STATE OF MINNESOTA

**OFFICE OF ADMINISTRATIVE HEARINGS
FOR THE PUBLIC UTILITIES COMMISSION**

IN THE MATTER OF THE APPLICATION FOR A ROUTE PERMIT FOR THE MONTICELLO TO ST. CLOUD 345 KV TRANSMISSION LINE PROJECT	PUC DOCKET NO. ET2/TL-09-246 OAH DOCKET NO. 15-2500-20665-2

TESTIMONY OF

Daniel Kline

On Behalf of

APPLICANTS

NORTHERN STATES POWER COMPANY, A MINNESOTA CORPORATION
and GREAT RIVER ENERGY, A MINNESOTA COOPERATIVE CORPORATION

February 1, 2010

Exhibit _____

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I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND YOUR BUSINESS ADDRESS.

A. My name is Daniel Kline. My business address is 414 Nicollet Mall, Minneapolis, Minnesota 55401.

Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?

A. I am employed as a Regional Transmission Planning Engineer at Xcel Energy Services Inc., the provider of certain business services for Northern States Power Company, a Minnesota corporation ("Xcel Energy"). I am the lead planning engineer for the Twin Cities – Fargo 345 kV Project. As the lead planning engineer, I have primary responsibility for the engineering analysis supporting the identified needs for this project. I am also primarily responsible for the engineering analysis to support the facilities that will be constructed to meet those needs.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I earned a Bachelor of Science degree in Electrical Engineering (power systems and microelectronics emphasis) from Iowa State University in 2003. I am a registered Professional Engineer in the State of Minnesota, License Number 46235. From 2006 to the present, I have been employed by Xcel Energy. From 2006 to 2009, I was a transmission planning engineer. As part of this position, I led the technical analysis and development of the Twin Cities – Fargo 345 kV Project. From 2009 to present, I have been employed in the Regional Transmission Planning department. In this capacity, I have been responsible for overseeing Xcel Energy's participation in and analysis of regional transmission studies, representing Xcel Energy in dealings with the Midwest ISO, and

negotiating issues related to regional transmission development with other utilities. Prior to joining Xcel Energy, I was employed with Open Systems International Inc. where I was responsible for, among other duties, analyzing customer requirements, creating a product implementation plan for Power Systems applications on customer projects and taking overall responsibility for implementing that plan. Some of the applications I dealt most extensively with were AGC, economic dispatch, power flow and state estimator (security analysis). I began my career as a transmission planning engineer at Pacific Gas and Electric Company ("PG&E") where I was responsible for planning activities in the southern half of PG&E's service territory with customer load totaling approximately 5,500 MW. My resume is attached as **Schedule 1**.

Q. FOR WHOM ARE YOU TESTIFYING?

A. I am testifying on behalf of Xcel Energy and Great River Energy, the joint Applicants for a Route Permit in this proceeding.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to address the impacts of the various route alternatives and substation sites under consideration on the overall reliability of the electrical system.

Q. WHAT SCHEDULES ARE ATTACHED TO YOUR TESTIMONY?

A. Schedule 1: Kline Resume.

II. ELECTRICAL SYSTEM PLANNING CRITERIA

Q. FROM AN ELECTRICAL RELIABILITY STANDARD, HOW GENERALLY DOES THE LOCATION OF A NEW HIGH VOLTAGE TRANSMISSION LINE IMPACT ELECTRICAL SYSTEM RELIABILITY?

A. In general, overall system reliability is enhanced when transmission facilities are located in distinct geographic areas. Reliability is reduced when facilities are congregated in close proximity to each other. This is particularly true for 345 kV facilities that comprise the backbone of regional transmission system serving Minnesota and the surrounding region.

Q. WHY?

A. The North American Electric Reliability Corporation ("NERC") has established mandatory standards with which every utility in the United States must comply. These standards govern many aspects of transmission systems and transmission planning is among them. "Category D" is a common reference to the standards that govern the most serious transmission system contingencies. The Category D contingencies that pertain to this proceeding are loss of all transmission lines along a common right-of-way and loss of an entire voltage level at a substation. The effect of these transmission contingencies on the system (and the transmission system's ability to serve load) must be monitored.

The more common rights-of-way are propagated, particularly involving high voltage facilities, the more likely it becomes that an outage involving multiple facilities could occur.

Q. HOW DOES THIS PLANNING CRITERIA SPECIFICALLY RELATE TO THE ROUTING DECISION IN THIS PROCEEDING?

A. Those routes that are more geographically distant from existing transmission facilities will provide the most reliability benefit. In particular, the Preferred Route, Route A, Route B and Route C would provide more reliability benefits than Route D.

Q. PLEASE EXPLAIN.

A. There are five 115 kV transmission lines that provide electrical power to the greater St. Cloud area and loop around the city: The Project provides a necessary 345 kV connection to the 115 kV loop. All three-bulk power sources that serve the area are connected at or share corridors with facilities at the Sherburne Substation causing risk to the St. Cloud electric supply. The three bulk sources are: 1) Sherburne County – Benton County 345 kV line; 2) Monticello – Benton County 230 kV line and 3) Sherburne County – St. Cloud 115 kV line. In the case of a NERC Category D contingency (loss of an entire voltage level, plus transformers) at Sherburne County, St. Cloud would lose all of its bulk power transmission sources and voltage collapse in the St. Cloud area would be highly possible. Therefore, a termination at Monticello Substation was determined to be the most appropriate to reduce the outage risk to the region.

If the new transmission line were constructed such that congestion near the Sherburne County Substation or in other places is increased, the risk of multiple lines being out of service due to a single event, e.g. ice storm or tornado, is increased. This includes a route option that routes near without actually connecting at Sherburne County Substation. There is a reasonable likelihood that if there were an event that took out the substation, one or more of the

transmission lines near the substation would be damaged as well. Consequently, overall system reliability is reduced.

The issue of geographic diversity is particularly important when constructing new 345 kV transmission lines that serve as the backbone of the overall regional transmission system. If such bulk transmission facilities are built in proximity to each other, single events can affect not only Minnesota, but surrounding states as well.

Q. WHAT ARE YOUR SPECIFIC RELIABILITY CONCERNS REGARDING ROUTE D?

A. If the facilities were constructed along Route D, the facilities would exit the Monticello Substation following a corridor congested with transmission lines, including 345 kV transmission lines. In contrast, the Preferred Route and Routes A, B and C do not share rights-of-way with existing transmission lines. As a result, the outage risk to the region would be higher if the facilities were constructed along Route D than if it were constructed along one of the other routes.

In addition, if Route D were selected, and the new facilities were co-located with existing facilities or next to existing facilities at the crossings of the Mississippi River, reliability would also be reduced. This is because if there were a natural event strong enough to cause damage to one line, all lines would be affected.

Q. ARE THERE ANY RELIABILITY CONSIDERATIONS ASSOCIATED WITH QUARRY SUBSTATION SITE 3?

A. Yes. If Quarry Substation Site 3 is selected, approximately 3.5 miles of new 115 kV line would need to be constructed to tie the new substation to the St. Cloud area 115 kV loop. In contrast, Quarry Substation Sites 1, 2 and 4 are

located on the St. Cloud area 115 kV loop, so only a short connection would be required. To be a truly equivalent alternative to Sites 1, 2 and 4, Site 3 would need to be looped "in and out" and two lines would have to be built on separate rights-of-way to connect the site back to the St. Cloud area loop. If the lines were built on the same structures, a single event could knock out both lines, thereby reducing the reliability of the electrical system serving the St. Cloud area.

Q. DOES QUARRY SUBSTATION SITE 3 POSE ANY LONG TERM SYSTEM PLANNING CONSIDERATION?

A. In addition, because Quarry Substation Site 3 is so small (15 acres), should additional transmission facilities be needed in the area, a new substation site would likely be required.

III. CONCLUSION

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

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DANIEL KLINE, P.E.

STATEMENT Licensed professional engineer with electrical engineering, transmission planning, and project leadership experience ranging from single cities to large multi-state regions with utilities across the country and around the world

EDUCATION

08/07 to Present *University of Idaho* *Moscow, ID*
Master of Engineering in Engineering Management
Focus in Leadership and Financial Processes
Anticipated Graduation Date: May 2010

08/99 to 05/03 *Iowa State University* *Ames, IA*
Bachelor of Science in Electrical Engineering
Emphasis in Power Systems and Microelectronics

WORK EXPERIENCE

04/09 to Present *Xcel Energy Services Company* *Minneapolis, MN*
Senior Engineer, Regional Transmission Planning

- Coordinate involvement of Xcel Energy planning department in regional cost allocation discussions; develop guiding principles, determine how those principles apply in the framework of regional discussions, and negotiate with other stakeholders to find common ground
- Manage participation of all Midwest ISO transmission owners in Planning Advisory Committee
- Represent Xcel Energy in discussions for Upper Midwest Transmission Development Initiative (UMTDI)
- Oversee Xcel Energy participation in Strategic Midwest Area Renewable Transmission (SMART) Study; review study models, shape study assumptions, develop study alternatives
- Manage Xcel Energy participation in regional transmission "seams" issues, including interface with utilities in Canada, North Dakota, South Dakota, and Wisconsin
- Assess FERC rulings and provide input from planning into Company and transmission owner interventions

02/06 to 04/09 *Northern States Power - Minnesota* *Minneapolis, MN*
Transmission Planning Engineer

- Oversee completion of 10-year plan for Xcel Energy's entire Wisconsin service territory. Coordinate and focus efforts of other engineers to complete this work
- Manage study of upper Midwest region focused on identifying necessary electric transmission infrastructure to meet 2016 renewable energy standard milestone. Assist in developing necessary regulatory filings
- Lead the technical analysis and development of a 250-mile, 345 kV transmission line from Fargo, North Dakota to Monticello Generating Plant with capital expenditures of approximately $500 million dollars and assist with necessary regulatory fillings
- Guide projects to inclusion in Midwest ISO Transmission Expansion Plan (MTEP)
- Complete focused study to develop long-term planning solutions for two areas in Wisconsin; resulting projects represent approximately ten years and $35 million worth of capital improvements
- Develop technical regulatory requirements for permit applications in Wisconsin
- Represent Xcel Energy at public meetings to increase awareness of and public involvement in the transmission planning process
- Review and respond to MRO Standards changes with respect to their effect on Xcel Energy
- Represent Xcel Energy to third-parties and the Midwest ISO during generation interconnection proceedings

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- Analyze transmission projects being completed by outside utilities and their effect on Xcel Energy's transmission grid
- Perform analysis of requested transmission interconnections and report on their effect on the transmission network
- Coordinate implementation of projects with internal and external customers, including consultants, project managers, community members, and contractors

07/04 to 02/06 Open Systems International, Inc. Plymouth, MN
Power Systems Engineer

- Analyze customer requirements, created a product implementation plan for Power Systems applications on customer projects, took responsibility for implementing that plan
- Ensure the customer was thoroughly trained in the effective use of the applications they purchased
- Perform Factory Acceptance Testing with the customer
- Plan and implemented the proper commissioning strategy for the applications at a customer site after system installation, ensuring the complete implementation of the application products
- Act as a customer advocate by proposing software enhancements, monitoring software development, and advising OSI management of customer-desired features
- Managed development of Java-based power system applications by tracking and scheduling necessary software upgrades
- Create and verified power flow model for large, interconnected electrical utility
- Configure and tested a variety of applications, ranging from AGC to power flow (transmission and distribution) to geographical information systems
- Present training sessions and workshops to users both familiar with and new to OSI products

07/03 to 07/04 Pacific Gas & Electric Company San Francisco, CA
Transmission Planning Engineer

- Assess transmission grid weaknesses on ten-year horizon for four PG&E territories and more than 5500 MW of customer load
- Assist with development of regulatory filings for 20-mile, $200 million 230 kV line
- Review Nuclear Regulatory Commission voltage stability requirements and studied long-term voltage stability in area around Diablo Canyon Nuclear Power Plant
- Correspond with California Independent System Operator (ISO) as point of contact for issues related to reliable system operation
- Propose and obtained funding for $12 million 230/115 kV, 420 MVA transformer installation
- Present Transmission Grid Expansion Plan Proposal to a group consisting of ISO members, independent power producers, municipal utility representatives, engineering consultants, environmental groups, and consumer watch groups
- Conduct long-term voltage reliability study of Bay Area for various critical contingencies. Results of study were used to determine Bay Area transmission projects over ten year horizon.

03/01 to 07/03 P & E Engineering Co. Carlisle, IA
Electrical Engineer/Electrical Engineering Technician

- Perform voltage and power flow analysis on 34.5kV and 24.9kV collector systems for wind farms in Iowa, North Dakota, Oklahoma, and New Mexico
- Model Council Bluffs Energy Center from 345kV level to 480V motor control centers to initiate coordination study for entire substation
- Conduct transmission planning study for municipal electrical utility resulting in suggested system enhancements and presentation to board of directors

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05/00 to 01/03 *MidAmerican Energy Company* *Urbandale, IA*
Energy Management System Intern
- Update and improve system displays
- Program, update, and maintain dynamic system mapboard
- Manage and maintain Energy Management System

HONORS AND ASSOCIATIONS

Eagle Scout Award Recipient
American Legion Boy's State Attendee
Representative to Mayor's Housing Occupancy Committee, Ames, IA, 2003
Vice-Chairman, Government of the Student Body Finance Committee, 2002-03
Senator, Government of the Student Body, 2002-03
President, Acacia Fraternity, 2001
Member, National Society of Collegiate Scholars
Member, Iowa State University Jazz Ensemble One, 2001-2003
Member, Institute of Electrical and Electronics Engineers, 2003 to Present

PROFESSIONAL SKILLS

Registered Professional Engineer in the State of Minnesota
Skilled public speaker comfortable in technical, political, and social settings in front of large and small groups
Work well in group settings
Strong computer skills in IBM AIX, TRU64 Unix, SuSe and RedHat Linux, DOS, Windows (95, 98, 2000, 2000 Server, 2003 Server, XP) and Macintosh formats.
Programming knowledge in C, C++, and EPCL
Experienced with Power Tools for Windows (PTW), GE Positive Sequence Load Flow (PSLF), and Power System Simulator for Engineering (PSS/E)
Knowledge of Oracle, MySQL, SQL Server, and Sybase relational database platforms
Experienced in design and implementation of Automatic Generation Control, Power Flow, State Estimator, and Contingency Analysis software packages

OTHER INTERESTS

History, Supreme Court decisions and Law, Hockey, Backpacking