

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

In the Matter of the Request by Minnesota Power
For a Certificate of Need for the
Great Northern Transmission Line

OAH Docket No. 65-2500-31196
MPUC Docket No. E-015/CN-12-1163

Exhibit _____

MISO STUDIES

Direct Testimony and Exhibits of

SCOTT HOBERG

August 8, 2014

MR. SCOTT HOBERG

OAH Docket No. 65-2500-31196

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1 **I. INTRODUCTION**

2 **Q. Please state your name and business address.**

3 A. My name is Scott Hoberg and my business address at Minnesota Power is 30 West
4 Superior Street, Duluth, Minnesota 55802.

5 **Q. What is your current position with Minnesota Power?**

6 A. I am the Supervising Engineer of the System Performance Department.

7 **Q. How long have you been employed by the Company and when did you**
8 **assume your current position?**

9 A. I joined Minnesota Power in December of 2008 and assumed my current position
10 in June of 2014.

11 **Q. Please describe your educational and professional background.**

12 A. I have a Bachelor of Science degree in Electrical Engineering, with an emphasis in
13 power systems, from South Dakota State University. Prior to joining Minnesota
14 Power I worked for Midcontinent Independent System Operator (“MISO”) for
15 eight years. While at MISO, I worked in the control room for the Western Region
16 as an operations engineer, providing engineering support for short term planning
17 and real-time operations. Since 2006 I have been a licensed professional engineer
18 in the State of Minnesota.

1 **Q. What are your present duties at Minnesota Power?**

2 A. I am responsible for providing technical support to the Company, customers, and
3 regional transmission organizations in order to ensure safe and reliable operation
4 of the Bulk Electric System. I work with neighboring utility and reliability
5 coordination engineers to develop real-time operating plans and procedures. I also
6 perform detailed future looking analysis as well as review of external study work
7 meant to document the impact of changes made to the electric system including
8 generation interconnections and transmission lines.

9 **Q. Can you also describe your ongoing interactions with MISO and your**
10 **involvement in MISO studies?**

11 A. As a part of my day to day job activities, I coordinate with the MISO Outage
12 Coordination Department on transmission and generation outage scheduling
13 studies to determine impacts or if corrective mitigation plans are required to
14 facilitate outages. I also work as needed with the MISO real-time operations
15 engineers to determine system operating limits and establish valid operating levels
16 during forced system outages. Because of this work with the MISO operations
17 personnel and my work on near-term and long-term regional planning, I have led
18 the involvement from the Minnesota Power perspective in regional MISO studies.
19 Recently these studies have included the Northern Area and Manitoba Hydro
20 Wind Synergy Studies.

1 **Q. What is the purpose of your testimony?**

2 A. I discuss the MISO studies and Transmission Service Request (“TSR”) Reports
3 considered by Minnesota Power in the course of our work on the Great Northern
4 Transmission Line (also “Project”) and in our consideration of alternatives to the
5 Project. I also discuss the Wind Injection Study (Appendix O of the Certificate of
6 Need Application (“Application”)) and the Great Northern Transmission Line
7 Economic Impact Study performed by Ventyx and discussed in Section 6.3.3 of
8 the Application.

9 **Q. Do you sponsor certain sections and appendices of the Application?**

10 A. Yes, I sponsor:

- 11 • Section 7.2 (MISO Studies Considered in Analysis);
- 12 • Appendix I (MISO Manitoba Hydro Wind Synergy Study Final Report,
13 September 2013);
- 14 • Appendix M (MISO Northern Area Study, June 2013);
- 15 • Appendix N (Dorsey – Iron Range 500 kV Project Preliminary Stability
16 Analysis, December 5, 2012);
- 17 • Appendix O (Manitoba – United States Transmission Development Wind
18 Injection Study, March 1, 2013); and
- 19 • Appendix Q (MH – US TSR Sensitivity Analysis Draft Reports, July
20 2013).

1 **Q. Do you also have Exhibits to your testimony?**

2 A. Yes. I attach the following:

3 • Exhibit ___ (SH), Schedule 1 – Minnesota Power’s Response to
4 Department of Commerce (“Department”) Information Request (“IR”) 1,
5 discussing Transmission Study Requests (“TSRs”) and including
6 attachments;

7 • Exhibit ___ (SH), Schedule 2 – Minnesota Power’s Response to
8 Department IR 3, attaching the GNTL Economic Impact Study conducted
9 by Ventyx;

10 • Exhibit ___ (SH), Schedule 3 – Minnesota Power’s Responses to
11 Department IR 6, also discussing TSRs and studies and including
12 attachments; and

13 • Exhibit ___ (SH), Schedule 4 – Minnesota Power’s Response to RRANT
14 IR 4, regarding MISO studies and other materials referencing the Project.

15 **II. MISO STUDIES**

16 **Q. Have the Project and alternative new Manitoba – United States transmission**
17 **interconnections been the subject of MISO studies, reports or other MISO**
18 **efforts over the past several years?**

19 A. Yes. Both a new interconnection to Minnesota Power’s Blackberry substation and
20 alternative new interconnections have been extensively studied by MISO and

1 others for several years. For example, Ex. __ (SH), Schedule 4 provides a listing
2 of MISO studies and presentations referencing the Project.

3 Most notable is the study from Appendix I (MISO Manitoba Hydro Wind Synergy
4 Final Report, September 2013); where transmission plans including an Eastern
5 Plan such as the Project were analyzed within phases three and four of the study.
6 It was found that significant benefits can be realized from adding a 500 kV
7 transmission line from Manitoba to MISO.

8 **Q. Has Minnesota Power specifically considered some of these studies and other**
9 **materials during the course of developing the Project and considering**
10 **alternatives to the Project?**

11 A. Yes. The Company has considered a number of MISO studies, including the
12 Northern Area Study, the Manitoba Wind Synergy Study and Manitoba Hydro-
13 United States Transmission Service Request (“TSR”) analyses.

14 **Q. Can you briefly describe the MISO Northern Area Study?**

15 A. The Northern Area Study, Appendix M to the Application, was developed as an
16 exploratory study to understand how the development of new potential Manitoba –
17 MISO tie-lines, changing mining and industrial load levels, and the retirement of
18 generating units drive transmission investment in MISO’s footprint. The Northern
19 Area Study originated because of multiple transmission proposals and reliability
20 issues located in MISO’s northern footprint. The objective of the Northern Area

1 Study was to: (1) identify the economic opportunity for transmission development
2 in the area; (2) evaluate the reliability and economic effects of drivers on a
3 regional, rather than local, perspective; (3) develop indicative transmission
4 proposals to address study results with a regional perspective; and (4) identify the
5 most valuable proposal(s) and screen them for robustness.

6 **Q. Was the Northern Area Study designed to determine a “best” transmission**
7 **project or a preferred new transmission interconnection between Manitoba**
8 **and the United States?**

9 A. No. The Northern Area Study provides no indication or comparison between
10 various Manitoba to MISO tie-line options. Tie-lines and new hydro generation
11 were inputs to the Northern Area Study to determine economic development
12 opportunities after the tie-lines and generating units are built and in-service –
13 essentially answering what (if any) build-out is required for MISO’s entire
14 northern footprint to realize the benefits of new Manitoba imports. Given the
15 nature of the study, transmission solutions stemming from the Northern Area
16 Study analysis were not intended to be recommended for MTEP Appendix A or B
17 consideration. Rather, the Northern Area Study’s results and findings were
18 intended to determine and feed future studies.

1 **Q. Can you also describe the impetus behind the MISO Manitoba Hydro Wind**
2 **Synergy Study and that Study's results?**

3 A. As discussed in the Application, the variable and non-peak nature of wind creates
4 integration challenges within MISO. Manitoba Hydro, with its large and flexible
5 system, offers potential solutions for meeting these challenges. At the prompting
6 of Manitoba Hydro and the potential customers of output from their new
7 hydroelectric dams, MISO conducted the Manitoba Hydro Wind Synergy Study,
8 Appendix I to the Application, to evaluate whether the cost of expanding the
9 transmission capacity between Manitoba and MISO would enable greater wind
10 participation in the MISO market. At the time of the Application, MISO had 12
11 gigawatts ("GW") of wind online and 15 GW of active wind projects in the queue.
12 Manitoba Hydro is looking to expand its hydro system significantly over the next
13 several years, but its current firm export capacity to MISO is limited to 1,850 MW
14 which is insufficient to meet the needs of future wind generation in MISO for
15 synergy with hydropower. Thus, this study looked at expanding transmission
16 capacity between MISO and Manitoba Hydro to facilitate an increase in the
17 realization of these benefits.

18 The study found significant benefits can be realized from the addition of either an
19 eastern 500 kV line between Winnipeg, Manitoba, and the Iron Range in
20 northeastern Minnesota, or a western 500 kV line between Winnipeg, Manitoba,

1 and Barnesville, Minnesota. Given the wide variety of benefit metrics along with
2 the exploratory nature of the study, the specific allocation of benefits was not
3 possible. This study simply showed that the total benefits in the MISO area are
4 greater than the costs to build either line.

5 Wind synergy benefits from the expanded use of hydro resources from Manitoba
6 Hydro are demonstrated in three ways: by wind curtailment reduction in MISO; by
7 an inverse correlation between imports from Manitoba Hydro and MISO wind
8 generation; and by a better utilization of both wind and hydro resources. Based on
9 the analyses from the Manitoba Hydro Wind Synergy Study, MISO recommended
10 both the eastern and western transmission projects for inclusion in MTEP13
11 Appendix B.

12 **Q. You also indicated that Minnesota Power has considered MISO Manitoba**
13 **Hydro – United States TSR Studies. Can you discuss the nature of those**
14 **studies and their findings?**

15 A. MISO continually processes generation interconnection requests and Transmission
16 Service Requests (“TSRs”) on the transmission system that they operate. One
17 group of these TSRs involves an increase in the ability to transfer power from
18 Manitoba into the United States. The original Manitoba Hydro TSRs requested
19 delivery totaling 1,100 MW from Manitoba Hydro to four TSR customers in the
20 United States (north to south), and 1,100 MW from utilities in the United States to

1 Manitoba Hydro (south to north). An initial System Impact Study (“SIS”) was
2 completed in July 2009 for Firm Transmission Service between Manitoba Hydro
3 and the TSR customers. The two main transmission options considered in the SIS
4 generally extended from the Winnipeg area into the United States via either
5 northeastern Minnesota or the Red River Valley. A follow-up SIS completed in
6 April 2010 evaluated the impact of a new 500 kV interconnection from the
7 Winnipeg area to the planned CapX2020 Bison Substation near Fargo, North
8 Dakota.

9 More recently, MISO conducted a series of sensitivities on the original option to
10 evaluate alternative transmission scenarios for achieving 250 MW, 750 MW, or
11 1,100 MW of increased transfer capability from Manitoba to the United States.
12 The MISO TSR Sensitivity Studies have included a “Western Plan” extending
13 new 500 kV transmission to the Barnesville area in western Minnesota, an
14 “Eastern Plan” extending new 500 kV transmission to the Iron Range in
15 northeastern Minnesota, and a “230 kV Option” extending new 230 kV
16 transmission to the Iron Range. While the two 500 kV options could facilitate
17 increased transfers of 750 MW, 1,100 MW or more, the 230 kV Option would
18 facilitate only Minnesota Power’s 250 MW Agreements with Manitoba Hydro.
19 The MISO TSR Sensitivity Studies have demonstrated that the alternative
20 transmission options at their associated transfer levels do not result in negative

1 impacts to the bulk electric system. At the time of the Application, MISO had not
2 yet issued a final report for this series of studies so draft reports for the Eastern
3 Plan and the Western Plan sensitivities were included in Appendix Q.

4 **Q. Have those reports now been finalized?**

5 A. No. The draft reports included as Appendix Q were never produced as final
6 reports. This previous analysis was tabled in favor of revised model assumptions
7 as well as new TSR requests. A revised TSR study was completed and MISO
8 issued a final report on May 30, 2014. That report is attached as part of the
9 Company's response to a DOC IR 6, Ex. __ (SH), Schedule 3.

10 **Q. What are the key findings from that Report?**

11 A. The Report found that, based on the conditions studied, south-bound TSRs from
12 Manitoba to the United States could be granted by MISO to a maximum level of
13 883 MW provided that one facility be upgraded at an estimated cost of \$250,000.
14 It was also found that north-bound TSRs could be granted by MISO to a maximum
15 level of 883 MW provided that three facilities are upgraded at an estimated cost of
16 \$48,180,000. However, the Report also notes that due to one facility upgrade
17 costing \$48 million, a partial north-bound TSR could be granted by MISO to the
18 level of 698 MW contingent on an estimated \$180,000 in upgrades to two
19 facilities.

1 **Q. How do these TSR studies and reports, together with the other MISO studies**
2 **you have referenced, support Minnesota Power’s decision to construct the**
3 **Project?**

4 A. From a transmission planning study perspective the studies, while similar in nature
5 all have slightly different focuses, but the conclusions all show that under a wide
6 range of assumptions the Project has clear benefits to the State and regional
7 transmission system. It is also shown that the Project integrates into the bulk
8 electric system without significant impacts to the existing system as well as with
9 future planned transmission and generation facilities. These key findings support
10 the decision to construct the Project as it will provide value based on a wide array
11 of future outcomes.

12 **III. VENTYX REPORT**

13 **Q. In addition to the MISO studies and efforts you have discussed, what other**
14 **analysis of the potential transmission-related impacts of the Project did**
15 **Minnesota Power pursue?**

16 A. In order to assess the impact of the Project on costs for electric consumers in
17 Minnesota, Minnesota Power hired an experienced consultant, Ventyx, to perform
18 a PROMOD analysis to estimate the change in locational marginal prices
19 (“LMPs”) specific to Minnesota and the estimated change in adjusted production

1 costs within Minnesota and MISO region. The PROMOD software and the results
2 of the Ventyx analysis are discussed in Ex. ___ (SH), Schedule 2.

3 **Q. Can you briefly describe LMPs and “adjusted production costs” as discussed**
4 **here, and why those issues merit attention in this proceeding?**

5 A. LMPs and adjusted productions cost are metrics that can be used to analyze the
6 impact of a particular change made to an economic forecasting model. Changes
7 influencing these two metrics can be very diverse from the addition of a
8 transmission line or generation facility to the assumed price of natural gas or
9 addition of a carbon tax. Adjusted production cost is a measure of energy
10 production when determining the cost to serve load. Stated differently, it is the
11 cost of market purchases less revenues from market sales, modified by imports
12 and exports from neighboring markets. LMPs represent a cost incurred to supply
13 the last incremental amount of energy at a specific location on the transmission
14 grid that respects the limitation of the bulk electric system.

15 These economic metrics merit attention in that they can be used to gauge the
16 impact of the Project on the whole of MISO as well as Minnesota load.

17 **Q. And what were the results of the Ventyx analysis?**

18 A. As explained in Schedule 2 to this testimony, Ventyx determined that the Project
19 can be expected to bring about a slight decrease in the LMPs in Minnesota and
20 will not materially change the adjusted production cost in Minnesota or MISO.

1 **Q. And what is the significance of those findings?**

2 A. The findings show that, based on the assumptions included in the Ventyx report,
3 the Project is not expected to negatively impact load sources within the State of
4 Minnesota based on the LMP and adjusted production cost metrics. Further the
5 Project is not expected to effect a significant change to adjusted production cost
6 within the MISO boundary. A vertically-integrated utility with a balance between
7 economic generation assets and demand would therefore see little change in its
8 market settlement.

9 As such, the Ventyx study further demonstrates the value of the Project to the
10 Company, its customers, the State and the region.

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

12 A. Yes, it does.

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