3.0 Transmission Studies

3.1 Generally

Minnesota Rules part 7848.1300 sets forth what must be included in the biennial report, including the following:

> Each biennial transmission projects report . . . must contain at least the following information:
>
> B. a copy of the most recent regional load and capability report of the Mid-Continent Area Power Pool or other appropriate regional reliability council;
>
> C. a copy of the most recent regional transmission plan produced by the appropriate regional transmission organization;
>
> F. a list of studies that have been completed, are in progress, or are planned that are relevant to each of the inadequacies identified in item D.

Consistent with the approach taken in the 2005 Biennial Report, the utilities have elected to provide a separate section listing some of the studies that have been completed or are underway. The studies listed here are the broader, more wide-ranging studies that might impact more than one utility or more than one zone. Other more narrow studies related to specific inadequacies are described in Section 7 where the inadequacy is identified. Some are listed in the table in Section 3.6.

3.2 MAPP Load and Capability Report

There have actually been two Load & Capability Reports prepared by MAPP since the 2005 Biennial Report was completed on November 1, 2005. The 2006 Report was issued on August 1, 2006, and the 2007 Report was issued on May 1, 2007. Both reports are over 450 pages long so neither one is included with this biennial report. The 2006 and 2007 Load & Capability Reports, along with those for other years, are available in their entirety at:

> http://www.mapp.org/content/eia.shtml

The Introduction to the 2007 Load & Capability Report provides an overview of what the report is intended to do:

> The MAPP Load and Capability Report is prepared in response to the requirement set forth in the MAPP Agreement and the MAPP Generation Reserve Sharing Pool Handbook for a two-year

> monthly and a ten-year seasonal load and capability forecast from each MAPP Participant. The report contains forecasts of monthly load and capability data for the period of May 2007 through December 2009 and seasonal load and capability data for the ten-year period Summer 2007 through Winter 2016-17.

2007 Report at page I-2.

3.3 Midwest ISO Transmission Expansion Plans

The Midwest ISO engages in annual regional transmission planning and enters the results of its planning activities in the MISO Transmission Expansion Plan (MTEP). The MTEP process coordinates the transmission plans of individual MISO member utilities to develop a coordinated regional transmission plan.

MTEP-06 Report. The MTEP 06 report, which was first issued in December 2006 and revised and approved by the MISO Board of Directors on February 15, 2007, is the third regional expansion plan issued by MISO. It is over 350 pages long and is not included here.

MTEP-06 has identified 416 projects comprised of 738 planned or proposed facility additions or enhancements representing an investment of $3.6 billion through 2011 throughout the entire fifteen state MISO region.

MTEP-07 Report. The MTEP-07 Report is expected to be approved by MISO before the end of the year. The report is over 200 pages long. The following excerpt from the Executive Summary provides an overview of the contents of the 07 Report:

> This Midwest ISO Transmission Expansion Plan 2007 (MTEP 07) is the fourth regional expansion plan issued by the Midwest ISO. MTEP 07 builds on the grid improvements identified in MTEP 06 that was approved by the Midwest ISO Board of Directors in February 2007. Twenty-eight (28) new projects are being recommended for inclusion in the regional plan at this time, based on analyses that were completed as a part of MTEP 07. These incremental upgrades will ensure the continuing reliable operation of the Midwest ISO grid and provide for additional new generation interconnection to the Midwest ISO system.

Combined with the expansions identified in MTEP 06, the 07 plan includes $2.2 billion in approved projects through the year 2013, and over $800 million of investment placed into service in 2006 and 2007. In addition to addressing load growth and new generation driven reliability needs, the approved projects identified in the plan will reduce the loadings on a majority of the constrained facilities that define the three Narrow Constrained Areas identified within the market footprint.

In addition to recommending more than two dozen new projects, MISO also discusses a number of factors such as renewable portfolio goals and federal rules on transmission planning and pricing that are guiding some new thinking regarding transmission planning.

The MISO Expansion Plans are available on the MISO webpage at:

http://www.midwestiso.org/page/Expansion+Planning

3.4 Southwest Minnesota and Northwest Iowa Group 5 Study

MISO performed a transmission overload analysis for interconnecting over 2,800 MW of new generation, collectively known as the Group 5 projects, to the transmission grid. The proposed generation is located in southwest Minnesota, Northwest Iowa, and Eastern South Dakota. The Group 5 projects contain a total of 37 projects and are mostly wind-based, although they also include one proposed coal-based unit. The Group 5 report is available at:

http://www.midwestiso.org/publish/Folder/3e2d0_106c60936d4_-75ae0a48324a

The Group 5 Study consists of a number of separate reports identifying constraints that are caused by the connection of the individual projects, along with their collective impact.

3.5 NERC 2007 Long-Term Reliability Assessment

In October 2007 the North American Electric Reliability Corporation (NERC) released a study on the reliability and adequacy of the bulk power system in North America for the next ten years. The North American Electric Reliability Corporation is a non-profit, self regulatory organization whose mission is to ensure that the bulk power system in North America is reliable. NERC develops and enforces reliability standards, monitors the bulk power system, assesses and reports on future adequacy, evaluates owners, operators, and users for reliability preparedness, and offers education and certification programs to industry personnel.

In its Long-Term Reliability Assessment, NERC reported that nationwide our long-term capacity margins remain inadequate, that integration of wind, solar, and nuclear resources will require special considerations in planning, design, and operation, that a high reliance on natural gas in some parts of the country requires special attention to reduce risks of supply and delivery interruptions, and that while the transmission grid has shown some improvements, more is still required. NERC recognized that renewable energy initiatives cannot be achieved without construction of new transmission infrastructure.

The NERC Long-Term Reliability Assessment is available on the internet at:

ftp://www.nerc.com/pub/sys/all_updl/docs/pubs/LTRA2007.pdf

3.6 Summary of Completed and Ongoing Studies

The Minnesota Transmission Owners reported in the 2005 Biennial Report on a number of significant transmission studies that have taken place over the last several years. Information about some of these studies is also contained in Part II of this document, Section 3.0. In addition, the table below identifies a number of studies that have been completed or are underway.

TRANSMISSION STUDIES

Completed, In Progress or Planned

Study Title	Completion or Expected Completion	Utility Lead	Minnesota Planning Zone
Badoura Project Study	2005	GRE Minn Power	NE
Tower Project Study	2005	GRE	NE
Buffalo Ridge Incremental Generation Outlet Study (BRIGO)	2005	Xcel Energy	SW
Dotson Area Load Serving Study	2007	Xcel Energy	SW
Great River Energy Long Range Plan	Jan, 2008	GRE	All zones
Mankato Area Study	2007	Xcel Energy GRE	SE & SW
Load Service to Ethanol Plants in the Fairmont and Fox Lake Area	July, 2006	GRE	SW
Marshall Area Load Serving Study		MRES	SW
Minnesota Transmission Plan	Nov. 1, 2007		All zones
North Mankato	Jan, 2008	Xcel Energy	SE, TC
Outer Metro 115 kV	2007	Xcel Energy	TC
Devils Lake (ND) Area Load Serving Study	2008	WAPA	North Dakota
Southeast MN-Southwest WI Reliability Enhancement Study	2003	RPU	SW
Regional Incremental Generation Outlet Study (RIGO)	2007	Xcel Energy	SW, SE
RRV TIPS Update Study • Transmission	Feb, 2007	CapX	NE, NW
SW MN—TC EHV Study	2005	Xcel Energy	SW, TC, WC
TC 345/115kV Transformer Requirements Study	2003	Xcel Energy	TC

Study Title	Completion or Expected Completion	Utility Lead	Minnesota Planning Zone
TC Reactive Requirements	2003	Xcel Energy	TC
Cass Lake Area Voltage Study	2008	OTP	NE
Adams-Rochester 161 kV Study	2008	DPC	SE
Mud Lake—Wilson Lake Study	2006	GRE	NE
South Minneapolis Load Serving Study	2008	Xcel Energy	TC
Worthington Area Study	2007	Alliant	SW
Renewable Energy Standard (RES) Transmission Study	2008	MTO	All zones
Eau Claire Area Load-Serving Study	2007	Xcel Energy	Wisconsin
Northwest Wisconsin Load-Serving Study	2007	Xcel Energy	Wisconsin

3.7 Wind Integration Study

In 2005 the Legislature ordered electric utilities to participate in a statewide wind integration study. Minnesota Laws 2005, chapter 97, article 2, section 6. The purpose of the study was to determine the impacts on reliability and costs associated with increasing wind capacity to 20 percent of Minnesota retail electric energy sales by the year 2020. The study was completed on November 30, 2006.

This study is available on the Internet by doing a search for Wind Integration Study. Additional information is available under PUC Docket Number CI-05-973.

3.8 West Central Transmission Planning Zone CBED Study

This is the study that was described in Section 2.6.2. Please refer to that section for more information about this study. Additional information about the West Central CBED Study is available in Part II of this document, Section 3.3.9.

3.9 Renewable Energy Standards Studies

Part II of this document is the Renewable Energy Standards Report. Section 3.0 of Part II is entitled Transmission Studies. Brief descriptions of various ongoing and future studies are described.