

STATE OF MINNESOTA  
OFFICE OF ADMINISTRATIVE HEARINGS  
FOR THE PUBLIC UTILITIES COMMISSION

In the Matter of the Application to  
the Minnesota Public Utilities  
Commission for Certificates of  
Need for Three 345 kV Transmission  
Line Projects with Associated System  
Connections (CapX2020)

OAH Docket: 15-2500-19350-2  
MPUC: ET-2, E002 *et al.*/  
CN-06-1115

**INITIAL BRIEF OF  
THE MIDWEST ISO**

As provided by the presiding Administrative Law Judge, the Midwest Independent Transmission System Operator (“the Midwest ISO”) hereby submits its Initial Brief in the above-captioned proceeding. As explained below, the Midwest ISO – based upon its own analysis and for its own reasons – recommends granting the certificates of need for the transmission lines proposed by the Applicants in this matter. This Initial Brief addresses the key issues raised by the Applicants, and provides the Midwest ISO’s independent views and positions on those issues.

## INTRODUCTION

The Midwest ISO intervened in this proceeding after receiving a letter from the Office of Energy Security (“OES”) at the Minnesota Department of Commerce, requesting it participate as a formal party in the above-referenced certificate of need proceeding by providing clear impartial background information, where needed, regarding electric transmission operations, markets and industry challenges as well as information directly pertinent to this case.

As the Midwest ISO explained at the time of its intervention, it believed that it was - and is - able to provide the Commission and other parties valuable and useful information related to the issues and has attempted to do so in an independent, impartial manner. This position results from the Midwest ISO’s oversight and regional planning role as the independent transmission system operator of the bulk transmission system in the Midwest region, and its considerable overall energy expertise. The Midwest ISO is uniquely positioned to offer further comment on electric transmission system proposals such as what has been advanced by the Applicants in this proceeding, as was apparently what underpinned the OES’ original basis for requesting Midwest ISO’s participation.

By way of background, the Midwest ISO is the independent regional transmission operator (“RTO”), with an operational area covering 14 states, including Minnesota, and the province of Manitoba. Tr. Vol. 4 (July 17, 2008) at 152-153. The Midwest ISO administers a common tariff that applies to all transmission services to ensure non-discriminatory access and an application of a uniform set of rules for all transmission customers. The Midwest ISO also oversees and operates a wholesale energy market that provides non-discriminatory pricing for transmission services and the balancing of generation supply to assure load is satisfied in a reliable and efficient manner while managing transmission congestion.

Additionally, as the RTO, the Midwest ISO is responsible for operational oversight and control, market operations, and reliability planning for the regional transmission system. Among many other responsibilities, the Midwest ISO also monitors and calculates Available Flowgate Capability (“AFC”), and provides tariff administration for its Open Access Transmission Tariff (“OATT”). The Midwest ISO is the Reliability Coordinator for its footprint, providing real-time operational monitoring and control of the transmission system.

The Midwest ISO is responsible for approving transmission service, new generation interconnections, and new transmission interconnections to and within the Midwest ISO footprint, and for ensuring that the system is planned to reliably and efficiently provide for existing and forecast uses of the transmission system. The Midwest ISO is the Planning Coordinator for the footprint and performs planning functions collaboratively with its Transmission Owners with stakeholder input throughout, while also providing an independent assessment and perspective of the needs of the transmission system overall. Midwest ISO Exh. 1, at 4-5.

One of the Midwest ISO's obligations and planning functions is to pursue long-term, inclusive studies of transmission needs and expansion request within the Midwest ISO footprint. As explained by the Midwest ISO's witness in this matter, Jeffrey Webb, the Midwest ISO is actively involved in studying transmission needs and upgrades throughout the region, among other things, to increase the transfer capability in this region in order to provide for existing load, additional load-serving opportunities to meet, among other things, renewable and demand response mandates, while continuing to accommodate existing as well as new generation resource needs.

The facilities proposed in this proceeding are ones that have been presented, reviewed, analyzed, and then raised and considered as part of the Midwest ISO's overall open and inclusive stakeholder transmission expansion planning processes. Based upon its own analyses, the Midwest ISO has concluded that all three of the high voltage transmission lines proposed here are needed and should be approved by the Commission.

### ARGUMENT

#### The Proposed Lines Are Needed For Reliability and Regional System Performance, And To Permit Interconnection Of Renewable Generation.

In its RTO role, the Midwest ISO is responsible for ensuring that the regional transmission system planning is pursued in a coordinated and practical manner that will reliably and efficiently provide for both existing uses and for forecast future uses of the system. Midwest ISO Exh. 1, at 4-5. There are three key considerations used by the Midwest ISO, of which the first two are crucial:

- the security of the transmission system must be maintained – the transmission system must be able to withstand disturbances (caused by unforeseen generator and/or transmission facility outages) without interruption of service to load;

- the transmission system must be adequately planned to be able to accommodate load growth and/or changes in load and load growth patterns, as well as changes in generation and generation dispatch patterns, without causing equipment to perform outside of design capability; and,
- transmission constraints that impair the efficient regional generation dispatch alternatives and that limit access to potential future generation development scenarios must be identified, and solutions to those constraints must be devised and implemented. Midwest ISO Exhibit 1 at 7-8.

When it reviewed the three CapX2020 transmission lines proposed in this proceeding, the Midwest ISO concluded (based upon several different power flow models of the Midwest ISO transmission system analyzing summer and winter peak periods for 2011 and 2016 – *see* Midwest ISO Exhibit 1 at 16) that the lines would each be needed within the next 5 to 7 years for overall system reliability and security. In addition, the Midwest ISO found fundamental near-term local reliability needs which would be addressed by two of the three lines, and found that the third line is also needed to reliably deliver new generation developments. Midwest ISO Exhibit 1 at 10-11.

1. **The Twin Cities – Fargo line is needed for system reliability and to meet load growth.**

The Midwest ISO's study work evaluated three general load serving areas along the path of the proposed Twin Cities - Fargo line: the Red River Valley Area ("RRV Area"), the Alexandria Area, and the St. Cloud Area. Midwest ISO Exhibit 1 at 17. The Midwest ISO concluded that the areas served by the proposed Twin Cities - Fargo line have serious reliability and security dangers in the near term, and that there are no comparable, alternative ways of resolving the reliability risks in those areas other than the proposed line. Midwest ISO Exhibit 1 at 25.

a. **The RRV area.**

For the RRV Area, the Midwest ISO determined that under peak load conditions, without the proposed Twin Cities – Fargo line, there would be numerous problems on the network:

- there would be contingency conditions involving the forced outage of existing transmission facilities that would result in loadings on other existing facilities beyond their safe design capability;
- other conditions would result in transmission level voltages below design criteria; and,

- for certain conditions, these could result in voltage instability with resultant wide-area loss of load. Midwest ISO Exhibit 1 at 17-18.

The RRV area is winter-peaking, with an approximate load of 2,200 MW modeled in the Midwest ISO 2011 model, and 2,367 MW in the 2016 model. There is about 565 MW of generation within this area, and therefore the area relies on power transported into the area on the single Jamestown-Maple River 345 kV line and on other 230 kV transmission lines in the area, to meet the majority of its load serving needs. The Midwest ISO analyzed the loss of the single 345 kV line supporting the area at Maple River near Fargo, along with one of the 230 kV lines, and found that this condition could lead to an unstable decline in voltages in the region, with the potential for uncontrolled loss of large amounts of load across the region. System operators would be unable to take reasonable steps after the loss of one of those lines to mitigate the effects of the loss of the second line. Generation redispatch would not be a solution.<sup>1</sup> Under the modeling, the Fargo 230 kV to 115 kV transformers would overload during 2016 winter peak conditions if two transmission elements fell out of service.

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<sup>1</sup> National standards – set by the NERC - require that the electric transmission system be able to function and remain stable not only with one item off line, but also with the loss of one element followed by the loss of another element – a double contingency or an “N-1-1” event. Tr. Vol. 5A (July 18, 2008) at 32-33.



Under single contingency conditions, the Mud Lake to Brainerd 115 kV line would overload, and six 115 kV substations would experience low voltage conditions.

In order to avert the effects of these failures, system operators would have to interrupt an excessive amount of load. In plain terms this means a loss of electrical service across a large swath of the region, which is a result that the Midwest ISO believes is unacceptable. Midwest ISO Exhibit 1 at 18-19.

Adding the proposed Twin Cities - Fargo line would provide a second 345 kV supply to the Maple River 345 kV bus in the Fargo area. With that second 345 kV line in operation, the loss of one 345kV circuit would no longer place the area in the potentially unacceptable and insecure position – lights would stay on in the region even with the failure of that one major facility. Midwest ISO Exhibit 1 at 19.

**b. The Alexandria area.**

The Alexandria area (12 substations in and around Alexandria) is served by three 115 kV transmission lines: Inman to Elmo; Douglas County to Long Prairie, and; Grant County to Elbow Lake. The Midwest ISO reviewed and analyzed the conditions in this area for projected 2011 and 2016 winter peak conditions and for

2016 winter peak conditions. Those analyses showed that for the 2011, there will be severe line overloads as high as 154% of design capability, and critically low voltages of 52% of design in this area in the event of the loss of two of the three 115 kV lines noted above. These conditions will deteriorate as load grows in the area beyond 2011. By the winter peak of 2016, even a single contingency loss of the Grant County to Elbow Lake line will result in voltage below design at Elbow Lake. Should a double contingency outage occur in 2016, without the proposed line, voltages at Elbow Lake and surrounding areas would be as low as 47% of nominal, and the Long Prairie to Douglas line would overload by 60%. At these voltage levels, load service could not be sustained in the area. Midwest ISO Exhibit 1 at 20-21.

The proposed Twin Cities - Fargo line extends a 345 kV line supply from Monticello through St. Cloud to Alexandria, and continues that line to the Fargo area 345 kV substation. At the Alexandria substation a new step-down transformer will be installed that will directly inject into and support the heavily stressed 115 kV system in the area. With the line in operation, even for the worst single line loss condition in 2016, the post-project voltage is increased from 89.5% to 100% of nominal. In a two-line outage condition, line loadings are reduced

from 160% to under 65% of rating, and voltage is improved from 47% to 100% of nominal. The addition of the Twin Cities -Fargo line will provide a secure system, and add sufficient margin to accommodate load, including growth in the Alexandria area. (Midwest ISO Exh. 1, at 22). Additionally, all other viable alternative solutions were examined and determined to be deficient. Midwest ISO Exh. 1, at 23.

**c. The St. Cloud area.**

In St. Cloud, the Midwest ISO found the area to be vulnerable to a number of different contingency conditions that could cause overloading of existing supply lines, low voltage conditions, and loss of load service. As the network is presently configured, if there were a loss of the Benton County to Granite City tower line involving both circuits, the St. Regis load of approximately 89 MW would be automatically isolated, losing its power completely. In addition, the St. Cloud to Sauk River line would overload to 133% of rating. Lesser overloads would also occur on three other 115 kV lines between St. Cloud and W. St. Cloud and between W. St. Cloud and Granite City. Low voltage would also occur on several 115 kV buses. Midwest ISO Exhibit 1 at 24-25.

The Midwest ISO analyzed the 2011 summer peak conditions in the St. Cloud area. If there were to be a loss of two of the Benton 230/115 kV transformers, the St. Cloud to Wakefield 115 kV line would overload by 42% of its design rating. This, in turn, would cause the St. Cloud to Benton County line to overload by 6%. Voltages at eighteen 115 kV buses would be below design, with one as low as 81%. Midwest ISO Exhibit 1 at 25.

As proposed, the Twin Cities - Fargo 345 kV line will be tapped at a new Quarry substation on the west side of the city of St. Cloud, and a new 345/115 kV transformer will be installed to support the area. With those facilities placed into service, the Granite City substation can be reconfigured to maintain service to the St. Regis load even in the event of a double line outage condition. Post-contingency line loadings would be improved from 133% with the St. Regis load not served, to less than 65% with the St. Regis load intact, and voltage would improve from 86.8% to 101% for these conditions. The addition of the Twin Cities - Fargo 345 kV line will thus provide reliability and sufficient substantial margin to accommodate expanded power flow needs in and around the St. Cloud area.

2. **The Twin Cities to LaCrosse line is needed for system reliability and stability.**

The Midwest ISO reviewed the projected loadings and voltage conditions in the Rochester and La Crosse areas for the 2011 summer peak period, and also at load levels somewhat higher than the projected 2011 peak. That analysis demonstrated that both of these areas can be expected to experience significant reliability problems unless new transmission capacity is added in the area.

The Rochester area is supplied by three 161 kV lines and supported by 181 MW of installed generation at the Silver Lake and Cascade Creek stations, and two small hydro units on the Zumbro River. Some of this generation can reasonably be assumed to be available to support the system locally in the 2011 timeframe. However, the older and less efficient local generating units may be, and likely will be, retired in the future, or may become unavailable to address and/or relieve contingent conditions in all circumstances. As a result, the Midwest ISO modeled and evaluated area reliability with all available generation assumed to be available and on, and also with the Silver Lake 1, 2 and 3 units and the Cascade 1 unit unavailable.

The Midwest ISO analysis of the 2011 peak period show that, even with all local generation available and on, there would numerous line overload

conditions resulting in various combinations of forced outages. The proposed Twin Cities to La Crosse 345 kV line project will include a new North Rochester 345 kV to 161 kV substation with a step-down transformer between the 345 kV Prairie Island to Byron 345 kV line and the 161 kV. A 10.5 mile 161 kV line will be built between the new substation and the Northern Hills substation in Rochester. This new transformer and line will parallel the Byron transformer, and the Byron to Maple Leaf 161 kV line which is a critical outage for the area. In the event of an outage on the Byron to Maple Leaf 161 kV line, the new, parallel Twin Cities to La Crosse line will carry additional flow to Rochester. That will reduce loadings on otherwise overloaded existing 161 kV supply lines, allowing these lines to reliably remain in service. The worst overloaded line - the Adams to Rochester line - will be loaded to only 71% even with none of the local generation on, as compared to 173% for this same condition without the proposed new line. Midwest ISO Exhibit 1 at 26-28.

The La Crosse area is supplied primarily by four 161 kV lines: Alma - Marshland - La Crosse; Alma - Tremval - La Crosse; Genoa - Coulee; and Genoa - La Crosse. There is 1144 MW of generation in and adjacent to the load area, with 610 MW at Alma to the north, 368 MW at Genoa to the south of Lacrosse, 26

MW of refuse burning units, and 140 MW of gas turbine peaking units at French Island in central La Crosse. The load projected for the 2011 summer peak is 492 MW. For this 2011 load level, the Midwest ISO's analysis found numerous reliability issues and concerns. Midwest ISO Exhibit 1 at 29-30.

The Twin Cities to La Crosse 345 kV line will add a strong 345 V source into the area by terminating the 345 kV N. Rochester to N. Lacrosse line with a 345/161 kV transformer that will centrally tie into the area. With this new 345 kV source, the worst loading conditions (as seen in 2011) will be relieved. Midwest ISO Exhibit 1 at 31, and Table 1.

3. **The Brookings to Twin Cities line is needed to permit interconnection of renewable generation, and for local reliability.**

The Brookings to Twin Cities line is essential to the delivery of renewable energy resources which have requested interconnection to the transmission system near the path of that line. There are nearly 60 generator interconnection requests along or near the counties where the Twin Cities to Brookings line is intended to be routed, representing a total of approximately 15,940 MW of requests in the general area, with over 7,460 MW specifically within the counties along the preliminary Brookings to Twin Cities project route. The line will open

up incremental firm power transfer of about 700 MW, taking into account contingency conditions, which is about 13% of the Minnesota Renewable Energy Standard. Midwest ISO Exhibit 1 at 34.

There are already 58 projects that have been or are being studied<sup>2</sup> by the Midwest ISO with the Brookings to Twin Cities line as part of the base case assumptions used in those studies. Those projects represent 4358 MW of generation. The Midwest ISO has placed the Brookings to Twin Cities line into its base case assumptions because that facility is a critical component of the Applicant utilities' ability to meet their RES obligations, and because the Brookings to Twin Cities line is necessary to accommodate the extensive amount of new generation interconnection requests the Midwest ISO is receiving from that area. Midwest ISO Exhibit 1 at 34-35; Tr. Vol. 4 (July 17, 2008) at 131-132.

Simply put, the Brookings to Twin Cities line is needed to reliably deliver new generation developments in the near term, as there are many more interconnection requests in queue today in the area of the line than the present transmission system can reliably accommodate. If the Brookings to Twin Cities line is not placed into service, there will be direct and negative impacts on those



generators which are seeking to be connected to the network. Some of them may be able to be interconnected and operate for a limited period of time. But for others, there may be no possible alternative upgrades that can be identified unless and until the Brookings to Twin Cities line is built and placed into service. Midwest ISO Exhibit 1 at 35.

The Brookings to Twin Cities 345 kV line is necessary – but not sufficient on its own - to reasonably meet the milestone targets of the Minnesota RES. Tr. Vol. 5B (July 18, 2008) at 13. Additional facilities will be required to meet the total requirements of the RES which will require approximately 5,600 MW of total nameplate capacity from renewables. The additional longer-term facilities will be designed to work in concert with existing system and expansion plans in the area, including the lines proposed here. Midwest ISO Exhibit 1 at 35-36.

Finally, the Brookings to Twin Cities line will also provide local reliability benefits to the area. Tr. Vol. 4 (July 17, 2008) at 145. In addition to transporting renewable energy from the wind resource-rich southwest Minnesota area to the 345 kV grid in the Twin Cities area, the project will support the underlying lower voltage transmission systems along the route at Lyon County, Franklin, and Lake

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<sup>2</sup> This number has grown since the time Mr. Webb's prefiled testimony was prepared in May, 2008. The identified number of and MW loads of projects cited here were determined at that

Marion, and at a new Hazel Creek substation near Granite Falls. These lower-voltage transmission improvements will reduce loadings on 115 kV and 69 kV circuits extending into these areas from more distant supply sources by providing a strong source of power at these step-down points along the route. Voltages on these systems will also be supported to provide for better service quality under contingent conditions impacting the local transmission systems. Midwest ISO Exhibit 1 at 36.

**4. There is an overall economic benefit from the proposed lines.**

In addition to the reliability improvements and generation outlet enhancements which the proposed lines will provide, there is an additional economic benefit. When the transmission network is improved in a way – as proposed here - that extends the network in different multiple directions, it allows further flexibility to utilities purchasing power by allowing them to take advantage of the most cost-effective generation that may be available, whatever that may be. Midwest ISO Ex. 1 at 6-7; Tr. Vol. 4 (July 17, 2008) at 156. The economic benefits are then available to all the customers of those utilities as reduced costs of electricity. Tr. Vol. 4 (July 17, 2008) at 168.

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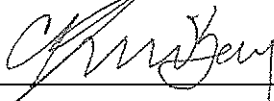
CONCLUSION.

The Commission should approve the Applicants' request for certificates of need for the three lines, as proposed by the Applicants in this matter.

Date: December 5, 2008.

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