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May 8, 2019

VIA E-FILING

Mr. Daniel P. Wolf, Executive Secretary
MN Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

RE: 2016-2017 Annual Automatic Adjustment Reports
Docket No. E999/AA-17-492

and

2017-2018 Annual Automatic Adjustment Reports
Docket No. E999/AA-18-373

Dear Mr. Wolf:

Minnesota Power hereby submits its Compliance Filing in the above-referenced Dockets.

Attachment 1 has been designated as non-public in its entirety because it contains information Minnesota Power considers to be trade secret as defined by Minn. Stat. § 13.37 and Minn. Rule 7829.0500. The Attachment contains formulas and information not generally known to, or readily ascertainable by, others who could obtain economic advantage from its disclosure or use.

If you have any questions regarding this filing, please do not hesitate to contact me at the number above.

Yours truly,

Christopher D. Anderson

CDA:sr
Enc.

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of Minnesota Power's
2016-2017 Annual Automatic
Adjustment Reports

Docket No. E999/AA-17-492

AND

MINNESOTA POWER
COMPLIANCE FILING

In the Matter of Minnesota Power's
2017-2018 Annual Automatic
Adjustment Reports

Docket No. E999/AA-18-373

I. INTRODUCTION

Minnesota Power ("Company") provides this compliance filing in response to the Department of Commerce – Division of Energy Resources ("Department") Review of the 2016-2017 and 2017-2018 Annual Adjustment Reports ("FYE17 AAA" and "FYE18 AAA" respectively) and the related Minnesota Public Utilities Commission ("Commission") Order dated February 7, 2019.

II. INFORMATION REQUESTED FROM THE UTILITIES

On February 7, 2019, the Commission issued an Order Accepting 2016-2017 Reports and Setting Additional Requirements. The Commission Order stated under "*Cost of Self-Commitment and Self-Scheduling*":

"MISO markets identify the supply of electric generation available throughout the MISO regions, and the anticipated (and, in real time, the actual) demand for electricity in each area, selecting generators for dispatch in a manner designed to minimize overall costs to the system while meeting reliability requirements. MISO unit commitment is the process that determines which generators (and other resources) will operate to meet the upcoming need. MISO scheduling and dispatch sets the hourly output for each committed resource, using simultaneously co-optimized Security Constrained Unit Commitment and Security Constrained Economic Dispatch to clear and dispatch the energy and reserve markets. A market participant—that is, anyone registered for participation in MISO markets—can specify the production cost of its generator, and MISO will refrain from dispatching the resource until market prices meet or exceed that level, again, subject to reliability requirements. But under some circumstances a participant will prefer to commit its generator to be available for MISO dispatch ("self-commit"), and unilaterally set the generator's output level ("self-schedule"), accepting whatever market price results rather than awaiting economic dispatch by MISO.

Renewable sources of generation have the advantage of incurring no fuel costs, which tends to reduce their operating costs and make them attractive options for MISO dispatch. However, self-committed and self-scheduled generators may displace these resources—even if, at any given moment, the renewable resource had lower operating costs.

To further explore this matter, the Commission will direct Minnesota Power, Otter Tail Power, and Xcel to make compliance filings containing an initial analysis of the impacts of self-commitment and self-scheduling of their generators, including the annual difference between production costs and corresponding prevailing market prices both for FYE17 and FYE18. And the Commission will direct these utilities to provide a complete analysis and discussion of the impacts of self-commitment and self-scheduling of their generators, including the annual difference between production costs and corresponding prevailing market prices, in their future AAA reports.”

Order Point 4 states: “Within 90 days, Minnesota Power, Otter Tail Power, and Xcel shall each make a compliance filing containing an initial analysis of the consequences of self-commitment and self-scheduling of their generators, including the annual difference between production costs and corresponding prevailing market prices for both FYE17 and FYE18.”

Order Point 5 states: “In future AAA Reports, Minnesota Power, Otter Tail Power, and Xcel shall each provide a complete analysis and discussion of the consequences of self-commitment and self-scheduling of their generators, including the annual difference between production costs and corresponding prevailing market prices.”

Minnesota Power submits this compliance filing to comply with Order Point 4. Order Point 5 will be addressed in our next AAA filing.

III. COMPANY RESPONSE

Minnesota Power optimizes its resource portfolio within the MISO market structure to ensure efficient utilization of its generation portfolio. The Boswell facility is an approximately 1000 MW baseload generation asset that provides reliable, efficient, low cost energy to customers. Minnesota Power utilizes the self-scheduling provisions in the MISO tariff to ensure this resource is utilized to serve customer energy needs as part of its broader resource plan and based on its physical capabilities to produce energy.

The Company evaluates its energy market strategy and market performance for its generation portfolio on a regular basis to ensure the assets are providing value to customers within the MISO market construct. If the Company receives a signal that the current market strategy is no longer providing value to customers, then the strategy is reevaluated.

As provided in the analysis and descriptions below, the Boswell facility provided \$23 million in energy market benefit to customers for 2017 and 2018. The time periods when the Boswell facility is not gathering a net positive value from the MISO market is typically in the off-peak hours. However, as described below, the off-peak time periods are not contiguous or consistent. This demonstrates that MP is utilizing the MISO tariff and the self-commit provisions to serve its customers in an efficient manner.

A. MISO Market Offer

Minnesota Power participates in the MISO Day-Ahead and Real-Time energy markets by offering its power supply for dispatch in the MISO Market. The generation resources Minnesota Power offers into the Market include coal, wind, hydro, and natural gas. Each generating unit has different operating parameters, such as cost to produce energy, start up, ramp rate, minimum down time and others that are taken into consideration as part of the energy offer. To help ensure least cost supply for customers, Minnesota Power continuously evaluates its offer parameters to ensure the latest fuel cost is used, the appropriate MISO energy products are being utilized, and the operating parameters reflect current capability. By optimizing Minnesota Power’s generation fleet in the MISO market, the customers benefit by receiving the market benefits of the resources.

The self-commitment combined with allowing MISO to dispatch the Boswell facility economically between its minimum and maximum capability has been the least cost strategy for Minnesota Power customers. The self-commitment designates the resource as committed to being online and producing energy for the region at its minimum levels. MISO can dispatch Boswell Units 3&4 higher if it is economical. MISO will economically dispatch between the minimum and maximum levels based on Minnesota Power’s offer curves submitted to the market for both the Day-Ahead and Real Time markets. Table 1 below shows the current range Boswell Units 3&4 can be dispatched within by MISO.

Table 1 – Boswell Unit 3 &4 Dispatch Ranges

MW Values	Economic Min	Economic Max	Emergency Min	Emergency Max	Commit Status
	[TRADE SECRET DATA EXCISED]				
Boswell 3					
Boswell 4 (MP Share)					

* Must Run = Self Commit in the MISO tool set

BEC3: Boswell 3 generates energy in a dispatch band between **[TRADE SECRET DATA EXCISED]** MW.

BEC4: Boswell 4 generates energy in a dispatch band between **[TRADE SECRET DATA EXCISED]** MW (MP’s share of unit parameters). The unit is a joint owned unit with WPPI with Minnesota Power owning ~80% and WPPI ~20%. To ensure a consistent dispatch of Boswell Unit 4, Minnesota Power coordinates with WPPI on the market offer parameters.

B. Financial Impact of “Self-Commitment and Self-Scheduling”

Per the Commission’s request, Minnesota Power evaluated the financial impact of “self-commitment and self-scheduling” for Boswell Units 3&4. Since Boswell Units 1&2 were retired as of December 31, 2018, those units were excluded from the analysis. As shown in Table 2,

Minnesota Power’s self-scheduling of the facility has reduced customer costs for both 2017 and 2018 operations.

The analysis evaluated only the hours in each year where the unit was committed to its minimum value and compares the cost to operate at the Day Ahead Dispatch Minimums versus the payments Minnesota Power received from the MISO market during these same periods. If the culmination of the times MISO utilized the Boswell unit only at its minimum operating parameter created value for the customer then the self-commit strategy is beneficial for the customer.

For each hour in which MISO cleared the units at their Day Ahead Dispatch Minimums and no higher (this is defined for the analysis as a self-commit time period) the following calculations were performed:

$$\begin{aligned}
 &\text{Day Ahead Cleared MW times Day Ahead LMP} \\
 &+ \text{Plus (Actual MW output – Day Ahead Cleared MW) times Real Time LMP} \\
 &= \text{Equals Net MISO payment or charge to Minnesota Power} \\
 &- \text{Less Actual MW output times Unit Cost} \\
 &= \text{Equals the cost / benefit of “self-commitment and self-scheduling”}
 \end{aligned}$$

If all the time periods that were categorized as a self-commit period provided a net value to the customer when added together, it indicates that the customer received a benefit. Table 2 below shows the results of the analysis on a unit by unit basis for FYE17 and FYE18.

Table 2

		DA Clearing at Dispatch Minimums		
Unit		All Hours Cost / (Benefit)	Off-Peak (HE 1- 6,23,24) Cost / (Benefit)	On-Peak (HE 7- 22) Cost / (Benefit)
Boswell 3	FYE17	(2,406,507.49)	2,184,841.30	(4,591,348.79)
Boswell 3	FYE18	(5,772,695.63)	1,190,725.83	(6,963,421.46)
Boswell 4	FYE17	(5,424,576.45)	3,275,177.64	(8,699,754.09)
Boswell 4	FYE18	(9,787,511.06)	1,166,063.07	(10,953,574.13)

For all the hours where MISO cleared Boswell Units 3&4 at their Day Ahead Dispatch minimums, the units provided a net benefit to the ratepayers of over \$23.3 million for FYE17 and FYE18 combined. As Table 2 identifies, the off-peak time periods are generally more challenged than the on-peak.

Hourly data, including the calculations noted above, are included in Attachment 1. Please note that Attachment 1 contains Trade Secret Information.

When looking at off-peak hours only, MISO's clearing of Boswell Units 3&4 show a net cost to the customers. However, the profile of the off-peak time periods are not contiguous and span variable amounts of time. Therefore, not all off-peak hours show a cost and not all on-peak hours show a benefit.

This identifies that taking the unit off line for the off-peak time periods is not consistently needed and that the long duration of the startup process (typically 12 hours or more) is not conducive to removing the self-commit offer. Additionally, the units have minimum downtimes and required start up times which preclude the units from coming off line quickly and back on line, if taken off self-commit status. The analysis identified that the units are beneficial to have online and connected the grid.

C. Conclusion

Overall, the current process and methodology Minnesota Power employs when scheduling and offering the Boswell 3&4 units provides a net benefit to the ratepayers. Minnesota Power appreciates the inquiry from the Commission, so that stakeholders along with the Commission have a better understanding of how the utilities operate their steam generation in the MISO market and the corresponding benefits the customers receive. Having flexible generation within the power supply mix will have an important role today and in the future for keeping customer costs reasonable and maintaining system reliability. As the needs of the system continue to evolve, Minnesota Power is committed to evaluating the best practices for optimizing its resource portfolio in the MISO market.

Dated: May 8, 2019

Respectfully submitted,



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**PUBLIC DOCUMENT
TRADE SECRET DATA EXCISED
IN ITS ENTIRETY**

STATE OF MINNESOTA)
)ss
COUNTY OF ST. LOUIS)

AFFIDAVIT OF SERVICE VIA
ELECTRONIC FILING

SUSAN ROMANS of the City of Duluth, County of St. Louis, State of Minnesota, says that on the **8th** day of **May, 2019**, she served Minnesota Power's Compliance Filing in **Docket Nos. E999/AA-17-492** and **E999/AA-18-373** on the Minnesota Public Utilities Commission and the Office of Energy Security via electronic filing. The persons on E-Docket's Official Service List for this Docket were served as requested.



Susan Romans