MISO Exhibit ____

MINNESOTA PUBLIC UTILITIES COMMISSION

DOCKET NO. ET-6675/CN-12-1053

OAH 60-2500-30782

REBUTTAL TESTIMONY

OF

DIGAUNTO CHATTERJEE

Submitted on Behalf

of

MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, INC. (MISO), F/K/A

MIDWEST INDEPENDENT TRANSMISSION SYSTEM OPERATOR, INC.

MPUC Docket No. ET-6675/CN-12-1053
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Chatterjee Rebuttal Testimony
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April 25, 2014

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MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, INC. (MISO), F/K/A MIDWEST INDEPENDENT TRANSMISSION SYSTEM OPERATOR, INC.[1]

I. INTRODUCTION

Q. Please state your name, business address, and present position.

A. My name is Digaunto Chatterjee, and I am the Senior Manager of Resource Forecasting for the Midcontinent Independent System Operator, Inc. (hereinafter, "MISO"). My business address is 720 City Center Drive, P.O. Box 4202, Carmel, Indiana 46032-4202.

Q. Are you the Digaunto Chatterjee whose direct testimony in these cases was submitted in March 2014?

A. Yes.[2]

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[1] Effective April 26, 2013, MISO amended its Certificate of Incorporation on file with the State of Delaware to reflect a change in its legal entity name from "Midwest Independent Transmission System Operator, Inc." to "Midcontinent Independent System Operator, Inc." No other changes to the MISO business resulted from this change. "Midwest" continues to exist on some of MISO's documents.

[2] The abbreviations used my Direct Testimony are also adopted in this Rebuttal Testimony.

II. PURPOSE AND SCOPE

Q. Have you reviewed the prefiled testimony of witnesses for the Minnesota Department of Commerce?

A. Yes. I have reviewed the testimony submitted by witnesses Steve Rakow, Adam Heinen, and Mark Johnson.

Q. What is the purpose of your testimony?

I respond to several matters raised in the testimony of the Department of Commerce, Division of Energy Resources ("DOC-DER") witnesses. I address issues that were raised in that testimony regarding a potential Lakefield Junction – Rutland 345 kV line that is found in MISO planning documents, a "161 kV alternative" that is discussed in Dr. Rakow's testimony, and the reliability consequences related to construction of the MN-IA Project and related facilities that I referred to in my Direct Testimony as the Mid-MISO MVPs.

III. TRANSMISSION PLANNING ISSUES

A. Lakefield Junction – Rutland 345 kV Line

Q. What issue is raised by a DOC-DER witness regarding a Lakefield Junction – Rutland 345 kV line?

A. Dr. Rakow states, on page 17 of his Direct Testimony, that "it is not clear why the Lakefield Junction—Rutland 345 kV alternative cannot be expected to meet the claimed needs."

Q. What are the "needs" referred to by Dr. Rakow?

A. Dr. Rakow's Direct Testimony is not clear whether it refers to localized benefits in Minnesota or also includes the "broader set of needs" that he refers to on page 16 his Direct Testimony. The Mid-MISO MVPs provide localized benefits in Minnesota stemming from construction and operation of the Mid-MISO MVPs that include relieving thermal overloads on transmission lines in Minnesota. The Mid-MISO MVPs provide additional regional benefits by meeting transmission needs that will accrue as the result of constructing the entire MVP portfolio of transmission projects.

Q. What thermal constraints are relieved by the Mid-MISO MVPs?

A. As noted in my Direct Testimony, the Mid-MISO MVPs help alleviate thermal overloads as far north as Redwood, Nicollet, and Watonwan counties in Minnesota to as far south as Black Hawk County in Iowa. In all, thirty-seven (37) constraints both on the 69 kV as well as 161 kV transmission systems were mitigated by the Mid-MISO MVPs. Relieving thermal overloads on these facilities directly helps prevent curtailment of up to approximately 1,933 MWs of wind generation. Fox Lake to Rutland 161 kV and Rutland to Winnebago 161 kV constraints are among these thirty-seven constraints. In all, eighteen (18) constraints in Minnesota are relieved by the Mid-MISO MVPs:

Adams 345/161 kV Transformer

Madelville - Madelia Switch Station 69 kV

Arlington - Green Isle 69 kV

Arlington - Jesnland 69 kV

Green Isle - Carver Co 69 kV

Austin - Hayward 161 kV

Penelope Tap - Penelope 69 kV

Penelope - Penelope Tap 69 kV

Redwood - Sheridan Tap 69 kV

Winnebago 161/69 kV Transformer

Alden Jct - Albert Lea 69 kV

Hayward - Glenville Tap 69 kV

Adams - McNeilus 69 kV

Hayward - Walter Scott 161 kV

Glenworth 161/69 kV Transformer

Thompson Tap - T Birch 69 kV

Fox Lake - Rutland 161 kV

Rutland - Winnebago 161 kV.

In addition to the above, nineteen (19) constraints located in Iowa as well as in Nebraska are mitigated by the Mid-MISO MVPs.

Q. What alternatives would alleviate the Fox Lake to Rutland 161 kV constraint?

A. Various transmission alternatives studied over the years focused on relieving long standing congestion issues on the Fox Lake to Rutland 161 kV constraint. Some of these transmission proposals were:

1. Second Lakefield Junction to Rutland 161 kV (MTEP09 and MTEP10)
2. Second Fox Lake to Rutland to Winnebago 161 kV (MTEP10)
3. Lakefield Junction to Rutland 345 kV (MTEP10)
4. Lakefield Junction to Winnebago to Adams (MTEP10)
5. Lakefield Junction to Winnebago to Webster to Blackhawk to Hazelton 345 kV (MTEP 10)
6. Lakefield Junction to Mitchell County 345 kV (MTEP10)

All of the above transmission proposals would relieve thermal overloads on Fox Lake to Rutland 161 kV constraint.

Q. Would any of these alternatives relieve the remaining constraints mitigated by the Mid-MISO MVPs?

A. No.

Q. Why did MISO not recommend Lakefield Junction to Rutland 345 kV upgrade even though it individually demonstrated a high benefit to cost ratio?

A. While MISO was completing evaluation of MTEP10 projects, MISO was also commencing MVP studies in MTEP11 where network upgrades recently studied as economic projects with high benefit to cost ratios would be re-tested for better alignment with broader transmission expansions necessary to maintain and improve reliability. Network proposals such as Lakefield Junction to Rutland 345 kV were identified as potential mitigations for constraints in MTEP10 that would be the subject to further reliability study.

MISO MVP studies as part of MTEP11 focused not only on existing congestion but also on projected congestion resulting from planned generation additions such as wind throughout the MISO footprint. Not only would Lakefield to Rutland 345 kV not alleviate any of the other identified constraints in Iowa or central Minnesota, it would not alleviate congestion on the transmission segment immediately adjacent to Rutland on the Rutland to Winnebago 161 kV line. A Lakefield Junction to Rutland 345 kV project would not result in an improvement in wind curtailment reductions from network upgrades. Such a narrowly-focused project would also result in a network upgrade that would not provide electrical connection points for remaining MVPs in Iowa, thus not aligning with the MVP network requirements to mitigate broader reliability issues and enable reliable delivery of generation that includes wind generation.

B. The 161 kV Alternative Discussed in DOC-DER Testimony

Q. What is the 161 kV alternative that is discussed in DOC-DER testimony?

A. On page 10 of Dr. Rakow's Direct Testimony, he describes this alternative as the "complete rebuild of the Fox Lake—Rutland—Winnebago Junction 161 kV line (161 kV Rebuild)." Like Dr. Rakow, I will refer to this line as the "161 kV Rebuild."

Q. Would the 161 kV Rebuild serve as a suitable alternative to the Mid-MISO MVPs?

A. No. As stated earlier, this project would alleviate only two (2) of the thirty-seven (37) constraints from central Minnesota to Iowa.

Q. From a planning perspective, do you have concerns regarding Dr. Rakow's Direct Testimony regarding the 161 kV Rebuild?

A. Yes. Dr. Rakow treats the 161 kV Rebuild and the facilities in the ITCM Application as providing equivalent benefits, and proceeds with a review of comparative costs. But these two "alternatives" are not equivalent. As noted in my testimony, the 161 kV Rebuild would only alleviate two (2) of the thirty-seven (37) constraints from central Minnesota to Iowa. Further, the 161 kV Rebuild is inconsistent with the goal of the MVP portfolio to create a robust 345 kV overlay across the upper MISO footprint to enable the reliable and efficient delivery of energy.

Q. **If the Commission were to deny the Certificate of Need for the MN-IA Project, would that have an impact on the MISO planning process?**

A. Yes. The MN-IA Project, as designed and part of the MVP portfolio of transmission projects, has been evaluated by MISO and its stakeholders as providing needed 345 kV connections. The MISO regional planning process adheres to the FERC Order 890 open and transparent planning principles. This process involves numerous evaluations of project proposals and their effectiveness, and provides multiple opportunities for stakeholders to review

project need, design, and effectiveness. Throughout the multi-year planning process involved in developing the MVP portfolio (including the Mid-MISO MVPs), this project has been considered and finally approved by MISO's Board of Directors as an integral part of the transmission system in MISO's footprint. In order for the regional planning process to be as effective as possible, stakeholders should make every effort to identify and address, within the regional planning processes potential issues that could result in redesign.

Q. What would be the impact of such a redesign?

A. When a project is redesigned after the extensive regional planning process, MISO must ensure that the redesigned project will continue to meet the initial needs ascribed to the project. This review process should involve engaging MISO stakeholders (and finally MISO's Board of Directors) to ensure continued transparency surrounding project development and cost evaluation. In the worst case scenario, such reengagement could lead to delays in the completion of an urgently needed project that may take years to construct. In addition, after a project is approved for the regional plan, that project is assumed to be a part of the base plan, and incremental system needs are identified relying upon that base plan. MISO studies that rely upon the base plan, such as for generator interconnection, would have to be re-examined. While modifications may occur to approved plans, such changes have ripple effects on the identification of necessary projects in subsequent planning cycles. These ripple effects can contribute to delays in addressing other transmission system needs. For these

reasons, modifications to projects subsequent to the collaborative regional planning process should be minimized to the extent possible.

C. Local Reliability Benefits Related to the MN-IA Project

Q. What concerns were stated in DOC-DER testimony regarding the reliability benefits of building the MN-IA Project?

A. Dr. Rakow summarizes, on pages 43-44 of his Direct Testimony, ITCM's discussion of the removal of two special protection schemes ("SPS") as a benefit of the MN-IA Project. Mr. Heinen's Direct Testimony on page 10 asks for an explanation as far as "whether potential reliability issues still exist in the Project area [that are addressed by SPSs]" and asks for "further information of the reliability concerns."

Q. Generally, what is a SPS?

A. A SPS is generally a "workaround" operating procedure that addresses weaknesses in the transmission system. MISO, working with transmission owners and stakeholders affected by the underlying reliability issues, plans over time to develop a robust transmission system that permits the removal of temporary SPSs.

Q. Are SPSs in place serving the Southern Minnesota area?

A. Yes. As noted by Mr. Heinen, two SPSs are in place in the area.

Q. Who determines whether SPSs remain in place?

A. MISO makes that determination.

Q. How many constraints are protected by these SPSs?

A. Two constraints.

Q. Mr. Heinen states, on page 10 of his Direct Testimony, that MISO data files label these SPSs "inactive." Is Mr. Heinen's observation correct?

A. Yes, Mr. Heinen is correct.

Q. Can you explain what the "inactive" designation means at MISO?

A. Yes. In compliance with NERC Transmission Planning ("TPL") Standards requiring study of all existing and planned protection systems, MISO studies each SPS in the footprint with its MTEP reliability analysis. As part of this study, MISO checks for overloads for associated contingent conditions (otherwise intended to be mitigated by the SPSs) under a range of system conditions. Where overloads are identified, the SPS operation is tested to identify if the SPS, as designed, successfully mitigates the identified overload. If no overload is identified under the studied system conditions, MISO data files label these SPS as "inactive." But this designation does not mean that the SPS is not needed.

Q. Did MISO identify the SPSs that serve the Southern Minnesota region as "inactive"?

A. Yes.

Q. Were the same SPSs identified as "active" in a previous MISO study?

A. Yes.

Q. Why were these different identifications given to these SPSs?

MISO identified the SPSs as "active" in MTEP12 for the 2014 year case, which did not include modeling of the Mid-MISO MVPs because they would not be constructed by 2014. A thermal overload was identified and SPS action successfully mitigated the constraint. In other MTEP12 longer-term cases for 2017 and beyond, which included modeling of Mid-MISO MVPs as in service, no thermal overload on the constraint was identified and thus the SPSs were documented as "inactive."

Subsequently in MTEP13, for the 2015 year case that also did not include modeling of Mid-MISO MVPs, the SPSs were labeled "inactive." While a very high loading on the transmission line was identified, it remained just under the emergency rating of the facility. The transition from being thermally overloaded to being highly loaded for the same contingent event from MTEP12 to MTEP13 models resulted from a combination of a slight change in loads modeled and in generation dispatch for the area.

In all other MTEP13 longer-term cases for 2018 and beyond, which included modeling of Mid-MISO MVPs, no thermal overload on the constraint was identified and thus SPSs were again documented as "inactive."

Q. Since the SPSs were identified as "inactive," can they be retired?

A. No. As noted earlier, while an overload was not identified, contingent conditions still result in a very high loading. This indicates that absent a longer-term network upgrade, reliability issues on that facility remain at or near its emergency rating, preventing retirement of the SPSs.

Q. Does the MN-IA Project provide a benefit by permitting the removal of the SPSs that are available to serve Southern Minnesota?

A. Yes. As noted above, all cases with inclusion of Mid-MISO MVPs have consistently shown no thermal loading on the subject facility.

IV. CONCLUSION

Q. Based upon your rebuttal testimony, what do you conclude regarding the issues raised in the testimony submitted for the DOC-DER witnesses?

A. The facilities proposed by ITCM are necessary to meet the reliability needs of the system in the Southern Minnesota area and Iowa. These facilities also provide a cost effective means of achieving important reliability and efficiency needs for the regional transmission system.

Q. Does this conclude your prepared rebuttal testimony?

A. Yes it does.