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May 5, 2023

VIA EMAIL AND HAND-DELIVERY

Public Service Commission
Attention: Steve Kahl
600 East Boulevard Avenue, Dept. 480
Bismarck, ND 58505-0480

In re: Northern States Power Company
460MW Solar – Sherburne Cnty, MN
PU-21-152

Dear Mr. Kahl:

Enclosed for filing in the above-referenced matter please find the original and seven copies of the following **Public Documents**:

Sheldon A. Smith*

Scott K. Porsborg***

Suzanne M. Schweigert*

Mitchell D. Armstrong**

Stacy M. Moldenhauer**

David J. Smith**

Brian D. Schmidt*

Tyler J. Malm*

Austin T. Lafferty*

Jon C. Lengowski*

Morgan E. Wentz*

1. Rebuttal Testimony of James Heidell (Public Version);
2. Verification; and
3. Affidavit of Service.

Pursuant to the October 21, 2021, *Order Granting Trade Secret Protection*, we are also enclosing one copy of the following documents in a sealed envelope labeled “**PROTECTED INFORMATION/TRADE SECRET – PRIVATE**” the following documents:

1. Rebuttal Testimony of James Heidell (Non-Public Version);

* Licensed in North Dakota

** Licensed in Minnesota

*** Licensed in South Dakota

* Board Certified Civil Trial
Specialist by National Board
of Trial Advocacy

30 PU-21-152 Filed 05/05/2023 Pages: 27
Prefiled Rebuttal Testimony of James A. Heidell - redacted
Public Service Commission
Mitch Armstrong, SAAG

May 5, 2023

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Thank you for your attention to this matter.

Respectfully,



MITCHELL D. ARMSTRONG
Special Assistant Attorney General for PSC
Advocacy Staff

amh

enclosures

cc: ALJ Timothy Dawson (via U.S. Mail, w/ public enc. only)
Zeviel Simpser (via U.S. Mail, w/ public enc. only)
John Schuh (Via U.S. Mail, w/ public enc. only)

PSC.4

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REBUTTAL TESTIMONY

JAMES A HEIDELL

**STATE OF NORTH DAKOTA
BEFORE THE
NORTH DAKOTA PUBLIC SERVICE COMMISSION**

NORTHERN STATES POWER COMPANY

CASE NO. PU-21-152

ADVANCE DETERMINATION OF PRUDENCE – 460 MW SHERCO SOLAR FACILITY

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1 **I. Introduction**

2 **Q. Would you please state your name, affiliation, and address?**

3 **A.** My name is James A. Heidell and I work as an Associate Partner for PA Consulting
4 Group, Inc. (PA). My business address is 1700 Lincoln Street, Suite 3550, Denver, CO
5 80203.

6
7 **Q. On whose behalf are you filing this testimony?**

8 **A.** I am filing this testimony on behalf of the Advocacy Staff of the North Dakota Public
9 Service Commission (Commission or NDPSC).

10
11 **Q. Did you previously submit testimony in this proceeding?**

12 **A.** Yes, I submitted pre-filed testimony in December 2021.

13
14 **Q. What is the purpose of your testimony?**

15 **A.** The purpose of my testimony is to provide the Commission with my updated assessment
16 of the Northern States Power Company's (NSP or Company) Application for an
17 Advanced Determination of Prudence (the Application) for the 460 MW grid-scale solar
18 photovoltaic (PV) facility at the Company's Sherburne County (Sherco) Generation
19 Station site (Sherco Solar, or the Project). My updated testimony reflects assessment of
20 the rebuttal testimony filed by NSP on October 27, 2022 and further information
21 provided by NSP in discovery.

22
23 **Q. Did NSP make substantial changes to its ADP application?**

24 **A.** Yes. In the initial filing NSP noted that Sherco Solar was not the least cost capacity
25 resource when excluding GHG emission costs. Mr. Chamberlain noted that at the time
26 adding 374 MW of firm dispatchable capacity was the least cost capacity resource under
27 the North Dakota Plan in the IRP Supplement.¹ As a result of a combination of updated

¹ Direct Testimony of Mr. Chamberlain, p. 7, lines 18 – 20.

1 Project cost estimates and updated EnCompass modeling, NSP has now identified Sherco
2 Solar as the least cost capacity addition without assigning any cost to GHG emissions.
3 Based upon this analysis, the Company is requesting that this Commission make an
4 Advanced Determination of Prudence (ADP) for the project on the basis that it is the least
5 cost resource to fulfill a capacity need in 2026. I have reviewed NSP's rebuttal testimony
6 and supporting analysis and have supplemented my recommendation provided in pre-
7 filed direct testimony.
8

9 **II. Organization of the Testimony**

10 **Q. Would you please summarize the organization of your testimony?**

11 A. Yes. I start with presenting my updated recommendations and findings followed by a
12 discussion of the basis for my updated recommendations and additional factors
13 considered. I reiterate and supplement my recommendations regarding proxy pricing
14 should the Commission not approve the ADP. Finally, I review the conditions for the
15 Commission to consider imposing should the Commission approve the ADP. My
16 testimony is separated into nine sections:

- 17 • A summary of my recommendations (Section III);
- 18 • A summary of my findings (Section IV);
- 19 • Additional Considerations Based Upon NSP's Rebuttal Testimony (Section V);
- 20 • Risks of Sherco Solar as a Proxy Resource (Section VI);
- 21 • Capacity and Energy Need in Alternate Plan (Section VII);
- 22 • Continued Concerns with NSP's Proxy Pricing Proposal (Section VIII), and
- 23 • My conclusions and recommendations (Section IX).

24 **III. Summary of Recommendations**

25 **Q. Do you recommend the Commission approve the Company's updated request for an**
26 **ADP for Sherco Solar?**
27

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1 A. No, I recommend disapproval of the ADP as the Company has not reasonably
2 demonstrated that Sherco Solar is the least cost capacity resource. The analysis presented
3 by the Company is based upon an outdated assumption regarding the annual MISO
4 capacity accreditation regime. MISO has adopted a seasonal capacity accreditation and
5 the process for determining the accredited capacity for solar (and other intermittent
6 resources) is under review. The Company notes that it would be speculative to forecast
7 what the seasonal accredited capacity would be. Lacking a basis for knowing what
8 summer, spring, fall, and winter accredited capacity Sherco Solar will provide, I conclude
9 there is an inadequate basis to make an ADP.
10

11 **Q. Do you recommend the Commission approve the Company's request for proxy
12 pricing if the ADP is not approved?**

13 A. No. I have reviewed the Company's rebuttal testimony with regards to its position that
14 MISO's CONE calculation of a combustion turbine (CT) is an appropriate proxy cost and
15 my objections to that approach as outlined in my pre-filed testimony are still appropriate.
16 In addition, I note that a CT will likely have spring, fall, and winter capacity value in
17 excess of a solar facility and that needs to be accounted for, a factor that NSP has not
18 addressed in its proposal. It is unlikely that Sherco Solar will have a significant winter
19 capacity value (potentially on the order of 6.3% or lower).
20

21 **Q. If the Commission were to approve the Company's request for an ADP, are you
22 recommending any conditions?**

23 A. Yes.

- 24 • If NSP procures additional seasonal capacity to make up for the shortfall between
25 the assumed capacity in its ADP filing and actual capacity, then North Dakota
26 customers should not have to pay the allocated share of that increased seasonal
27 capacity.

- Cost recovery under the ADP is limited to the revenue requirements (combined impact of capital costs and tax benefits) identified by NSP in its response to NDPSC-8-008 Attachment A.
- NSP should file quarterly status reports on the project until it reaches COD.

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5
6 **Q. If the Commission were to approve the Company's request for approving proxy**
7 **pricing, are you recommending modifications?**

8 **A.** Yes, as conditions to any Commission approval of proxy pricing, I recommend that the
9 Commission make the following adjustments.

- Set the proxy capital cost of capacity equal to the cost of a brownfield CT assumption as defined in the most recent Upper Midwest Resource Plan Alternate Proposal (IRP).
- Adjust the proxy capacity cost in each period to reflect an offset for the energy market margins the brownfield CT would earn in the MISO energy markets
- Adjust the capacity value to reflect the differential between the spring, fall, and winter capacity value of Sherco Solar versus the CT as the CT will have a similar accredited capacity in all seasons but it is unlikely that the spring, fall, and winter capacity of Sherco Solar will be as high as the summer capacity.
- Clarify that ND customers will only pay for the actual seasonal accredited capacity that is relevant to the Project as determined by the MISO and is subject to changes as determined by MISO.
- Adjust ND customers' cost share of the capacity based upon the prevailing demand cost allocation factors between the NSP utilities.
- Explicitly exclude ND customers from any future renewable integration costs assigned to the Project by MISO.
- Establish that the approval is non-precedential.

1 **IV. Summary of Findings**

2 **Q. Have you modified your findings based upon you review of the Company's rebuttal**
3 **testimony and data response?**

4 A. I have added additional findings related to NSP's request in its Rebuttal Testimony to
5 find Sherco Solar as the least cost capacity addition.
6

7 **Q. Would you please provide a summary of the findings that you recommend the**
8 **Commission consider as it evaluates whether Sherco Solar is the least cost capacity**
9 **option?**

10 A. Yes, a summary of my key findings follows with more detailed explanations provided in
11 the remainder of my testimony.

- 12 • The determination that Sherco Solar is the least cost capacity resource is
13 contingent on the assumptions regarding its accredited capacity as well as the
14 energy revenues realized from the MISO market.
- 15 • The seasonal capacity accreditation of Sherco Solar is unknown at this time.
- 16 • While not unique to this proceeding, the energy revenues are unknown as well as
17 the potential impacts on energy revenues of large amounts of solar added to the
18 MISO system.
- 19 • A solar resource does not have all the reliability attributes of a combustion turbine
20 and hence not necessarily the same reliability and economic value to North
21 Dakota ratepayers.
- 22 • NSP does not have an immediate need for the energy so the Project has limited
23 value to hedge power costs for North Dakota customers.
- 24 • The Company has not demonstrated that Sherco Solar is the lowest risk approach
25 to addressing the capacity need in 2026.
- 26 • The Company's analysis of Sherco Solar as the least cost capacity addition is
27 constrained by excluding the option of the Sherco CC, allowing only a solar

1 project to reuse Sherco Unit 2 interconnection rights, and not evaluating the
2 option of meeting the 2026 capacity need with the PRA or a bilateral contract.
3

4 **V. Additional Considerations Based Upon NSP's Rebuttal**
5 **Testimony**

6 **Q. What is your perspective on the most significant new information introduced by**
7 **NSP in their rebuttal testimony?**

8 A. Eighteen months have elapsed between the direct testimony filed April 26, 2021, and the
9 rebuttal testimony on October 27, 2022, and the Company has revised its estimate of the
10 cost of Sherco Solar and has updated its modeling assumptions in the Supplement to the
11 Company's 2020-2034 Upper Midwest Integrated Resource Plan used in its direct case.
12 The Company's rebuttal testimony and evaluation of Sherco Solar as the least cost
13 capacity resource is based upon the "Alternate Plan" filed with the Commission on June
14 28, 2021.

15
16 **Q. How did the estimated cost of the Sherco Solar project change?**

17 A. As Mr. Krug notes, issues surrounding potential tariffs on the import of solar panels have
18 been resolved and the passage of the Inflation Reduction Act (IRA) is a significant factor
19 in the reduction in the estimated project cost.² The Company's rebuttal testimony notes
20 that the total cost of the project has increased from the April 2021 filing but the effective
21 cost to ratepayers has decreased as a result of greater tax incentives afforded by the IRA.
22 In April 2021 the estimated cost of the project excluding AFUDC was [Trade Secret
23 Begins] [REDACTED] [Trade Secret Ends]. The revised cost estimate
24 excluding AFUDC is now [Trade Secret Begins] [REDACTED] [Trade
25 Secret Ends].
26
27

² MISO Tariff, Attachment X, Section 3.7.1.

1 **Q. What is the Company's estimated net costs of the Project after accounting for the**
2 **IRA?**

3 A. The revised levelized cost of energy (LCOE) for the Sherco Solar project after
4 incorporating the PTC is [Trade Secret Begins] [REDACTED] [Trade Secret Ends]
5 compared to the prior estimate of an LCOE of [Trade Secret Begins] [REDACTED]
6 [Trade Secret Ends]. In short, the upward estimate of project costs is more than offset
7 by the expected benefits of the PTC under the IRA.
8

9 **Q. Did revised modeling assumptions in the Alternate Plan impact the assessment of**
10 **whether Sherco Solar is the last cost capacity resource?**

11 A. Yes, in addition to the revised cost estimate for Sherco Solar, the Alternate Plan allows
12 solar projects to use the Sherco Unit 2 transmission in 2026, and removes the option for
13 the Sherco CC. The Alternate Plan continues to use the Ventura Hub for natural gas
14 prices and Minnesota Hub On-Peak power prices from the first half of 2021. NSP also
15 developed the "Alternate ND Scenario" that removes the cost of carbon from the
16 evaluation of the least cost capacity resource in the revised analysis.
17

18 **Q. Does the re-use of capacity rights associated with the retirement of Sherco Unit 2 in**
19 **2023 impact the selection of Sherco Solar as the least cost capacity resource?**

20 A. Yes, the retirement of Unit 2 frees up over 700 MW of interconnection capacity hence
21 there are no significant transmission upgrade costs associated with the Project.³
22

23 **VI. Risks of Sherco Solar as a Proxy Resource**

24

25 **Q. What do you view as the risks associated with identifying Sherco Solar as the least**
26 **cost capacity resource?**

27 A. The determination of Sherco Solar as the least cost capacity resource is dependent on
28 modeling assumptions including:

³ Rebuttal Testimony of Mr. Krug, p. 9, lines 6-9.

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- 1 • The capacity credit (ELCC or credit under the proposed Loss-of-Load basis)
- 2 determined by the MISO,
- 3 • The value of the energy produced by Sherco Solar, and
- 4 • The assumptions regarding transmission costs for competing projects.
- 5

6 **Q. What did NSP assume as the Capacity Credit for the Project?**

7 A. The Company assumed an ELCC of 50% in 2023 declining by 2% per year until 2033
8 where it remains at 30%.⁴ The 460 MW nameplate of solar from the Project translates
9 into providing 248 MW of firm capacity in 2026 declining to 138 MW in 2033 based
10 upon the Company's assumed ELCC.

11

12 **Q. Did NSP model a seasonal capacity accreditation for the Project under the current**
13 **MISO seasonal capacity construct?**

14 A. No.

15

16 **Q. Has MISO developed a procedure to determine the future seasonal accredited**
17 **capacity of a solar project?**

18 A. No, MISO is working with stakeholders to determine how to calculate the seasonal
19 capacity credit for intermittent renewable resources and once a methodology is
20 developed, it will still need to be approved by the FERC. The current schedule is to file
21 the methodology at the FERC at the end of 2024 for implementation for the 2024-2025
22 planning year or phased in over a three-year period.⁵

23

24 **Q. Has the Company developed an estimate for the seasonal capacity of the Sherco**
25 **Solar project subsequent to the Alternate Plan?**

⁴ Schedule 1 IRP Alternate Plan, p 14, June 15, 2021.

⁵ Market Redefinition: Accreditation Reform Resource Adequacy Subcommittee, January 18, 2023, p 6.
Forward Capacity Accreditation for Renewable Resources (fka IR095) (misoenergy.org)

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1 A. No. Ms. Mandich notes that “she thinks it will have a higher seasonal accredited capacity
2 value in the summer and a lower value in the winter than what was modelled”.⁶
3 However, in a follow-up data request asking for the Company’s expectation of the
4 accredited capacity values the Company objected “on the basis that it calls for
5 speculation” and noted that its expected values are to be published in January [2024].⁷
6

7 **Q. Is it likely that the ELCC methodology will result in lower accredited capacity
8 credit than what was assumed in the Company’s Alternate Plan Analysis?**

9 A. Yes. MISO is proposing a methodology that would look at the collective performance of
10 the solar class during Loss-of-Load (LOL) hours. MISO has identified over 23 GW of
11 executed solar Generator Interconnection Agreements associated with projects not in
12 service. Preliminary analysis suggests that the summer LOL hours will shift over time
13 from mid-afternoon to the evening when solar will have relatively low availability.
14 Based on the proposed methodology, a sample calculation for the solar summer capacity
15 value decreases from 40% in the 2023-2024 planning year to 1% in 2031. Winter ELCC
16 of solar in the example is below 2%.⁸

17 I note that the issue is being actively studied by MISO and there are different estimates of
18 the long-term summer accredited capacity for solar. For example, the MISO 2022 RRA
19 study shows an estimated average summer ELCC of solar of 23% in 2031 and 18% in
20 2041.⁹ However, I am not aware of any recent studies to support Ms. Mandich’s belief
21 that Sherco Solar will have a higher accredited capacity than what was assumed in the
22 Company’s analysis. MISO has determined that the solar ELCCs for the 2023/2024
23 Planning year will be 45.4% for the summer and 6.3% for the winter.¹⁰
24

⁶ Rebuttal Testimony of Ms. Mandich, p 9.

⁷ Company Response to NDPC DR 8-9.

⁸ Market Redefinition: Accreditation Reform RASC, March 1, 2023. [Forward Capacity Accreditation for Renewable Resources \(fka IR095\) \(misoenergy.org\)](https://www.misoenergy.org/forward-capacity-accreditation-for-renewable-resources-fka-ir095)

⁹ 2022 Regional Reliability Assessment Report, MISO, Figure 32, P 45.

¹⁰ PowerPoint Presentation ([misoenergy.org](https://www.misoenergy.org))

1 **Q. Does the Company's determination that Sherco Solar is the least cost capacity**
2 **addition address the potential need for capacity to meet MISO capacity**
3 **requirements in other seasons?**

4 A. No. As a follow on to Ms. Mandich's statement that the utility's peak demand is driven
5 by the summer peak, I requested the Company provide its forecast of winter capacity
6 requirements under the seasonal capacity construct. The Company did not provide that
7 forecast on the basis that it calls for speculation.¹¹

8
9 **Q. Do MISO planning studies identify a long-term need for additional winter capacity**
10 **in LRZ-1?**

11 A. Yes, the 2022 Regional Resource Assessment identifies the need for additional winter
12 capacity in part driven by retirements of coal and natural gas capacity.

13
14 **Q. Does the determination of seasonal accredited capacity of a combustion turbine**
15 **have the same risk as a solar project.**

16 A. No.

17
18 **Q. Could the Company alternatively meet its capacity obligations with a bilateral**
19 **contract or purchasing credits in the PRA?**

20 A. Yes. However, Ms. Mandich states that the Company did not pursue the option of the
21 PRA due to the "level of risk".¹² I am not aware of any specific risk assessment the
22 Company performed related to a short-term reliance on the PRA until MISO developed
23 an approved seasonal accreditation of solar capacity slated for the end of this year.

24
25 **Q. How do assumptions about MISO market prices impact selection of Sherco Solar as**
26 **the least cost capacity resource?**

27 A. The Company projects that Sherco Solar will have a capacity factor of approximately
28 22%. The determination that a combined energy and capacity resource is the least cost

¹¹ NSP Response to NDPSC 8-10.

¹² Rebuttal Testimony of Ms. Mandich, line 4, page 4.

1 option is also dependent on the expectation of value of the energy. In the case of Sherco
2 Solar the value of the energy is the difference between the cost of the project and the
3 energy revenues from MISO (the margin). The margin from energy sales to MISO
4 offsets the cost of the project. Those margins effectively lower the resulting cost of the
5 capacity in comparison to a combustion turbine. As more solar is added to the MISO
6 system, the margin from the energy sales from Sherco Solar is likely to diminish.

7
8 **Q. Is the value of the Project's energy margins known?**

9 A. No. The market value of the energy will be based upon the marginal dispatch cost in the
10 MISO market. While the Company used an early 2021 forecast for on-peak MISO
11 energy prices, it is not known if the forecast for on-peak Minnesota Hub energy prices
12 reflects MISO's anticipated amount of solar resources that will be added as resource
13 additions and the impacts on prices during peak hours of solar production.

14
15 **Q. How do assumptions about MISO transmission upgrade costs impact the selection
16 of Sherco Solar as the least cost capacity resource?**

17 A. The analysis did not assign MISO transmission upgrade costs to a solar project sited at
18 Sherco in 2026 since the project can re-use the transmission capacity associated with the
19 retirement of Sherco Unit 2. The Company did not allow a CT to use the Sherco 2
20 transmission capacity in 2026 but allowed a CT to use the Sherco 1 transmission capacity
21 in the 2027 – 2029 time frame.¹³ It is notable that the CT is the least cost resource in the
22 ND Alternate Plan in 2025, 2026, and 2027.

23
24 **Q. Does Sherco Solar have the same reliability value as a combustion turbine?**

25 A. No. A MW of seasonal capacity value based upon the MISO accreditation method is
26 equivalent to a MW of seasonal capacity from a combustion turbine. However, as the
27 Company points out in its IRP, both the Sherco CC (removed from the Alternate Plan)

¹³ Schedule 1_IRP Alternate Plan, Table 13, Page 16 of 25, June 25, 2021.

1 and dispatchable long duration capacity (CTs) in the Alternate Plan support grid
2 reliability and resiliency.¹⁴
3

4 **Q. Please summarize the risks of treating Sherco Solar as the least cost capacity**
5 **resource?**

6 A. The Sherco Solar project will be assigned seasonal accredited capacity values under the
7 mechanism MISO ultimately develops and obtains FERC approval. However, to use the
8 Company's words, it is speculative to assume what that capacity will be. Furthermore,
9 not only could that accredited capacity change over time (and likely decline) but treating
10 a solar project as a capacity resource rather than an energy resource that has some
11 associated capacity is novel when it does not have all the attributes that are traditionally
12 assigned to other capacity resources such as combustion turbines or even batteries.
13

14 VII. Capacity and Energy Needs

15 **Q. Would you please summarize the capacity needs and additions under the Alternate**
16 **Plan for North Dakota?**

17 A. Yes, I developed the following tables of the estimated accredited capacity additions based
18 upon the nameplate capacity additions identified by NSP.¹⁵ In Table 1, I used NSP's
19 ELCC assumptions identified in the IRP and did not make any assumptions regarding
20 what MISO will adopt for seasonal accreditation factors for intermittent resources. I have
21 focused on the near-term capacity additions (2024 – 2030). Table 1 shows the ELCC
22 capacity added in each year and Table 2 shows the cumulative capacity additions and the
23 load resource balance based upon the cumulative additions.
24
25
26

¹⁴ Schedule 1_IRP Alternate Plan, Page 26 of 242, June 25, 2021.

¹⁵ Table 2: Alternate ND Scenario Annual Expansion Plan, by Fuel Type, Schedule 1_IRP Alternate Plan

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Table 1: North Dakota Alternate Plan – Accredited Capacity Added by Year

Type	2024	2025	2026	2027	2028	2029	2030
Storage	-	-	-	-	-	-	50
Wind	-	-	-	-	-	-	80
Solar	312	92	-	210	-	171	54
CT	-	57	246	1,066	355	355	711
Total	312	149	246	1,276	355	526	895

Table 2: North Dakota Alternate Plan – Load & Resources

Type	2024	2025	2026	2027	2028	2029	2030
Storage							50
Wind	-	-	-	-	-	-	80
Solar	312	391	374	567	540	684	702
CT		57	303	1,369	1,724	2,080	2,790
Total Capacity Added	312	448	677	1,936	2,264	2,764	3,622
Obligation	9,406	9,381	9,370	9,385	9,393	9,341	9,354
Existing & Approved Planning Position with Targetted Additions	10,841	9,628	9,160	7,998	7,954	7,438	6,910
	1,747	695	467	549	825	861	1,178

Q. Would you please summarize the capacity needs and additions under the Alternative Plan that incorporates the social cost of carbon?

A. Yes, Table 3 provides the ELCC capacity additions and Table 4 shows the associated load & resources balance.

Table 3: Alternate Plan – Accredited Capacity Added by Year

Type	2024	2025	2026	2027	2028	2029	2030
Storage							200
Wind	-	-	-	-	32	32	152
Solar	336	276	-	252	60	152	36
CT	-	57	246	355	-	355	355
Total	336	333	246	607	92	539	743

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Table 4: Alternate Plan – Load & Resources

Type	2024	2025	2026	2027	2028	2029	2030
Wind Additions (MW-ELCC)					33	67	225
Solar Additions (MW - ELCC)	336	598	572	798	820	931	918
CT (MW)			278	599	599	920	1,241
Storage							200
Total Capacity Added	336	598	850	1,397	1,452	1,918	2,584
Obligation	9,406	9,381	9,370	9,385	9,393	9,341	9,354
Existing & Approved Planning Position with Targetted Additions	10,841	9,628	9,160	7,998	7,954	7,438	6,910
	1,771	845	641	10	14	15	141

Source: Appendix B Table 3: Alternate Plan Load and Resources (2020 – 2034)¹⁶

Q. What is the significance of the prior two different capacity expansion plans?

A. When the social cost of carbon is excluded, the North Dakota Alternate Plan shows almost 1,500 MW more firm dispatchable capacity (CTs) than the Alternate Plan. In addition, the North Dakota Alternate Plan illustrates that Sherco Solar is not needed for capacity if the CTs are built.

Q. What is your understanding of why the Company focused on building a solar resource at the Sherco site?

A. My understanding is that the Company was focused on re-using the interconnection rights associated with retiring Sherco 2 and issued an RFP for solar at/adjacent to the existing coal plant.

Q. Did the Company's RFP also include the option of building a CT at the Sherco site?

A. No, not that I am aware of.

Q. Did the Company's IRP include the option of building a CC at the Sherco site?

A. At the time the Company's Supplement IRP (prior to the Alternate IRP), the Company identified building a combined cycle project at Sherco to supply capacity and energy

¹⁶ Appendix B Table 3: Alternate Plan Load and Resources (2020 – 2034), Schedule 1_IRP Alternate Plan

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1 starting in 2027. However, in the Alternative Plan the Company abandoned the Sherco
2 CC option so that the least cost plan is predicated on excluding the option of a CC at the
3 Sherco site.

4
5 “While we continue to believe the Sherco CC would be a valuable system
6 resource and a reasonable and appropriate solution to retiring more than
7 2,400 MW of coal generation on our system while maintaining system
8 stability and providing dispatchable energy to complement the increasing
9 amount of renewables on our system, we also believe the Alternate Plan
10 presented in these Reply Comments represents the best path forward for
11 our customers, stakeholders, and the states we serve.”¹⁷ [Alternate Plan]
12

13 **Q. Did the Company’s IRP include the option of building a CT at the Sherco site?**

14 **A.** The Company included an option to include a CT in the 2027 – 2029 timeframe but not
15 the 2024 – 2026 time frame.¹⁸
16

17 **Q. Would you please summarize the energy needs and additions under the Alternate**
18 **Plan?**

19 **A.** Yes, the following table focuses on the energy position for 2024 – 2030. The table
20 illustrates that the utility has a long energy position and does not need new energy
21 resources.¹⁹
22
23
24

¹⁷ Exhibit (FLM-2), Schedule 1 Page 7 of 242. See also Rebuttal Testimony of Ms. Mandich, p 5 lines 6 – 8.

¹⁸ Table 13: Retiring Coal Units and Selection Windows for Gen-tie Resources, 2020-2034 Upper Midwest Plan p 16 of 35, Exhibit __ (FLM-2 Schedule 1.

¹⁹ Source: EO-6-10-21 Scenario 9 – tab Area Annual. Note, that exports are constrained in NSP’s modeling based upon a limitation of exports to 25% of load. Sales to MISO would likely be higher absent this constraint.

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Year	Energy (GWH)	MISO Net (GWh)	% Long	MISO Sales (GWh)	MISO Purchases (GWh)	Sherco Solar Generation (GWh)
2024	51,390	9,045	18%	9,441	396	1,221
2025	51,477	8,545	17%	9,078	533	1,182
2026	51,675	8,358	16%	9,041	683	1,183
2027	51,929	7,229	14%	8,159	930	1,239
2028	52,344	7,192	14%	8,117	925	1,218
2029	52,479	5,826	11%	7,183	1,358	1,222
2030	52,804	3,597	7%	5,582	1,985	1,190

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VIII. Continued Concerns with NSP's Proxy Pricing Proposal

Q. Did the Company change its position with regards to what should be the proxy price for the Sherco Solar capacity if the Commission rejects the ADP?

A. No, the Company presented the same four options and repeated its arguments for using the MISO CONE based upon a CT as the proxy cost of capacity.

Q. Do you agree with Ms. Mandich's statement regarding the comparison of MISO CONE with the alternative proxy of Sherco Unit 2 plus a brownfield CT?²⁰

A. No, as I note below, the reasonable alternative to Sherco Solar capacity is constructing a brownfield CT. I also note that while Mr. Krug indicates that he does not wish to relitigate the prudence of retiring the Sherco Units, Ms. Mandich compares the MISO CONE to using Sherco 2 costs. This comparison highlights that North Dakota customers will be paying for the capacity twice.²¹

²⁰ Rebuttal Testimony of Ms. Mandich, p. 19, lines 12 – 18.

²¹ Rebuttal Testimony of Mr. Krug, p. 8, lines 12 – 14.

1 **Q. Does MISO's proposal to implement seasonal capacity accreditation for intermittent**
2 **resources based upon loss of load probability create additional concerns regarding**
3 **use of the CT as the proxy for capacity costs?**

4 A. Yes. The CT is likely to have a similar accredited capacity rating across the four seasons
5 but that is unlikely to be the case for Sherco Solar. Accounting for the differences in
6 accredited capacity across the four seasons introduces an additional level of complication
7 in determining a proxy price.
8

9 **Q. Did the Company update its analysis and recommendations regarding the value of**
10 **Sherco Solar Capacity to reflect the impact of MISO's seasonal accreditation of**
11 **intermittent resources?**

12 A. No. Ms. Mandich indicated that she does "not have enough details".²²
13

14 **Q. Have you reviewed Ms. Mandich's rebuttal testimony with regards to your**
15 **recommendation that the proxy price for the CT should be a brownfield CT?**

16 A. Yes. Ms. Mandich continues to recommend that the MISO CONE price is the appropriate
17 proxy since it is an industry standard for constructing a greenfield CT.²³ I continue to
18 disagree with Ms. Mandich as the MISO estimate is based upon a generic cost estimate
19 developed by the EIA with a regional cost adjustment and translated into an annual
20 number reflecting MISO's assumptions about the weighted cost of capital and O&M.
21 The MISO CONE price is used to establish a maximum clearing price in the PRA and is
22 not used by NSP to construct generation as evidenced by the Company's IRP that
23 establishes cost estimates. The better reflection of the cost to North Dakota's customers
24 is what NSP has identified in their IRP as the least cost CT and use of the Company's
25 approved WACC. The choice with regards to meeting the share of capacity required to
26 serve North Dakota customers is the resources modeled in the IRP and the Company has

²² Rebuttal Testimony of Ms. Mandich, p. 17, lines 7 – 12.

²³ Rebuttal Testimony of Ms. Mandich p 15, lines 6 – 8.

1 not suggested or modelled the option of relying on the PRA for meeting the capacity
2 deficit.

3
4 **Q. What is the difference between the capital cost assumption used by MISO and the
5 Company's assumption in the IRP?**

6 A. The brownfield CT price in the Supplement IRP is \$467/kW (2018 dollars)²⁴ while the
7 MISO projected capital cost for Load Resource Zone 1 is \$875/kW (2023 dollars)²⁵.
8 The Levelized cost a brownfield 7F CT is \$6.86/kW-Mo (2023) and \$7.00/kW-Mo
9 (2024) in the Alternate Plan.²⁶ Alternatively, the MISO CONE for Planning Year 2023 –
10 2024 is \$8.68/kW-Mo.²⁷

11
12 **Q. What is your response to Ms. Mandich's argument that the proxy cost of capacity
13 should be based upon a new CT since Sherco Solar is a greenfield development?²⁸**

14
15 A. I fail to see the relevance of her argument. The alternative cost of equivalent seasonal
16 capacity should be based upon the least cost CT option and that is the cost of the
17 brownfield option identified in the same IRP that the Company is using to justify Sherco
18 Solar as the least cost option.

19
20 **Q. What is your response to Ms. Mandich's argument that the proxy cost of capacity
21 should reflect CONE and not Net CONE?²⁹**

22 A. Ms. Mandich is being inconsistent. In her proxy pricing proposal she is asking North
23 Dakota customers to pay for the value of the energy from Sherco Solar as well as the

²⁴ Table 12: Thermal Generic Information (Costs in 2018 dollars), Appendix A: Modeling Assumptions & Inputs, Schedule 1, page 212 of 242.

²⁵ Filing of the Midcontinent Independent System Operator, Inc. Regarding Local Resource Zone CONE Calculation Docket No. ER22-____-000, Attachment A. September 30, 2022.

²⁶ Table 20: Levelized Capacity Costs by Year, Exhibit __ (FLM-2) Schedule 1 Page 215 of 242.

²⁷ MISO Cost of New Entry (CONE) Planning Year 2023/2024, Resource Adequacy Subcommittee, October 12, 2022.

²⁸ Rebuttal Testimony of Ms. Mandich, p 21, lines 9 – 12.

²⁹ Rebuttal Testimony of Ms. Mandich, p 22, lines 7 – 14.

1 value of the capacity. However, with regards to the CT, she is not willing to compensate
2 North Dakota customers for the value of the energy that would be produced had the
3 Company constructed a CT.
4

5 **IX. Conclusions and Recommendations**

6

7 **Q. Would you please summarize your conclusions?**

8 **A.** Yes.

- 9
- 10 • The Commission should deny the ADP for Sherco Solar on the basis that NSP has
11 failed to demonstrate that the Project is the least cost capacity resource. At the time it
12 filed its rebuttal testimony using an alternative cost estimate and an alternative
13 EnCompass scenario, it also presumably knew that MISO was developing a new
14 construct for seasonal capacity accreditation for intermittent resources.
 - 15 • The Commission should deny the Company's proposal for recovering the proxy cost
16 of capacity through the FCR. The Company's proposal creates a significant
17 precedent with regards to recovering capacity costs in the FCR or recovering the cost
18 of disallowed Company owned resources in the FCR.
 - 19 • The recovery of any capacity value associated with this Project, should be addressed
20 in a future Company rate case subsequent to MISO making a determination of how it
21 will develop seasonal capacity accreditation for intermittent resources.
 - 22 • Should the Commission approve the Company's proxy pricing approach, subject to
23 conditions and recommendations as described below, it should be on an interim basis.

24 **Q. What is your recommendation regarding proxy pricing if the Commission decides to**
25 **approve proxy pricing for valuing Sherco Solar capacity in conjunction with**
26 **rejecting the ADP for Sherco Solar?**

27 **A.** I recommend the Commission direct the Company to:

- 28
- 29 • Use the brownfield CT cost as identified in the IRP Alternate Plan as the basis of the
Gross CONE cost.


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Trade Secret Data Redacted

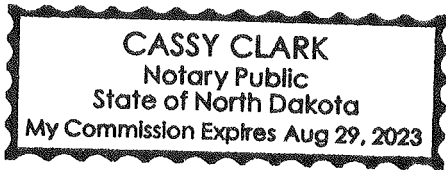
- 1 • The annualized brownfield CT cost as defined in the fore-mentioned IRP should be
- 2 reduced by subtracting the energy margins that the CT would have earned.
- 3 • The CT capacity cost should be reduced for the foregone seasonal capacity that a CT
- 4 has in the non-summer seasons versus the accredited capacity value of Sherco Solar.
- 5 • The seasonal capacity associated with Sherco Solar should be adjusted annually based
- 6 upon the MISO seasonal accredited capacity of the Project.
- 7 • The share of the MISO based accredited capacity of the Project that is assigned to
- 8 North Dakota should be based upon annual updates that reflect ND's share of system
- 9 capacity.
- 10 • Exclude North Dakota from any allocation of the transmission cost associated with
- 11 interconnection of the Project, and
- 12 • Hold North Dakota customers harmless for any potential future intermittent
- 13 renewable generation integration charges that may be imposed by MISO.
- 14


15 **Q. Does this conclude your testimony?**

16 **A. Yes.**


Anna Heinen

Subscribed and sworn before me this 5th day of May, 2023.




Notary Public
Burleigh County, North Dakota