graph of 10-year Treasury bond yields and inflation rates since 1960. Dr. Bernanke notes that the inflation rate, at least partly, explains the pattern of interest rates. In his blog, Dr. Bernanke also answered the "confused criticism" that "the Fed is somehow distorting financial markets and investment decisions by keeping interest rates 'artificially low.'" Dr. Bernanke explains:

> The best strategy for the Fed I can think of is to set rates at a level consistent with the healthy operation of the economy over the medium term, that is, at the (today, low) equilibrium rate. ***There is absolutely nothing artificial about that!*** (Emphasis added.)

In writing in the Financial Times on August 23, 2015, Dr. Summers explained that the state of the global economy dictates that, if we are to achieve satisfactory economic growth, historically low interest rates are now and will be required for quite some time, noting that long term bond markets are telling us that real interest rates are expected to be close to zero in the industrialized world over the next decade. Dr. Summers said:

> Much more plausible is the view that, for reasons rooted in technological and demographic change and reinforced by greater regulation of the financial sector, the global economy has difficulty generating demand for all that can be produced. This is the "secular stagnation" diagnosis, or the very similar idea that Ben Bernanke, former Fed chairman, has urged of a "savings glut". Satisfactory growth, if it can be achieved, requires very low interest rates that historically we have only seen during economic

> crises. ***This is why long term bond markets are telling us that real interest rates are expected to be close to zero in the industrialized world over the next decade.*** (Emphasis added.)

Also, in his August 25, 2015 New York Times opinion column, Dr. Krugman pointed to the evidence over the last seven years that demonstrates that the low interest rates we have been experiencing are not unnatural or artificial.

> The underlying claim in all such demands is that the low interest rates we've had since 2008 are ***"unnatural"*** or ***"artificial"***. So it's probably worth repeating that while very low rates may seem strange, they also seem fully justified by the economic situation. The original Wicksellian concept of the natural rate of interest defined that rate as the rate consistent with stable prices, with an economy that was neither too hot nor too cold. ***If we had had an unnaturally low rate these past 7 years, we should have seen accelerating inflation; we haven't.*** (Emphasis added.)

These prominent economists are saying that our economy, due to both domestic and international influences, has not been capable of sustaining substantially higher interest rate levels over the past several years, and this circumstance is not expected to change significantly anytime soon.

Q. Do you agree with Mr. Gaske's application of a "risk premium" in his DCF calculation?

A. No. Mr. Gaske's claim that MDU's electric operations have a higher risk than other electric utilities because of the percentage of coal generation, is a poor assumption. Utility risk is based upon a variety of

functions, including stability of rate base, regulatory environment, debt to equity ratio, ability to meet interest payments, growth forecasts, etc. With the change in federal administration at the US Environmental Protection Agency (EPA) it is likely that the concerns due to recent pollution regulations will be minimal, including those associated with the Clean Power Plan ("CPP"). The new EPA Administrator Scott Pruitt has targeted the repeal or significant overhaul of the CPP. This change in EPA position on the CPP significantly reduces the potential for MDU to have to make costly improvements or shutdown coal generation.

North Dakota's regulatory practice which allows utilities to implement interim rates while requested rate increases proceed through the regulatory process, also reduces MDU's risk in relation to many of the utilities within the Value Line group. Not all states have a policy which allow interim rates to be implemented, resulting in significant delays between utilities incurring costs and being able to recover those costs through rate increases. North Dakota's interim rate practice provides MDU quicker recovery of increased costs, reducing the risk of losses. MDU also enjoys the benefits of a monthly direct pass through of fuel and purchased power costs as well as a number of riders that are adjusted annually to reflect the most current costs which also reduce the Company's risks. In addition, MDU is part of the MISO Regional Transmission Organization which helps to mitigate price risk of generation resources. Last, investors

will price higher risk into the price of a stock. If a utility has a higher risk, that risk would be reflected in lower stock prices and is already reflected in the information contained in the Value Line data. This will factor risk into the DCF analysis.

Q. Do you feel Mr. Gaske's selection of representative utilities to be suitable for MDU's DCF calculation of cost of equity, is appropriate?

A. No. Mr. Gaske actually provides the reason not to use his very limited selection of representative utilities in his DCF calculation. As Mr. Gaske notes, electric utility is a division of MDU Resources and investors will treat equity as part of the whole company, not just the electric utility. Investors valuations are typically focused on the earnings and dividends of the whole company. Impact of a segment of a company only partially affects the valuation and investors' decisions.

Q. What was the criteria and selection process for your proxy utility group?

A. I selected a national electric utility proxy group using the following criteria:

(1) Companies that are included in the Value Line electric utility industry universe;

(2) Electric utilities that have an S&P corporate credit rating ("CCR") of BBB to A- [This rating range encompasses one credit rating notch above and below MDU Resources' S&P rating of BBB+. MDU is a division of MDU Resources and does not have S&P and Moody's ratings of its own, and MDU Resources does not have Moody's credit ratings.];

(3) Electric utilities having an IBES published analysts' consensus "five-year" earnings per share growth rate;

(4) Electric utilities that are not engaged in major merger or acquisition ("M&A") activity currently or during the six-month dividend yield analysis period;

(5) Electric utilities that paid dividends throughout the six-month dividend yield analysis period, did not cut dividends during that period, and have not subsequently announced a dividend cut; and

(6) Electric utilities whose DCF results pass threshold tests of economic logic and are not outliers.

Using the three-notch S&P credit ratings screen listed in item 2 above results in selection of utilities independently judged to have comparable risks to MDU. Using this criterion based on MDU's Standard & Poor's Corporate Credit Rating of BBB+, 29 of the companies included in the Value Line electric utility universe have been included in the representative proxy group of utilities. (Exhibit PSC-4)

Q. How did you apply the two-step DCF method to your proxy group of electric utilities?

A. First a single six-month average dividend yield was developed for each proxy company for the six-month period ending January 2017. I then calculated a single average growth rate for each proxy group company using a "short-term" analysts' forecasted "five-year" earnings per share growth rate weighted at two-thirds, and a "long-term" forecasted GDP growth rate with a one-third weighting. For the short-term growth rate, I used the average of the analysts' consensus "five-year" earnings per

share growth rate projections for each proxy group company as reported by Yahoo! Finance from the Thomson Reuters/IBES database on January 31, 2017. The long-term growth rate incorporated in my analysis is 4.35%. This growth rate is based on forecasted long-term GDP growth as prescribed by the FERC. The calculation of this recent long-term GDP growth rate was presented by FERC Staff witness Robert J. Keyton, in recent testimony, and the source documents are included in his workpapers available from the FERC's eLibrary on the Internet. The calculations of the dividend yield and composite average growth rates are shown in Exhibit PSC-4.

Q. What was the result of your DCF Analysis?

A. The resulting two-step DCF analysis of proxy utilities yielded a ROE range of 5.49% to 9.94%. The median and recommended ROE for MDU came in at 8.53%. This is after removing the one outlier, Entergy Corporation because the company's growth rate is projected to be negative and the resulting ROE is well below that of all the other proxy utilities.

Q. What is your recommendation for the ROE to be used in calculating MDU's overall rate of return?

A. Based upon the two-stage DCF model and the projected 2017 capital structure for MDU of 51.4% common equity, I recommend the Commission approve a ROE of 8.53% for MDU. As discussed earlier,

MDU's level of risk is minor in comparison to other utilities due to the regulatory environment in which it operates and its service area.

Q. What overall rate of return are you recommending for MDU?

A. Based upon the projected 2017 capital structure derived from MDU's 2016-year end actuals, the overall rate of return calculates to be 6.789% as shown in the following Table 1.

Table 1: MDU North Dakota Utility Operations Overall Rate of Return

Capital Type	2017 Projected	Percent	Cost	Overall Rate of Return
Long Term Debt	$600,440,903	42.673%	5.245%	2.238%
Short Term Debt	68,096,270	4.840%	2.402%	0.116%
Preferred Stock	15,258,600	1.084%	4.579%	0.050%
Common Equity	723,295,087	51.403%	8.530%	4.385%
Total	$1,407,090,860	100.000%		6.789%

Decommissioning Expense

Q. What decommissioning expenses has MDU proposed to recover through electric rates in this proceeding?

A. MDU has proposed to collect through its depreciation operating expense, the ***PROJECTED*** future decommissioning expense for each of its generation assets. It appears from Discovery Response No. 1.30 that MDU proposes to include in rates $1,900,146 of decommissioning expense.

Q. How has MDU proposed to account for the decommissioning funds?

A. MDU has not proposed an appropriate method for accounting and capture of this expense. In response to Discovery Question 5.10, MDU proposes to establish an accrual account for tracking collection of decommissioning funds. The funds will not be held in a separate account, but used at MDU's discretion. MDU does not intend to credit the prefunded decommissioning account for interest on the funds it is using for operations. Nor does there appear to be any adjustment to the funds need for operating expenses to account for use of decommissioning funds being used for operations. Unless MDU intends to create a liability account associated with the decommissioning funds, the decommissioning funds collected will become part of net company earnings. Under this arrangement, if MDU were to enter bankruptcy, the decommissioning funds would disappear. This arrangement provides North Dakota MDU ratepayers little to negative value.

Q. Why is there little to no value to North Dakota ratepayers in the collection of decommissioning funds as proposed by MDU'?

A. Under MDU's proposed arrangements for accrual of decommissioning funds, North Dakota ratepayers would effectively be providing MDU a loan on future expenses without being paid any interest. This funding is in today's dollars for a future expense. Today's dollars have a higher value then future dollars due to inflation. What happens to the decommissioning

funds if decommissioning costs are lower than projected, the plant remains in service longer, or the plant is sold? If only the accumulated dollars are returned to ratepayers without interest or accounting for time value of money, ratepayers will be refunded less than what they paid. This situation has already occurred in Montana where MDU had been collecting decommissioning funds from its Montana ratepayers. MDU had been collecting decommissioning funds for several decades in Montana with no accrued interest. On December 31, 2014, the decommissioning fund was significantly overfunded by $6,712,194. MDU proposed to refund its customers by decreasing the depreciation expense by $671,219 annually *over a ten-year period.* Assuming the $6.71 million over collection occurred in equal annual amounts over the 20-year basis, adjusting each collected years and refunded years' dollar to 2016-dollar value (year in which MDU began decrease in depreciation), Exhibit PSC-6 shows that MDU ratepayers will have received $2,013,738 less then they contributed in real dollars. That represents 23% in lost value to ratepayers and a gain for MDU. Under MDU's proposed method of accounting for decommissioning funds collected in this proceeding, this is likely to occur to North Dakota ratepayers if the Commission adopts MDU's request for collection of decommissioning funds.

Q. What has been the past experience in North Dakota with MDU's estimation of retirement costs?

A. Discovery Response 5.11 shows the decommissioning costs and revenue recovery from North Dakota ratepayers for several retired power plants prior to 2001. This discovery response shows that MDU received $331,456 more in decommissioning funding from North Dakota ratepayers than it incurred in decommissioning costs, an over collection of almost 13%. These examples of the over recovery of decommissioning costs likely contributed to additional MDU profits.

Q. Are there other examples of decommissioning funding?

Yes. When utilities have been allowed to collect decommissioning costs for nuclear power plants, they are often required to set aside the funds in separate account which accumulates interest. This interest is then used to offset some of the decommissioning costs. Decommissioning expense needs to be tracked and periodically reviewed to see if the level of funding is appropriate.

Q. What other reasons do you have for the Commission to reject MDU's proposal to collect future decommissioning funds?

The projections for the cost of decommissioning existing generation plants contain many, many assumptions regarding retirement timing, cost of retirement, disposition of equipment, salvage value, inflation rates, etc. These assumptions can have a wide range of impacts on

decommissioning costs. For example, the assumed life of the new Lewis & Clark RICE Project is 40 years but this type of generation has often been in operation for much longer periods and can easily be refurbished.

Q. What action should the Commission take in this proceeding regarding MDU's request to include decommissioning expense in its revenue requirement?

A. I recommend the Commission reject MDU's request to include decommissioning expense associated with projected future generation asset retirement. The complications of accounting treatment, assumptions used to determine the level of decommissioning expense, tracking of funds, interest on decommissioning funds, future reconciliation process and other issues have not been adequately addressed by MDU in its testimony. MDU's past history of estimation of decommissioning costs and methods of ratepayer funding have resulted in over recover by MDU and ratepayers incurring higher rates then should have occurred.

Other Adjustments to Electric Rate Base

Q. Do you recommend any other adjustments to MDU's electric rate base?

A. Yes. MDU has requested to recover the loss on sale of manufactured housing it purchased to house employees. On pages 35 and 36 of Mr. Jacobson's testimony, the reason for the purchase and loss on the sale of

manufactured housing is discussed. As should have been expected, when a shortage occurs within a housing market, builders move to fill that shortage with new homes, which is what occurred in this instance. MDU should have known that the housing stock would catch up with demand and made other arrangements, such as helping its workers procure rental manufactured units. These are readily available and could have been used to provide employees housing.

In addition, there are several accounting issues with his cost item. If the housing was for temporary employee housing due to temporary relocation to a job site, then usual utility practice is to expense the temporary housing as an O&M expense. If it was not for temporary housing associated with temporary relocation, then the cost of the housing should have been paid for by the employee because it was for purposes of permanent residence. In either of these situations, this is not a legitimate capital investment and should have been treated as an O&M expense. Thus, these costs should have been paid through MDU's operating expense account and do not belong in rate base.

Q. How should the Commission treat employee bonus and incentive compensation?

A. The Commission should apply the same principals to MDU incentive compensation and bonuses as was applied in Case PU-10-124. In that proceeding, incentive compensation and bonuses were reduced by 60%. I

have made the adjustment in Statement K workpapers, resulting in a reduction of $1,313,132 in labor costs. The MDU's figures in cells G37 and G38 of MDU Statement K Workpapers, K-152-153, were reduced by 60%. The resulting labor costs shown in cells G57-64 of Statement K Workpapers, K-152-153, were entered into the Income Statement spreadsheet, Labor Tab, cells F10-17.

Lewis & Clark RICE Project

Q. Have you reviewed MDU Witness Alan L. Welte's testimony regarding Lewis & Clark Reciprocating Internal Combustion Engine (RICE) Project?

A. Yes. The Lewis & Clark RICE Project is comprised of two 9.3 MW (18.6 MW total capacity) Wartsilla 20V34SG units located at the existing Lewis & Clark plant, in Richland County, Montana. The RICE Project was placed in service in 2015 (commercial operation in April 2016) to mitigate reliability concerns in the Bakken Oil Field region areas of northwestern North Dakota and northeastern Montana, a problem identified in MDU's 2013 Integrated Resource Plan (IRP). The 2103 IRP was finalized in September of 2013. The total project cost was $47.19 million or $2,537/kW.

Q. What was the projected size and cost of this project in the 2013 IRP?

A. The 2013 IRP projected the installation of 36.6 MW at a cost of $34.95 million or $955/kW. The 2015 IRP included a revised reciprocating internal combustion engine ("RICE") project of 27.9 MW at a total cost of $47.62 million or $1,707/kW.

Q. What was the justification for the significantly higher project costs?

A. Mr. Welte states that MDU was required to "fast track" the project because the Basin Electric transmission system in the Bakken Region was unable to support the rapidly increasing load. This created the risk of power interruptions to MDU customers in the winter of 2015-2016. The fast track project development was the result of MDU not beginning project development until May 29, 2014, over eight (8) months after publishing the 2013 IRP. It is likely MDU was aware of this problem much sooner than the publishing of the 2013 IRP, since they would have had to study various options for addressing the potential power supply shortage in the 2013 IRP final edition.

Q. Have you compared the costs of MDU's RICE Project to similar power generation projects?

A. Yes. GDS has worked on many different power generation projects over the last several years and tracked the generation costs for various types of generation. In addition, multiple utilities have published IRP's which provide cost estimates for various types of power generation systems. The

comparison of the costs of similar size generation projects is shown in Exhibit PSC-7. As can be seen in the table, the RICE Project was the most expensive, on $/kW basis, of all the projects in the list. As a comparison, MDU's Heskett III, 88 MW combustion turbine project's cost was only about $6 million higher than the RICE Project, while its generating capacity is over 4.7 times larger than the RICE Project.

Q. What is the typical cost range for a power generation project of similar size to the Rice Project on a $/kW basis?

A. The typical cost for a reciprocating internal combustion engine ("Recip") project in the size range of Lewis & Clark would be about $1,200/kW with an upper range of $1,500/kW for a greenfield site. For an existing site with existing infrastructure, the cost should be closer to $1,200/kW.

Q. What about MDU's claim they had to construct the project on an expedited schedule?

A. First, a typical construction schedule for a Recip project from initiation of engineering to commercial operation date is 24 to 30 months. The 19-month schedule for Lewis & Clark RICE was not significantly shorter. In fact, if you include the time to the commercial operation date of April 30, 2016, the schedule was a 23-month schedule. If MDU had begun the preliminary engineering and procurement of major components upon identification of need in the 2013 IRP (September 2013), then MDU would

have had 27 months or more to complete the project prior to the winter of 2015-2016.

Second, MDU also had the option of renting generation to get through the winter of 2015-2016. Several companies rent small packaged combustion turbine or Recip generator systems. In preparation for this testimony I obtained a quote to rent three Taurus 60 gas turbines for a total output of 16.5 MW at a monthly rental rate of approximately $404,331/month on a six-month contract. The total cost would have been $2.426 million for rental of the units over the Winter of 2015-2016. Assuming a non-expedited cost of $1,500/kW the RICE Project would have cost MDU $27.9 million, a savings of $19.3 million, more than enough to pay for rental of the combustion turbines. Even if you use MDU's 2015 projected RICE Project cost of $1,707/kW the RICE Project would have cost $31.75 million, MDU would have saved over $13.7 million, *including paying the cost of the rental units.*

Q. What is your recommendation regarding incorporation of the Lewis & Clark RICE Project into North Dakota rate base?

A. I recommend that the Commission disallow a total of $17 million of the Lewis & Clark RICE Project. This disallowance is based upon an appropriate installed cost of $1,490 for an appropriate Recip project on an existing power plant site and includes the rental cost for temporary generation. The calculation off the recommended disallowance, as shown in **Table 2**, will reduce MDU's plant in service by $12,273,406. I believe this is a reasonable disallowance in that it does not take into consideration the cost savings of building the project on an existing power plant site. This disallowance has been reflected in revised Exhibit PSC-3.

Table 2 - RICE Project Disallowance

Lewis & Clark RICE Project		**$47,194,515**
Typical Small Generation Cost/kW	$1,490	
Smart Power Proejct Size - kW	18,600	
Typical Project Costs	**$27,714,000**	**$27,714,000**
Cost of Rental Unit		**$2,425,986**
Excess Smart Power Project Cost		**$17,054,529**
Round Down Disallowance		**$17,000,000**
North Dakota Allocation Factor		72.196505%
North Dakota Disallowance		**$12,273,406**

Revenue Requirement Calculation

Q. Have you performed a revenue requirement calculation based upon your adjustments?

A. Yes. Exhibit PSC-3 shows the calculation of MDU's revenue deficiency's/(sufficiency's) for Base Rates, the Renewable Rider and Transmission Cost Adjustment.

Q. What test period did you use to determine the revenue requirement?

A. My adjustments and calculations of the plant in service and revenue requirements were based upon year end 2016 and project 2017 supplied in Discovery Response 1.1. This represents the most recent year end costs and 2017 projections for MDU.

Q. What changes did you make in MDU's Plant in Service?

A. The following adjustments were made to MDU's plant in service:

1. Lewis & Clark RICE Project costs were reduced by $12,273,406 to reflect the recommended disallowance.
2. Removal of the provision for funding of future decommissioning costs.
3. Removed the losses on sale of manufactured homes.

Q. How did these items affect revenue requirements?

A. Reduction in rate base results in lowering gross income which affects income taxes. These impacts are shown on the revised Statement I. Disallowances for the RICE Project, elimination of the decommissioning

funding and loss on manufactured housing affected depreciation and amortization amounts. All of these impacts are summarized in Exhibit PSC-3, which shows the recommended incremental revenue for MDU Base Rates is reduced to $515,316.

Q. Does this conclude your testimony?

A. Yes, it does.

STATE OF NORTH DAKOTA

BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION

In the Matter of the Application of
MONTANA-DAKOTA UTILITIES CO.,
A Division of MDU Resources Group, Inc.
for authority to Increase Rates for Electric Service in North Dakota

Case No. PU-16-666

AFFIDAVIT OF
Richard A. Polich

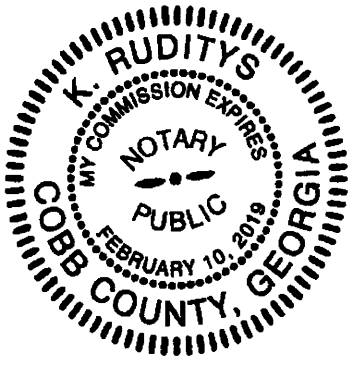
I, the undersigned, being duly sworn, depose and say that the foregoing is the Direct Testimony of the undersigned, and that such Direct Testimony and the exhibits or schedules sponsored by me to the best of my knowledge, information and belief, are true, correct, accurate and complete, and I hereby adopt said testimony as if given by me in formal hearing, under oath.

Richard A. Polich

Subscribed and sworn to before me
this **24th day of February, 2017.**

Notary Public

SEAL



GDS Associates, Inc
ENGINEERS & CONSULTANTS

Richard A. Polich, P.E.
Managing Director – Generation Services

EDUCATION

Master of Business Administration, University of Michigan, 1990
Bachelor of Science, Mechanical Engineering, University of Michigan, 1979
Bachelor of Science, Nuclear Engineering, University of Michigan, 1979

ENGINEERING REGISTRATION

Professional Engineer in the State of Michigan

PROFESSIONAL MEMBERSHIP

National Society of Professional Engineers
American Nuclear Society
American Society of Mechanical Engineers
Association of Energy Engineers Senior Member

PROFESSIONAL EXPERIENCE

Mr. Polich has more than 30 years' experience as an energy industry engineer, manager, and leader, combining his business and technical expertise in the management of governmental, industrial and utility projects. He has worked extensively in nuclear, coal, IGCC, natural gas, green/renewable generation. Mr. Polich has developed generation projects in wind, solar, and biomass in Australia, Canada, Caribbean, South American and United States. His generation experience includes engineering of systems and providing engineering support of plant operations. He also has extensive experience in utility rates and regulation, having managed Consumers Energy's rates group for a number of years. In that function his responsibilities included load and revenue forecasting, overseeing the design of gas and electric rates and testifying in regulatory proceedings. Mr. Polich has testified in over thirty regulatory and legislative proceedings.

Mr. Polich has testified in over 30 regulatory proceedings on a variety of issues. Recently, Mr. Polich provided direct and rebuttal testimony before the Hawaii Public Utilities Commission in Docket No. 2015-0022, regarding the Hawaiian Electric Company, Inc. and NextEra Merger. Over 15 years' experience working with Michigan Public Service Commission on renewable energy policies, independent power supplier regulations, and electric rate cases. He has also worked with the Michigan Legislature: defined laws for open markets, renewable portfolio standards. Mr. Polich has worked on various projects and policies in Arizona, Arkansas, California, Georgia, Indiana, Minnesota Nebraska, New Mexico, Ohio, Texas, and Wisconsin Commissions over the last ten years.

SPECIFIC PROJECT EXPERIENCE

RATES & REGULATORY

GDS associates, Inc. – Managing Director

SunEdison – Docket No. 2015-0022, regarding the Hawaiian Electric Company, Inc. and NextEra Merger

Presented evidence regarding NextEra's regulatory practices in Florida through its affiliate, Florida Power and Light (FPL), that indicated it would not be in the best interest for Hawai'i to approve the merger.

GDS Associates, Inc
ENGINEERS & CONSULTANTS

Richard A. Polich, P.E.
Managing Director – Generation Services

North Dakota Public Service Commission Staff – Case No. PU-15-96 NSP Determination of Prudence

Provided testimony on behalf of the North Dakota Public Service Commission Staff regarding analysis and recommendation concerning Northern States Power's ("NSP") need for additional generation resources.

Consumers Energy - Supervisor of Pricing and Forecasting

Managed the group responsible for setting and obtaining regulatory approval for the company's electric and gas rates. Developed new approaches to electric and natural gas competitive pricing, redesigned electric rates to simplify rates and eliminate losses and defined new strategies for customer energy pricing. Negotiated new electric supply contracts with key industrial electric customers resulting in over $800M in annual revenue.

EOS Energy Options & Solutions – Consulting Company

Provided testimony for multiple clients in both Detroit Edison and Consumers Energy in over 30 regulatory proceedings. Testimony topics included rates, public policy and deregulation. Also testified in several legislative proceedings in both Michigan and Ohio, addressing energy policy. Provided expert witness testimony in Massachusetts regarding wind energy projects.

NATURAL GAS COMBINED CYCLE EXPERIENCE

Consumers Energy – 1,560 MW Midland Cogeneration Venture
Member of a small team selected to investigate the feasibility of converting the mothballed Midland Nuclear Plant into a fossil fueled power plant. Established new plant configuration that repowered the existing nuclear steam turbine with natural gas fired combustion turbines and heat recovery steam generators. Developed the new thermal cycle and heat rate, determined how to supply steam to Dow chemical for cogeneration, developed models for projecting plant performance, defined which portions of the nuclear plant were useful in the new combined cycle plant and forecasted project economics.

Nordic Energy – (2) 1,150 MW IGCC Projects

Project Manager for the development of two IGCC projects proposed to Georgia Power and Xcel Energy in response to RFPs. Responsibilities included establishing thermal cycles, equipment selection, site selection, supervising engineering, developing project proforma and proposals.

Nordic Energy – 230 MW Power Barge

This unit was to be located on the Columbia River near Portland Oregon. Lead the project development team responsible for securing equipment, designing the power plant, design of barges, assessing site feasibility, developing project economics and interconnection applications.

Teekay Corporation – Gas to Wires Project

Feasibility study for the development of ship mounted gas turbine power units (including combined cycle) to be fueled with LNG. Performed research into power station configuration, on-ship LNG storage, LNG fuel transfer stations and project economics.

GDS Associates, Inc
ENGINEERS & CONSULTANTS

Richard A. Polich, P.E.
Managing Director – Generation Services

RENEWABLE ENERGY EXPERIENCE

Matinee Energy – Utility Scale Solar Developer

Engineering design and project development consultant for utility scale solar photovoltaic projects. Development activities include site selection, equipment specifications, financial analysis and preparation of proposals. Also responsible for engineering and securing electrical interconnection.

Windlab Developments USA – Wind Power Developer

Responsible for greenfield development of the US platform for wind energy projects east of the Mississippi. Developed the company's engineering protocol for wind project design and construction, responsible for managing engineering design and construction of projects, and established six wind power projects (750 MW). Responsible for negation of Power Purchase Agreements, electrical interconnection studies, interface with Midwest ISO and submitting Generation Interconnection Application.

TradeWind Energy - Wind Power Project Developer

Project developer for 800 MW of wind power projects in Michigan and Indiana. Introduced new project management methods to the development process which resulted in savings of over $200,000 annually on each project.

Third Planet Windpower – Wind Power Project Developer

Engineering and project management consultant to support the startup of new wind power company. Established engineering standards used for selection of wind project equipment and project construction, analysis tools for evaluating projecting wind project power production, and performed project economic modeling.

Noble Environmental Power – Wind Power Project Developer

Electric transmission system consultant on the development of several wind power projects. Supported Noble's decisions on transmission gird interconnect and negotiate interconnection agreements.

ENERGY EFFICIENCY EXPERIENCE

Arkansas Energy Office – Weatherization Assistance Program Evaluation

Evaluated the performance and operations of Arkansas's Weatherization Assistance Program. This included review of program effectiveness, program operations, energy efficiencies attained, adequacy of energy efficiency measures and subcontractor performance.

CLEAResult – Arkansas Energy Efficiency Programs

Energy efficiency operations and program support for 400% increase in Arkansas energy efficiency programs. Developed processes for data collection, field staff deployment and job assignments.

ECONOMIC IMPACT ASSESSMENT

Michigan Department of Environmental Quality - Economic Impacts of a Renewable Portfolio Standard and Energy Efficiency Program for Michigan

Project Manager for this report which focused on the economic impact of renewable portfolio standard and energy efficiency programs on the State of Michigan. The evaluation sued in this report encompassed using integrated resource planning models, econometric modeling and electric pricing models for the entire State of Michigan.

West Michigan Business Alliance - Alternative and Renewable Energy Cluster Analysis

Prepared the report provided a road map for Western Michigan businesses to establish new business in the renewable energy industry.

POWER PURCHASING AND TRADING

Nordic Energy LLC - Vice President

Established an innovative energy trading floor, created customer metering and billing systems that enabled Nordic to be the first non-utility company to supply electricity to retail customers in Michigan.

POWER PROJECT EXPERIENCE:

Detroit Edison St Clair Power Station – Performed coal combustion analysis associated with conversion Powder River Basin coal. Work included pulverizer mill performance testing, boiler combustion analysis on new coal, and unit performance analysis.

Consumers Energy Campbell 3 - Supported start-up efforts of this 800 MW pulverized coal power plant. Part of team that performed analysis of boiler data and determined the cause of superheater failure. Also part of team to analyze performance test data for warranty evaluation.

Consumers Energy Weadock Plant – Design oversight and specified various plant upgrades during major maintenance outage. Included replacement of high pressure superheater, design of new steam supply pipes, valve specifications and supported plant restart.

Consumers Energy Midland Nuclear Plant – Responsible for overseeing EPC contractor design and construction of primary and secondary nuclear systems. Included review of systems for compliance with Nuclear Regulatory Commission regulations. Key projects included:

- Leading team to analyze plant and determine best methods for compliance with new CFR Appendix R Fire Protection rules
- Design of primary cooling system pump oil collection and disposal systems.
- Oversight of redesign of component cooling water systems.
- Analysis of diesel generator capability to meet emergency shutdown power requirements.
- Primary interface with Dow Chemical for steam supply contract.

GDS Associates, Inc
ENGINEERS & CONSULTANTS

Richard A. Polich, P.E.
Managing Director – Generation Services

Consumers Energy Midland Cogeneration Venture – Part of team to assess and develop design for converting nuclear plant to gas combined cycle project. This included researching and developing scenarios for project funding and regulatory approach Primary responsibilities included:

- Developing new thermal cycle that best utilized existing steam turbine and supply steam to Dow Chemical.
- Determining which existing assets could be utilized in new plant and determining the original construction value of these assets.

REGULATORY AND LEGISLATIVE EXPERIENCE

Consumers Energy Manager of Rates – Responsible for managing rate design team, forecasting annual sales and revenue forecast and developing regulatory strategies. Testified in several state and federal regulatory proceedings.

PAPERS & PUBLICATIONS

Engineering and Economic Evaluation of Offshore Wind Plant Performance and Cost Data, 2011, Produced for the Electric Power Research Institute, KEMA, Inc.

FERC's 15% Fast Track Screening Criterion, 2012, Paper reviewing the FERC 15% screening criteria for electrical interconnection, KEMA, Inc.

Island of Saint Maarten Sustainable Energy Study, 2012, Produced for the Cabinet of Ministry VROMI, KEMA Inc.

A Study of Economic Impacts from the Implementation of a Renewable Portfolio Standard and an Energy Efficiency Program in Michigan, 2007, Produced for the Michigan Department of Environmental Quality

Alternative and Renewable Energy Cluster Analysis, 2007, Produced for the West Michigan Strategic Alliance and The Right Place

COURSES & SEMINARS

Association of Energy Engineers – Certified Energy Manager
Green Building Council – Associated LEED Certification Training
CLEAResult Leadership Academy

COMMUNITY SERVICE AND ACTIVITIES

Bicycling, hiking and cross-country skiing
Instrument-Rated Private Pilot
Habitat for Humanity
Scoutmaster
Soccer coach and referee
Volunteer work for disaster relief and building homes in Mexico