SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

CASE NO. EL05-022

IN THE MATTER OF THE APPLICATION BY OTTER TAIL POWER COMPANY

ON BEHALF OF THE BIG STONE II CO-OWNERS

FOR AN ENERGY CONVERSION FACILITY SITING PERMIT FOR THE

CONSTRUCTION OF THE BIG STONE II PROJECT

DIRECT TESTIMONY

OF

PETER A. KOEGEL

PROJECT MANAGER

MAPPCOR

MARCH 15, 2006

TESTIMONY OF PETER A. KOEGEL

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BEFORE THE SOUTH DAKOTA PUBLIC UTILITES COMMISSION

DIRECT TESTIMONY OF PETER A. KOEGEL

I. INTRODUCTION

Q: Please state your name and business address.

A: Peter A. Koegel, 1125 Energy Park Drive, St. Paul, Minnesota.

Q: By whom are you employed and in what capacity?

A: I am a Project Manager at MAPPCOR, a non-profit corporation that provides transmission and reliability services to members of the Mid-Continent Area Power Pool (MAPP) and the Midwest Reliability Organization (MRO). MAPPCOR has been providing these services since 1990.

I am the Project Manager for many of the MAPP Generation Reserve Sharing Pool (GRSP) projects, including: MAPP Load and Capability Reporting, Real-Time Contingency Reserve Activation Program, MAPP Load and Capability Audits of Reserve Capacity Obligation, as well as supplying information to the MRO/North American Reliability Council (NERC) Assessments.

Q: What is your educational background?

A: I received my Bachelor Degree in Electrical Engineering from the University of Minnesota in 1999.

Q: What is your employment history?

A: I started at MAPPCOR as a student engineer in May 1997, and was hired full-time upon graduating from the University of Minnesota. Initially, I worked on data analysis, data entry,

and accreditation of generation or capacity transaction submittals and request for MAPP members. I became a Project Manager in July 2004.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to describe MAPP and MAPPCOR, and MAPPCOR's duties in providing technical expertise in assessing the resource adequacy needs of the GRSP now and into the future.

Q: Please summarize your testimony.

A: The GRSP currently has enough generation with planning reserves to meet its current load projections. However, without adding generation resources over the next few years, the GRSP will fall short of its resource adequacy obligations, which will impact the reliability of the GRSP. Without new generation resources, the MAPP-U.S. region will have a capacity deficit of over 800 MW by 2011 and approximately 2400 MW by 2014. In order to meet MAPP's forecasted reserve capacity obligations, MAPP Members will need to build generation, purchase additional capacity, or reduce demand.

III. MAPP AND MAPPCOR

Q: What is MAPP?

A: MAPP is a voluntary association of electric utilities and other electric industry participants in the Upper Midwest and others that was organized in 1972 for the purpose of pooling generation and transmission. MAPP serves over 16 million people and covers nearly 1,000,000 square miles in the states and provinces of Minnesota, Nebraska, North Dakota, Manitoba, Saskatchewan, and parts of Wisconsin, Montana, Iowa and South Dakota. MAPP also

has members in Kansas and Missouri. MAPP has two primary functions: (1) to serve as a regional transmission group, responsible for facilitating open access of the transmission system, and (2) to provide generation reserve sharing that provides MAPP members, and the customers they serve, with efficient and available generation when needed. These functions assure efficient and economical power in the Upper Midwest and parts of Canada.

Q: Who are the members of MAPP?

A: Its members are investor-owned utilities, cooperatives, municipals, municipal power agencies, public power districts, a power marketing agency, power marketers, regulatory agencies, and independent power producers from the following states and provinces: A list of current MAPP members is found in Exhibit 9-A attached to this testimony.

Q: What is MAPPCOR?

A: MAPPCOR is the service provider to members of MAPP and the newly organized Midwest Reliability Organization (MRO). MAPPCOR is the contractor to MAPP and administers the MAPP Restated Agreement – the contract that governs the MAPP organization. MAPPCOR was incorporated in June 1990 as a not-for-profit cooperative organization and has been providing transmission and reliability services to MAPP members and industry participants for the past decade. MAPPCOR now provides reliability services to the MRO as well. MAPPCOR employs professionals in the areas of engineering, technology, finance, and other professional functions.

IV. MAPP FUNDING

Q: How is MAPP funded?

A: The Generation Reserve Sharing Pool members – those utilities with generation capability – pay fixed annual dues, in equal amounts, such that the total amount of dues equals 10% of the annual total costs allocated or assigned to the Pool Committee. GRSP Members pay additional GRSP Dues that equal a pro-rata share based on the GRSP Member's Reserve Capacity Obligation.

V. MAPP FORECASTING

Q: Does MAPP prepare electrical energy forecasts for the MAPP region?

A: Yes. Those forecasts are presented in the annual MAPP Load and Capability Report, the most recent of which is the 2005 Load and Capability Report.

Q: What specific forecasts does MAPP prepare?

A: MAPP prepares the following forecasts:

- Annual MAPP Load and Capability Report;
- MRO 10-Year Assessment;
- NERC Long Term Assessment (MRO Portion);
- NERC Summer Assessment; and
- NERC Winter Assessment.

Q: What is the purpose of the MAPP Load & Capability Report?

A: *Annual MAPP Load and Capability Report* ("L&C Report") – the L&C 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 10-year seasonal,

load and capability forecast from each MAPP Participant. The 2005 L&C Report contains forecasts of monthly load and capability data for the period of May 2005 through December 2007 and seasonal load and capability data for the 10-year period Summer 2005 through Winter 2014. The information in the 2005 L&C Report is prepared in conjunction with the May 1, 2005, MAPP Regional Reliability Council Report on Coordinated Bulk Power-Supply Program (EIA-411), submitted to NERC.

Q: Summarize the conclusions of the most recent L&C Report.

A: MAPP can meet its Reserve Capability Obligation for the next five years. However, by the summer of 2011, the MAPP-US region will have a capacity deficit of approximately 219 MW even if Big Stone Unit II is constructed. Without Big Stone Unit II, the MAPP-US region will have a capacity deficit of approximately 819 MW by 2011, and 2400 MW by 2014. In order to meet its forecasted Reserve Capacity Obligation, MAPP members will need to build generation, purchase additional capacity, and/or reduce its demand growth.

Q: What is the MRO 10-Year Assessment?

A: *MRO 10-Year Assessment* - patterned after the NERC Annual Reliability Assessment, this document is an assessment of the reliability of the MRO region for the 2005-2014 time period. The Reliability Studies Subcommittee of the MAPP Regional Transmission Committee prepares this document with assistance from its Transmission Reliability Assessment Working Group. The purpose of the report is to assess the health of the region from a demand and capacity perspective as well as identify any projected problems, such as fuel availability or transmission related problems.

Q: Please summarize the findings of the most recent 10-Year Assessment.

A: *Demand and Energy:*

The MAPP-U.S. and MAPP-Canada combined 2004 summer non-coincident peak demand was 34,940 MW, a 1.2% increase over 2003 (34,509 MW) and 1.1% below the 2004 forecast (35,335 MW). MAPP-U.S. accounted for 29,351 MW, a 1.54% increase over 2003 (28,906 MW) and 1.2% below the 2004 forecast (29,692 MW). MAPP-Canada accounted for 5,589 MW, a 0.25% decrease over 2003 (5,603 MW) and 0.96% below the 2004 forecast (5,643 MW).

The MAPP-U.S. summer peak demand is expected to increase at an average rate of 1.82% per year during the 2005-2014 period, below last year's rate of 2.11% for the 2004-20013 period. The MAPP-U.S. 2014 non-coincident summer peak demand is projected at 35,612 MW. This projection is 1.8% above the 2013 non-coincident summer peak demand predicted last year (34,994 MW).

Annual electric energy usage for MAPP-U.S. in 2004 (154,053 GWh) was 0.09% above 2003 consumption (153,918 GWh) and 3.7% below the 2004 forecast (159,932 GWh).

Resource Assessment:

The MAPP-U.S. region is judged to be adequate over the 2005-2014 period. The MAPP Agreement obligates the member systems to maintain reserve margins at or above 15%, which is equivalent to a 13.04% minimum capacity margin requirement. The summer reserve margin is forecast to decline from a high of 23.1% in 2004 to 7.0% in 2014**.** In addition, when a 3% demand forecast uncertainty is taken into account, the MAPP-U.S. area may be capacity deficit by 2008 summer and 4,038 MW deficit by 2014 summer. MAPP-U.S. members will provide an additional 3,099 MW of new generation for the period of 2005-2014 as reported in the EIA-411.

For the Summer periods 2008-2014, currently projected capacity reported in the MAPP-US region is below MAPP requirements for Reserve Capacity Obligation, but MAPP does not expect a capacity deficit in this period.

Generating system adequacy for the MAPP-Canada region is forecast to be adequate over the 10-year period. In addition, when a 3% demand forecast uncertainty is taken into account, the MAPP-Canada area may have capacity surplus of as much as 2,272 MW by 2014 summer. MAPP-Canada will provide an additional 396 MW of new generation for the period of 2005-2014 as reported in the EIA-411.

Transmission Assessment:

The existing transmission system within MAPP-U.S. is comprised of 7,240 miles of 230 kV, 5,742 miles of 345 kV, and 343 miles of 500 kV transmission lines. MAPP-U.S. members plan to add 546 miles of 345 kV and 261 miles of 230 kV transmission in the 2004-2013 time frame. The MAPP-Canada existing transmission system is comprised of 4,578 miles of 230 kV and 130 miles of 500 kV transmission lines. MAPP-Canada is planning for an additional 429 miles of 230 kV and an additional 539 miles of 500 kV HVDC transmission in the 2004-2013 time frame. There are a total of 2,030 miles of HVDC lines in MAPP-U.S. and MAPP-Canada.

Q: Describe the NERC Long-Term Assessment.

A: NERC's Reliability Assessment Subcommittee (RAS) prepares this report, which includes: (1) an assessment of long-term electric supply and demand and transmission reliability through 2014; (2) a discussion of key issues affecting reliability of future electric supply and transmission; and (3) and regional assessments of electric supply reliability, including issues of specific regional concern. This assessment predicts trends in electric supply and demand and

transmission conditions over the next several years. The trends are based on the most accurate and up-to-date information available at the time the assessment is prepared. In preparing the report, RAS reviews summaries of regional self-assessments, including forecasts of peak electric demand, electric energy requirements, and planned resources; appraises regional plans for new electric generation resources and transmission facilities; and assesses the potential effects of changes in technology, market forces, legislation, regulations, and governmental policies on the reliability of future electricity supplies. MAPP is responsible for preparing a part of this report.

Q: Describe the conclusions and findings of the most recent Long-Term Assessment.

A: The most recent NERC Long-Term Assessment was completed in 2005. Even though NERC expects the transmission systems to operate reliably, some portions of the grid will not be able to support all desired electricity market transactions. Some well-known transmission constraints are recurring, while new constraints appear as electricity flow patterns change. In cases where generation redispatch options have been exhausted or are ineffective, the only ways to relieve these constraints is to build new generation downstream of the constraint, implement demand-reduction measures, or increase the capacity of the transmission system. Reliability coordinators, transmission planners, and system operators need to regularly communicate and coordinate their actions to preserve the reliability of the bulk electric transmission system.

More than 7,122 miles of new transmission (230 kV and above) are proposed to be added in North America through 2009, with a total of about 12,484 miles added over the 2005–2014 time frame. The proposed new transmission represents a 5.9% increase in the total miles of installed extra high voltage (EHV) transmission lines (230 kV and above) in North America over the 2005–2014 assessment period. New transmission line construction is not the only means of

ensuring transmission adequacy, as discussed in the Transmission Issues section of NERC's 2004 Long-Term Reliability Assessment report. For example, upgrading or replacing existing lower capacity transmission lines increases the capacity and reliability of the existing transmission network but does not increase the reported miles of transmission lines.

In the long term, reliable transmission will depend upon the close coordination of generation and transmission planning and construction. This coordination activity must now be accomplished through different means than in the past and involves coordination among many different market participants. A combination of market signals and regulatory decisions will dictate the location and timing of generating capacity additions, and also will influence the siting and construction of new transmission facilities.

Q: Describe the NERC Summer and Winter Assessments.

A: *NERC Summer Assessment* – the Summer Assessment provides an industry assessment of the reliability of the bulk electricity supply and demand in North America for the period of June through September. It is prepared annually.

NERC Winter Assessment – the Winter Assessment, which is prepared annually, provides an assessment of the reliability and adequacy of the bulk electric system in North America for the period December through February.

Q: Do the Winter and Summer Assessments provide any information on the MRO region?

A: Yes, they provide upcoming seasonal projections on demand, resources, transmission, and operational issues.

Q: Please describe how MAPP prepares its forecasts.

A: MAPP sends out an annual data request to its members. MAPP then reviews the data submittals for consistency with previous data submittals, accuracy versus other data sources, and compliance with applicable standards and policies. Models are used by the various operating working groups within the region in their technical write-ups on reliability.

Q: Does MAPP do anything to verify the accuracy of the member utilities' load and capability forecasts?

A: Yes. MAPPCOR staff performs detailed analyses of the data submittals, including comparisons versus the previous years' forecasts, and comparisons to most recent actual data.

Q: Who has access to MAPP's forecasts?

A: The MAPP forecasts are publicly available on our website. In addition, data from the forecasts directly feeds into assessments, reports, and filings that get submitted to the Federal Energy Regulatory Commission, the Department of Energy, NERC, NERC Reliability Regions, and state Public Utility Commissions, among others.

Q: Please describe what MAPP forecasts are showing.

A: The 2005 L&C Report predicts that the MAPP-U.S. region will have a capacity shortage of 219 MW by the summer of 2011 even if Big Stone Unit II is constructed. Without capacity from Big Stone Unit II, MAPP predicts that MAPP-U.S. will have a 819 MW deficit by 2011 and a deficit of over 2400 MW by the summer of 2014.

Q: How do you explain the change from a capacity surplus to capacity deficit in just four years?

A: The change form surplus to deficit is explained by three major factors. Demand growth during the five-year period is projected at more than 3000 MW. Second, there is virtually no change in projected generation to meet those needs. Third, there is only 200 MW increase in projected Net Capacity transactions.

Q: Was MAPP involved in preparing the Big Stone Unit II Energy Conversion Facility Siting Application?

A: No.

VI. DSM AND CONSERVATION IMPROVEMENT PROGRAMS

Q: With regard to its forecasted deficit, did MAPP take into account any projected demand-side management and conservation improvement programs and initiatives?

A: Yes. The deficits are projected with all known generation, demand-side management, and conservation improvement programs in place.

Q: Do you consider the forecasts to be "net" of such demand-side and conservation initiatives?

A: Yes. Reductions from DSM programs are either included in the interruptible demand forecasts or shown as a reduction in the increase of projected demand if it is a conservation program.

VII. MAPP RESERVE REQUIREMENTS

Q: Does MAPP impose capacity requirements on its members?

A: Yes, the current reserve capacity obligation for MAPP Members is 15%.

Q: How are the capacity requirements determined?

A: MAPP performs a Loss of Load Expectation (LOLE) Study and sets the Reserve Capacity Obligation so that we meet or exceed a one day in 10 years LOLE reliability criteria.

Q: Why does MAPP impose a 15% reserve requirement on its members?

A: MAPP performs a LOLE Study and sets the Reserve Capacity Obligation so that it meets or exceeds a one day in 10 years LOLE reliability criteria. This is the reliability standard MAPP has chosen to meet, with the states' input. The most recent LOLE study completed in November 2003 showed that continuing with the long established 15% planning reserve requirement fell within the acceptable band of reliability based on the one day in 10 years LOLE reliability criteria. In greater detail, LOLE takes the capacity resources of MAPP GRSP along with their associated historical operating probabilities and applies those to each and all together to an expected load profile of the GRSP (and within sub-regional areas of the GRSP transmission paths being taken into consideration between the sub-regional areas) and tallies up the hourly time periods when it could be expected that capacity resources of the entire GRSP would fall short of predicted load requirements. The one day in 10 years LOLE index means that there cannot be more than 24 separate hourly periods in about 87,600 hours where capacity resources falls short of load requirements.

Q: What does MAPP view as the potential negative repercussions of a member utility falling below the 15% reserve requirement?

A: There becomes an increased risk of load outages (blackouts, brownouts, load-shedding).

Q: Does this conclude your testimony?

A: Yes.