ENVIRONMENTAL ASSESSMENT

SOUTH BEND – STONEY CREEK

115 KV TRANSMISSION LINE AND SUBSTATIONS

PUC DOCKET No. E-002, ET-2/TL-08-734

office of energy security

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Abstract

Northern States Power Company d/b/a Xcel Energy and Great River Energy (Applicants) submitted an application to the Minnesota Public Utilities Commission (Commission) for a Route Permit for the South Bend to Stoney Creek Transmission Line and Substations Project (Project) on August 7, 2008, pursuant to the provisions of Minn. Statute 216E.

Applicants are proposing to replace an existing 69 kilovolts (kV) high voltage transmission line (HVTL) and construct two new substations south of Mankato in Blue Earth County. The line would be rebuilt from 69 kV to 115 kV from a new South Bend Substation in Rapidan Township to a new Stoney Creek Substation in Mankato Township and on to the Pohl Road Substation. The approximately eight-mile Project is designed to maintain reliable electric service in the Mankato area.

The Office of Energy Security (OES), Energy Facilities Permitting (EFP) is preparing this Environmental Assessment (EA) in the matter as required for the Route Permit Application, pursuant to Minn. Rule 7849.5700. The content will address the issues elaborated in subdivision 4 of that rule and as determined in the OES Director's Scoping Decision of December 11, 2008.

Persons interested in these matters can register their names on the Project Docket webpage at http://energyfacilities.puc.state.mn.us/Docket.html?Id=19642 or by contacting David Birkholz, Energy Facilities Permitting, 85 7th Place East, Suite 500, St. Paul, Minnesota 55101, phone (651) 296-2878, e-mail: david.birkholz@state.mn.us. Documents of interest can be found at the above website or by going to https://www.edockets.state.mn.us/EFiling/search.jsp and entering "08" and "734" as the year and project identification search criteria.

Following the release of this Environmental Assessment, a Public Hearing will be held in Mankato in February 2009.

Acronyms and Abbreviations

ACSR	Aluminum Conductor Steel Reinforced
ACSS	Aluminum Conductor Steel Supported
APP	Avian Protection Plan
BMP	best management practice
Commission	Minnesota Public Utilities Commission
CN	Certificate of Need
CSAH	County State Aid Highway
dBA	A-weighted sound level recorded in units of decibels
dba	doing business as
EA	Environmental Assessment
EFP	Office of Energy Security Energy Facilities Permitting
EMF	electromagnetic field
HVTL	high voltage transmission line
Hz	Hertz
kV	kilovolt
kV/M	Kilovolt per meter
MDH	Minnesota Department of Health
MN DNR	Minnesota Department of Natural Resources
MN DOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
NERC	North American Electric Reliability Council
NESC	National Electrical Safety Code
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OES	Department of Commerce Office of Energy Security
ppm	parts per million
ROW	Right-of-Way
SFD	Swan Flight Diverter
SHPO	State Historic Preservation Office
SWPPP	Stormwater Pollution Prevention Plan
USDA	United States Department of Agriculture
USDOE	United States Department of Energy
USFWS	United States Fish and Wildlife Service
WMA	Wildlife Management Area

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1.0 Introduction

Great River Energy and Xcel Energy have made a joint application to the Minnesota Public Utilities Commission (Commission) for a Route Permit authorizing construction of a High Voltage Transmission Line (HVTL) and Substations pursuant to the provisions of the Power Plant Siting Act (Minnesota Statute 216E). Throughout this document, the applicants will be referred to as "Applicants" unless specifically referred to as Great River Energy or Xcel Energy.

Minnesota Office of Energy Security (OES) Energy Facility Permitting (EFP) is tasked with conducting environmental review of applications for route permits. The intent of the environmental review process is to inform the public, the applicant, and decision-makers about potential impacts and possible mitigations for the proposed project. Under the alternative permitting process, the requirement is to produce an Environmental Assessment (EA). This EA covers the required environmental review by a) providing information in Section 2 on the regulatory framework and route permit process; b) describing in Section 3 the proposed project and an alternative route segment; c) summarizing in Section 4 the potential effects on people and the environment of the proposed project and the alternative; and d) assessing in Section 5 the feasibility of the proposed project and the alternative.

1.1 Description

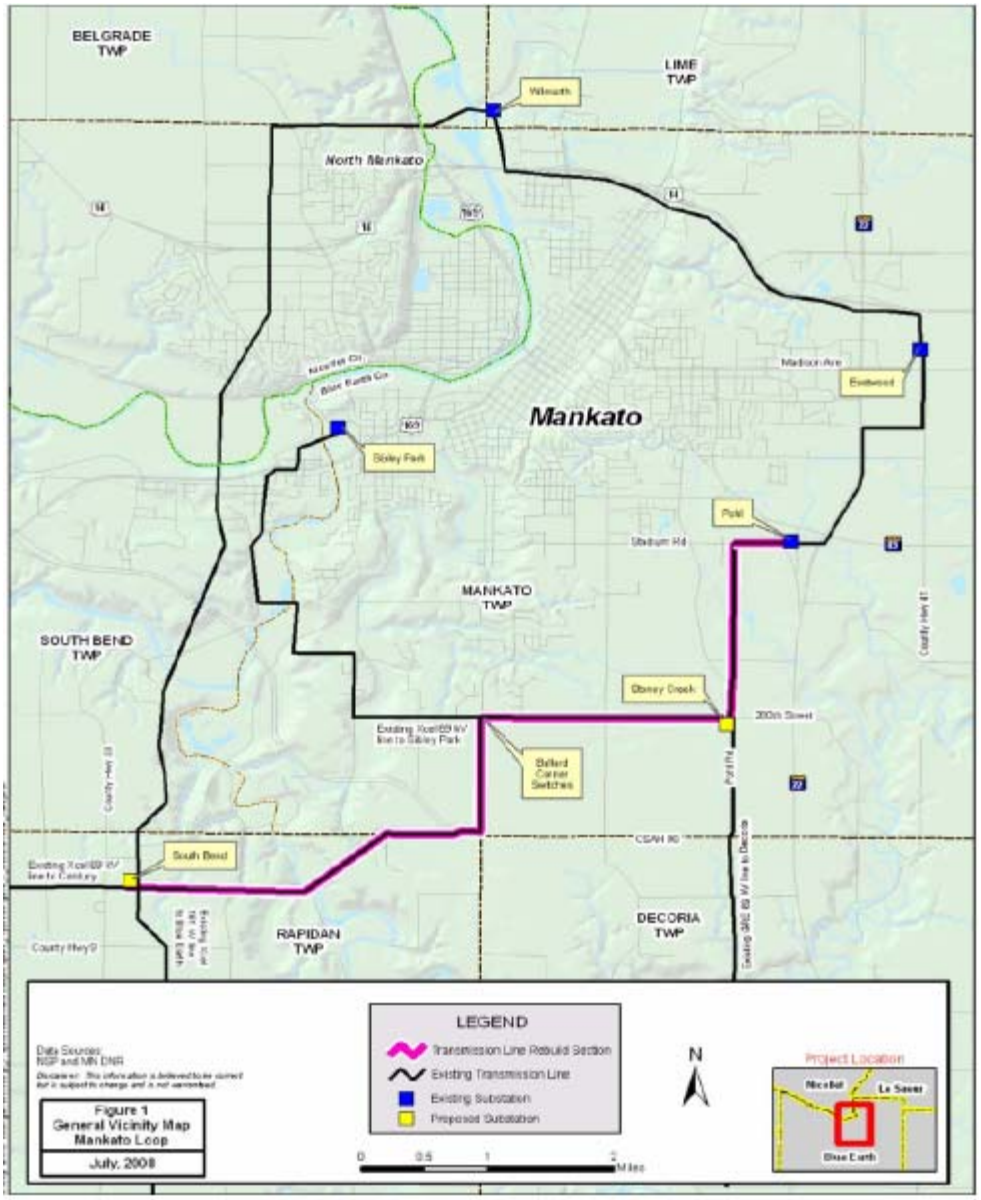
The proposed HVTL would be an 115 kilovolt (kV) alternating current transmission line with two new substations. The permit application is for the construction, operation, and maintenance of a new 115 kV transmission line circuit approximately eight miles in length, connecting a new substation in Rapidan Township to a new substation in Mankato Township, through to the existing Pohl Road Substation. The proposed facilities also would include substation and equipment upgrades at the Eastwood and Wilmarth substations to accommodate the upgraded transmission facilities.

Applicants have proposed to 1) construct a new South Bend 115-161/69 kV substation and rebuild an existing 69 kV transmission line to 115 kV to the Ballard Corner Switches on 200th Street; 2) construct a new Stoney Creek 115/69 kV substation and rebuild an existing 69 kV transmission line to a 115/69 kV double circuit transmission line from the Ballard Corner Switches to the proposed Stoney Creek Substation; and 3) rebuild the existing 69 kV transmission line to 115 kV from the proposed Stoney Creek Substation to the existing Pohl Road Substation. See the Figure 1 on the next page.

1.2 Purpose

The proposed Project is intended to support load growth in the city of Mankato and to improve system reliability by eliminating low voltage and equipment overloads. There are critical contingencies under which customers are at risk of service interruptions. The proposed Project is planned to meet these contingencies by increasing the load serving capability of the electrical system so that electrical service can be maintained during a transformer outage without the need to run additional generation. The proposal also alleviates local service deficiencies by making available two new high voltage sources (the two new substations) in the region.

Figure 1. Project as Proposed



1.3 Sources of Information

Much of the information used in this Environmental Assessment is derived from documents prepared by GRE and Xcel Energy. These include the Route Permit Application, August 7, 2008, hereinafter referred to as the "Application." Discussion of Electromagnetic Field (EMF) issues came primarily from the white paper developed by the Interagency Task Force led by the Minnesota Health Department, The National Institute for Environmental Health and the World Health Organization. Additional information comes from earlier OES Environmental Assessments in similar dockets, other state agencies, such as the Department of Natural Resources, and additional research. First hand information was gathered by site visits along the proposed line.

2.0 Regulatory Framework

In Minnesota, most high voltage transmission line projects go through a two stage regulatory process. First, application is made to the Minnesota Public Utilities Commission for a Certificate of Need (CN). If a CN is granted, the utility must then obtain a Route Permit from the Commission that designates a specific route for the line.

2.1 Certificate of Need Requirement

Because the proposed line is below 200 kV line, it would need to be more than ten miles in length in order to trigger a certificate of need, according to Minn. Statute 216B.2421, subd 2 (3). The new line is approximately eight miles long as proposed. The alternative discussed in this EA would also not exceed ten miles. Therefore, the applicants are not required to obtain a certificate.

2.2 Route Permit Requirement

Minn. Statute 216E.03 subd 2a states, "Any person seeking to construct a large electric power generating plant or a high voltage transmission line must apply to the board for a site permit or a route permit." "High voltage transmission line means a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kilovolts or more," according to Minn. Statute 216E.01 subd 4. The proposed 115 kV transmission line in Rapidan and Mankato townships meets this definition, and the Applicants are required to obtain a route permit from the Commission for the line. However, since it is under 200 kV, the Project qualifies for Alternative Review under Minn. Statute 216E.04 subd 2.

The Commission's obligation is to choose routes that minimize adverse human and environmental impacts while insuring continuing electric power system reliability and integrity, and also while insuring that electric energy needs are met and fulfilled in an orderly and timely fashion. The route permit will contain conditions specifying construction and system operation standards (see a sample Route Permit in Appendix B).

On August 7, 2008, the Applicants applied to the Commission for a route permit for the proposed new power line and substations. They identified a preferred route for the new line in the Application, shown in Figure 1.

Environmental Assessment

For this project, and all other projects under the alternative route permitting process in Minn. Rule 7849.5510-5720, OES Energy Facilities Permitting prepares an Environmental Assessment. The EA contains information on the human and environmental impacts of the proposed project. It also addresses required methods to mitigate such impacts for all of the routes considered. The EA is the only state environmental review document required to be prepared for this Project.

EFP held a public meeting on this project, as required by Minn. Rule 7849.5570, in Mankato on November 12, 2008. This meeting provided the public with an opportunity to learn about the proposed project, to suggest other route alternatives, and to identify concerns that should be

considered by EFP in preparing the EA. The EA will assist the Commission in making its decision on approving a route and on what construction and operation conditions to attach to the final permit. Public comments on the scope of the EA were accepted until November 26, 2006. Copies of the comment letters received regarding this project can be reviewed at http://energyfacilities.puc.state.mn.us/Docket.html?Id=19642.

After consideration of the public comments, the OES Director issued his Scoping Decision on December 11, 2008. A copy of this order is attached in the Appendix. The major concerns expressed by citizens about this project are eminent domain, the use of existing easements, easements in relation to road right-of-way (ROW), landscaping and expansion at cleared substation areas, mitigation for construction and maintenance work within the ROWs, and the potential for future expansion of the system.

Meeting participants also recommended that EFP staff study several environmental questions in the Environmental Assessment including: possible impacts of electromagnetic fields, potential interference of transmission lines with communications such as TV, radio and cell phones, and a question of substation impact on the bald eagle population.

An alternative route option was identified by Mankato Township officials during the public meeting and public comments, and was included in the Scoping Decision. The comments suggested an alternate route for the segment between South Bend and Stoney Creek substations to run along County State Aid Highway (CSAH) 90 rather than 200th Street. This option also includes moving the Stoney Creek down to 200th Street.

In this EA, EFP addresses the major social, environmental and economic concerns associated with the new HVTL as proposed and with the alternative option described above.

Public Hearing

The Commission is required by Minn. Rule 7849.5710 subp 1, to hold a public hearing once the EA has been completed. This hearing will be held in Mankato in February 2009, and will be conducted by an Administrative Law Judge (ALJ). The hearing will be noticed separately and details found online at http://energyfacilities.puc.state.mn.us/Docket.html?Id=19642. Interested persons may comment on the EA at the public hearing. Persons may testify at the hearing without being first sworn under oath. The ALJ will ensure that the record created at the hearing is preserved and will provide EFP with a summary of testimony from the hearing.

Comments received on the Environmental Assessment become part of the record in the proceeding, but OES EFP is not required to revise or supplement the EA document. A final decision on a route permit will be made by the Commission at an open meeting within a couple of months after the public hearing, depending on scheduling opportunities. The process anticipates a decision within six months of the Application.

2.3 Other Permits

The Public Utilities Commission route permit is the only State permit required for routing of high voltage transmission lines, but other permits may be required for certain construction activities, such as river crossings. This EA includes a list of supplementary permits that may be required for the Applicants to complete this project.

Table 1. Potential Required Permits

Permit	Jurisdiction
License to Cross Public Waters or Lands	MN DNR Division of Lands and Minerals
National Pollutant Discharge Elimination System (NPDES) Permit- Construction Stormwater	MPCA
Utility Permit	MN DOT

Once the Commission issues a Route Permit, local zoning, building and land use regulations and rules are preempted per Minn. Statute 216E.10, subd 1. However, the Applicants are still required to obtain relevant permissions, such as road crossing permits.

2.4 Applicable Codes

The transmission line, regardless of route location, must meet all requirements of the National Electrical Safety Code (NESC) and the Rural Utilities Service (RUS) Design Manual for High Voltage Transmission Lines. These standards are designed to protect human health and the environment. They also ensure that the transmission line and all associated structures are built from high quality materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment provided normal routine operational and maintenance is performed.

Utilities must comply with the most recent edition of the National Electric Safety Code, as published by the Institute of Electrical and Electronics Engineers, Inc., and approved by the American National Standards Institute, when constructing new facilities or reinvesting capital in existing facilities. See Minn. Statute 326B.35 and Minn. Rule 7826.0300 subp 1.

The NESC is a voluntary utility developed set of standards intended to ensure that the public is protected. The NESC covers electric supply stations and overhead and underground electric supply and communication lines, and is applicable only to systems and equipment operated by utilities or similar systems on industrial premises. For more information, go to standards.ieee.org/faqs/NESCFAQ.html#q1. The RUS provides leadership and capital to "upgrade, expand, maintain, and replace America's vast rural electric infrastructure." For more information, go to http://www.usda.gov/rus/electric/index.htm.

2.5 Issues Outside the Scope of the EA

The EA will not consider whether a different size or type of transmission line should be built, nor will the EA consider the no-build option. The EA will also not consider the following:

1. The manner in which land owners are paid for transmission rights-of-way easements, as that is outside the jurisdiction of the Commission.

2. Alternatives not described specifically in the Scoping Decision.

3.0 Proposed Project

The applicants propose to rebuild a 69 kV transmission line to 115 kV between a proposed South Bend Substation in Rapidan Township through a proposed Stoney Creek Substation in Mankato Township to the Pohl Substation in Mankato Township. The line as proposed is eight miles long and would require little new right-of-way. (See Figure 1 above for the proposed project location.) The permit application, maps, appendices and other relevant documents may be viewed at http://energyfacilities.puc.state.mn.us/Docket.html?Id=19642.

Table 2. Project Location

County	Township (N)	Range (W)	Sections
Blue Earth	107	27	1, 2, 3
	108	27	25, 36
	108	26	20, 21, 28- 32

3.1 Project Segments

The proposed project comprises two new substations and three separate line segments. The design of the structures in the segments is summarized in Table 3 below.

South Bend Substation

The new Xcel Energy South Bend Substation would be located one-quarter mile east of the intersection of Highway 33 and Huffy Lane and would contain two transformers (one 115-161 kV, 167 megavolt ampere (MVA) unit and one 115-69 kV, 47 MVA unit), four 115 kV circuit breakers, 115 kV switches, one 69 kV breaker, other associated electrical equipment and steel structures supporting the electrical equipment. A new 24 feet by 40 feet electrical equipment control building would be installed on the site. The electrical equipment enclosure would contain all control systems for the substation. An area approximately 350 feet by 460 feet would be graded and fenced for the new substation. The overall substation size would be approximately seven to ten acres. This area includes setbacks, access roads, stormwater ponds and potential transmission line structures. The substation would be designed to accommodate possible future expansion. A new driveway would be installed for the substation along the existing 69 kV line right-of-way going east from CSAH 33.

Also, as part of this segment, a short 161 kV connection (less than 100 feet) would be constructed between the South Bend Substation and the existing Xcel Energy–owned Wilmarth – Winnebago 161 kV line. New transmission line right-of-way of 75 feet would be required for this connection.

South Bend to Ballard Corner Switch

The four miles of the 69 kV transmission line from the proposed South Bend Substation to the Ballard Corner Switches would be rebuilt to 115 kV standards. The new line would be constructed using the same structure configuration (single pole/H-frame) and spans as the existing facilities to keep the conductors within the existing easements. A single 795 Aluminum Conductor Steel Supported (ACSS) conductor per phase would be installed. Weathering steel poles would be used for all structures. All angle structures would be self-supporting, using concrete foundations.

Ballard Corner Switch to Stoney Creek

The two miles of existing 69 kV line from the Ballard Corner Switches to the proposed Stoney Creek Substation would be rebuilt as a double-circuit 115 kV/69 kV transmission line. A single 795 ACSS conductor per phase would be installed for the 115 kV transmission line and a single 336 ACSR conductor per phase would be installed for the 69 kV transmission line. This new double-circuit line would be located within the existing easement area. Direct-embedded weathering steel poles with davit arms would be used for the tangent structures. Self-supporting weathering steel poles with davit arms on concrete foundations would be used for all angle and dead-end structures. The line would be designed to minimize the need for additional right-of-way.

Stoney Creek Substation

The new Great River Energy Stoney Creek Substation would locate a breaker station and substation at the southwest corner of Pohl Road and 200th Street.

The new substation would initially consist of one transformer (115/69 kV, 70 MVA), three 115 kV circuit breakers, three 69 kV circuit breakers, 115 kV and 69 kV switches, other associated electrical equipment and steel structures supporting the electrical equipment. A new 20 feet by 24 feet electrical equipment control building would contain all electrical equipment and control systems for the substation. An area approximately 500 feet by 350 feet would be graded and approximately 240 feet by 160 feet would be fenced for the new substation. A driveway exists at the site off of 200th Street that would be used for access to the Stoney Creek Substation.

Stoney Creek to Pohl

The final segment would consist of rebuilding two miles of 69 kV line between the proposed Stoney Creek Substation, the Pohl Road Tap and the Pohl Road Substation to 115 kV standards. A single 795 ACSS conductor per phase would be installed. Direct embedded weathering steel poles would be used for all tangent structures. Self-supporting weathering steel poles with concrete foundations would be used for all angle and dead-end structures. The line would be designed so that no additional right-of-way is required.

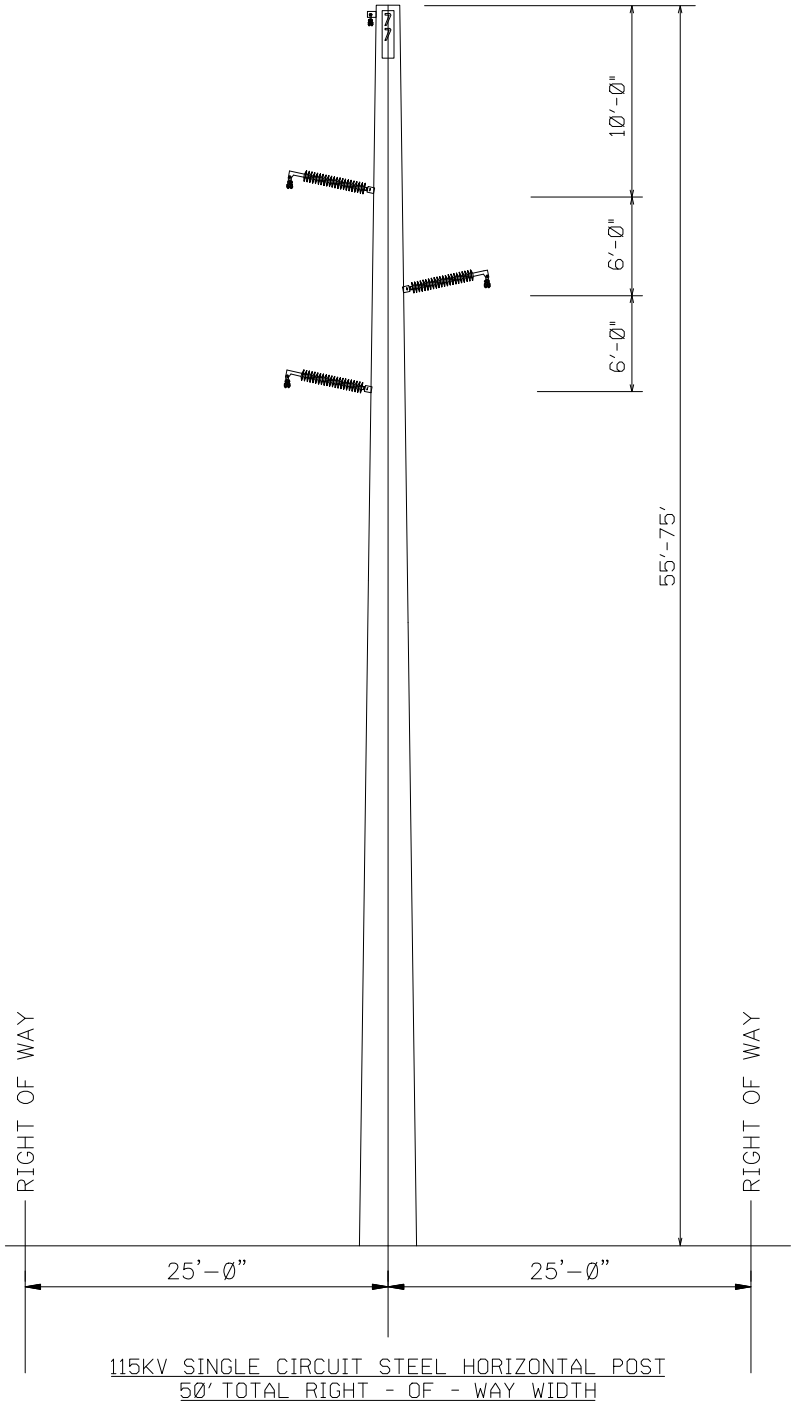
3.2 Right-of-Way

The Applicants are requesting a right-of-way width up to 75 feet wide. Applicants, however, would rebuild the transmission lines for the Project within the existing 50-foot right-of-way wherever reasonably possible. When the line is parallel to a roadway, poles would generally be placed approximately five feet outside the public right-of-way. Therefore, a little less than half of the line right-of-way would share the existing road right-of-way, resulting in an easement of

lesser width required from the landowner. For the Project, approximately four miles of the transmission line would parallel existing roadways, and four would not follow a road corridor.

Figure 2 below shows the general ROW requirements for the line when constructed within an existing easement area.

Figure 2. Typical Right-of-Way Requirements



Right-of-Way Acquisition

Because Applicants intend to rebuild the transmission line within the existing 50-foot right-of-way, the need for new right-of-way acquisition would be limited. All existing easements would be evaluated to determine if the Project can be built without obtaining additional land rights. If an easement would accommodate the Project, the right-of-way agent would still work with the landowner in order to address any construction needs, impacts, damages, or restoration issues. To the extent new right-of-way acquisition is necessary, the evaluation and acquisition process would include title examination, initial owner contacts, survey work, document preparation and purchase. Most of the time, utilities are able to work with the landowners to address their concerns and an agreement is reached for the utilities' purchase of land rights.

In some instances, a negotiated settlement cannot be reached and the landowner may choose to have an independent third party determine the value of the rights taken. Such valuation is made through the utility's exercise of the right of eminent domain pursuant to Minn. Statute 117.

Table 3. Summary of Transmission Structures

Line Type	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Structure Base	Span Between Structures (feet)
115 kV Single Circuit	Single Pole, Horizontal Post	Weathering Steel	75	60-80	Direct Embedded for tangents and self-supporting for angle structures	275-325
115 kV Single Circuit	H-frame Pole	Weathering steel	75	60-80	Direct Embedded for tangents and self-supporting for angles/dead-ends	400-700
115 kV Single Circuit	Single Pole, Horizontal Post	Wood	75	70-85	Direct Embedded	250-300
69/115 kV Double Circuit	Single Pole, Horizontal Post	Weathering Steel	75	50-80	Direct embedded for tangents and self-supporting for angle/dead-end structures	250-325
69/115 kV Double Circuit	Single Pole, Davit Arm	Weathering Steel	75	50-80	Direct embedded for tangents and self-supporting for angle/dead-end structures	250-325

3.3 Project Construction and Maintenance

The Project has a variety of implementations along the line and would use a variety of structures to fit the needs along the various segments (see Table 3 above). Generally:

- The majority of the new line would be constructed using single circuit, weathering steel single poles, with horizontal post construction.
- Wood structures would be used for the Pohl Road Tap section of 115 kV transmission line.
- Steel, double circuit structures with davit arms would be used for the 115 kV/ 69 kV section of the project.
- A few two-pole, weathering steel H-frame structures would be used in areas where the existing 69 kV structures are H-frames.

For the 115 kV sections of the Project the conductor would be a single 795 Aluminum Conductor Steel Reinforced (ACSR). The 69 kV lines would have 336 ACSR conductor. The single-circuit structures would be direct embedded. All self-supporting structures would have drilled pier concrete foundations. As shown in the Table 3 above, different structure types would result in varying span lengths. The average spans for the single pole structures would be approximately 275 to 325 feet. The average spans for the H-frame structures would be approximately 400 to 700 feet.

Construction

Construction would begin after federal, state and local approvals are obtained, property and rights-of-way are acquired, soil conditions are established and design is completed. The precise timing of construction would take into account various requirements that may be in place due to permit conditions, system loading issues, available workforce and materials. Actual construction would follow standard construction and mitigation practices, addressing right-of-way clearance, staging, erecting transmission line structures and stringing transmission lines. Construction and mitigation practices to minimize impacts would be based on the proposed schedule for activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain and other practices. Some construction restrictions and requirements will be reviewed in discussion concerning mitigations later in this document.

Maintenance

The principal operating and maintenance cost for transmission facilities is the cost of inspections, usually done monthly by air. Annual operating and maintenance costs for transmission lines in Minnesota and the surrounding states vary. However, past experience shows that for voltages from 115 kV through 345 kV, costs are approximately $300 to $500 per mile. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used and the age of the line.

3.4 Project Implementation

The Applicants anticipate a late 2009 in-service date. Construction would be expected to begin in mid 2009. This schedule is based on information known as of the date of the application filing and upon planning assumptions that balance the timing of implementation with the availability of crews, material and other practical considerations. This schedule may be subject to adjustment and revision as further information is developed.

Project Costs

The Applicants have estimated that the transmission line and substation improvements would cost approximately $18.3 million, as follows:

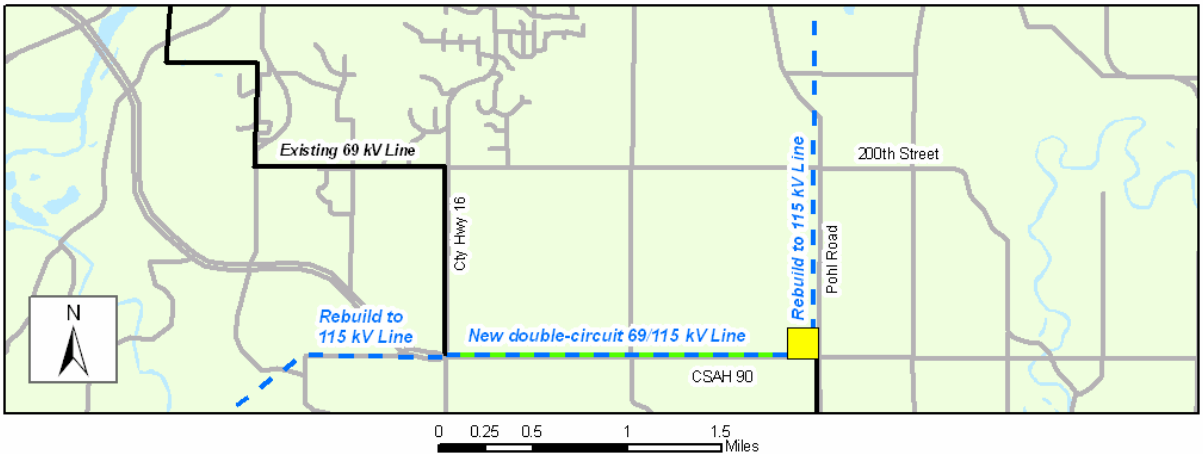
South Bend Substation	$6,500,000
Stoney Creek Substation	$4,500,000
Transmission Line Rebuild	
Segment 1 (South Bend – Ballard)	$4,065,000
Segment 2 (Ballard – Stoney)	$2,110,000
Segment 3 (Stoney – Pohl)	$1,140,000
Total Project Costs:	$18,315,000

3.5 Route Segment and Substation Alternative

Mankato Township officials requested the OES Director's Scope include an alternate location for the Stoney Creek Substation, which would include a minor route segment alteration to accommodate the placement (see Figure 3). The township request is to locate the new substation at the intersection of CSAH 90 and Pohl Road instead of along 200th Street. The township argues the Applicant's proposal would interfere with future development along 200th Street.

In this alternative, a new 69/115 kV double-circuit line would be constructed along CSAH 90 from Highway 16 to Pohl Road on double-circuit structures, instead of one mile north along 200th Street. Xcel Energy would remove its single-circuit Century – Ballard Corner Switches 69 kV transmission line along 200th Street from Highway 16 to Pohl Road. A single-circuit 115 kV transmission line, replacing the existing 69 kV transmission line, would run north from the alternatively located Stoney Creek Substation along Pohl Road Substation.

Figure 3. Alternative Substation and Route Segment Location



4.0 Assessment of Impacts and Mitigating Measures

The construction of a transmission facility involves both short and long-term impacts. An impact is a change to the pre-construction environment as a direct or indirect result of the proposed action and may be positive or negative. Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and occur later in time or are farther removed in distance, but are still reasonably foreseeable.

This section describes the potential impacts on resources and the possible mitigation measures intended to minimize impacts caused by the construction and future operation and maintenance of the proposed transmission facility.

4.1 Human Settlement

Located in Blue Earth County, the transmission line would run east from Rapidan Township through Mankato Township. Affected transportation corridors in the area of the project are CSAH 90, Highway 16, 200th Street, Pohl Road and Stadium Road.

The estimated population of Rapidan Township was 1,023 in 2007.[1] The 2000 U.S. Census calculated the township population as 98.5 percent white. The 1999 median annual household income was $53,839, well above the reported state median of $47,111, and the percentage of people living at or below poverty was 3.2 percent.[2] The estimated population of Mankato Township was 1,740 in 2007. The 2000 U.S. Census calculated the township population as 98.1 percent white. The 1999 median annual household income in the township was $64,471, well above the state median. The percentage of people living at or below poverty was 3.7 percent.

The townships had higher household income than the county as a whole, lower poverty rates and smaller percentages of non-white or Hispanic residents. So the Project would not fall disproportionately on lower income or minority populations.

Construction of the project should result in short-term positive economic impacts in the form of increased spending on lodging, meals and other consumer goods and services. It is not anticipated that the project would create new permanent jobs, but it would create temporary construction jobs that would provide a one-time influx of income to the area.

There would also be some long-term beneficial impacts from the new transmission facilities, especially an increase to the county's tax base resulting from the incremental increase in revenue from utility property taxes. The availability of reliable power in the area would also have a positive effect on local businesses and the quality of services provided to the general public.

These general socioeconomic indicators suggest impacts resulting from the project would be primarily positive, with increased tax revenue and an influx of wages and expenditures made at local businesses during construction.

[1] Minnesota State Demographic Center and the Metropolitan Council, Annual Estimates of City and Township Population, Households and Persons Per Household, 2000-2007 (July 28, 2008).
[2] U.S. Census Bureau, <http://factfinder.census.gov>

Property Values
One of the first concerns of many residents near existing or proposed transmission lines is how that proximity to the line could affect the value of their property. Research on this issue does not identify a clear cause and effect relationship between the two. Instead, the presence of a transmission line becomes one of several factors that interact to affect the value of a particular property.

The Wisconsin Public Service Commission (WPSC) addressed the issue of changes in property value associated with high voltage transmission lines in their *Final Environmental Impact Statement* on the Arrowhead – Weston Electric Transmission Line Project. Their analysis of the relationship between property values and transmission lines looked at approximately 30 papers, articles and court cases covering the period from 1987 through 1999.

The WPSC analysis identified two types of property value impacts that property owners may experience: potential economic impact associated with the amount paid by a utility for a ROW easement, and potential economic impact regarding the future marketability of the property.

The Final EIS provides six general observations from the studies it evaluated. These are:

- The potential reduction in sale price for single family homes may range from 0 to 14 percent.
- Adverse effects on the sale price of smaller properties could be greater than effects on the sale price of larger properties.
- Other amenities, such as proximity to schools or jobs, lot size, square footage of a house and neighborhood characteristics, tend to have a much greater effect on sale price than the presence of a power line.
- The adverse effects appear to diminish over time.
- Effects on sale price are most often observed for property crossed by or immediately adjacent to a power line, but effects have also been observed for properties farther away from the line.
- The value of agricultural property is likely to decrease if the power line poles are placed in an area that inhibits farm operations.

Any potential impacts of property values would typically be mitigated through negotiation in an easement agreement between the Applicants and the landowner.

Displacement
Siting and construction of the transmission line and structures will not necessitate the displacement of persons from their residences or businesses. Mitigative measures are not necessary.

Noise
Noise is measured in units of decibels (dB), or sound pressure level. The sound pressure level for purposes of human hearing is measured with the A-weighted decibel scale or dB(A). Potential noise associated with the proposed project includes sources associated with initial construction and long-term operation of the proposed project.

Short-term exceedance of daytime noise standards would be intermittent and temporary in nature. Impacts from general construction noise are expected to occur during daytime hours as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction personnel to and from the work area.

Long-term operational noise would be associated with the insulators, transmission conductor hardware, and transformers at the substations. The level of noise is dependent upon the conductor conditions, voltage levels and weather conditions. Conductors and transformers may create subtle crackling noise due to the electric ionization of moist air near the wires when it is rainy, damp, or foggy. The most stringent noise standard in Minnesota is the residential nighttime standard of 50 dB(A) L_{10}. (A library setting is a common referenced equivalent for 50 dB(A)[3] – See Table 4.) The noise generated from the proposed transmission line is not expected to exceed approximately 30 dB(A), which is below typical ambient levels.

The transformers for the Project would be designed not to exceed an average sound level at full-rated voltage with all fans and pumps in operation of 75 dBA (measured at 2 meters from the transformer edge). The nearest occupied home to the proposed South Bend Substation is 1,200 feet away and the nearest occupied home to the proposed Stoney Creek Substation is 500 feet away. In either case, it would be very unlikely that substation noise would be audible at these homes. Long-term noise impacts from the project are not anticipated.

Table 4. Common Sound Levels and Sources

Sound Pressure Level (dBA)	Noise Source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chainsaw
80	Heavy Truck Traffic
70	Business Office
60	Conversational Speech
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

[3] Minnesota Pollution Control Agency, *A Guide to Noise Control in Minnesota, Acoustical Properties, Measurement, Analysis and Regulation* (2008).

Aesthetics - Visual Impacts

Aesthetics refer to the natural and human modified landscape features or visual resources that contribute to the public's experience and appreciation of the environment. Wetlands, surface waters, landforms, forests and vegetation patterns are among the natural landscape features that define an area's visual character, whereas buildings, roads, bridges and other structures reflect human modifications to the landscape. The level of impact to visual resources generally depends on the sensitivity and exposure of a particular viewer and can vary greatly from one individual to the next. It is, therefore, difficult to predict whether a transmission line project would alter the perceived visual character of the environment and constitute a negative visual impact.

The proposed Project would result in limited perceptual changes to the viewshed. The proposed route follows the existing transmission line, and the proposed structures would be similar to, but slightly taller than the existing structures along the route. The proposed transmission line follows the existing line through cultivated lands, several areas of forested land, and crosses a river and wetlands.

The proposed transmission line and structures would add to the changing landscape of the area. Aesthetic impacts can be mitigated through minimizing tree clearing. In many cases low-growing shrubs or other vegetation can be planted in the ROW to blend the difference between the ROW and adjacent wooded areas. In some instances, planting or maintaining a vegetated screen between the substation or transmission line and sensitive features such as homes or scenic areas may also minimize the visual intrusion from the proposed Project.

In an effort to mitigate the potential visual impacts from the transmission project the Applicants have committed to using existing road and utility rights-of-way and maximizing setbacks from homes to the greatest extent practicable. Other potential mitigation measures could include:

- Considering input pertaining to visual impacts from landowners or land management agencies prior to final location of structures, rights-of-way, and other areas with the potential for visual disturbance.
- Preserving the natural landscape and preventing any unnecessary destruction of the natural surroundings in the vicinity of the project during construction and maintenance.
- Crossing wetlands, lakes, and surface flows in the same location as existing transmission lines to the extent practicable.
- Constructing substation equipment in an area on the property that is as far out of view from neighboring properties as possible.

Recreation

Recreational opportunities near the proposed South Bend Substation include the Red Jacket Trail that runs within 1,400 feet to the north and west of the proposed site. The Project will not directly impact this resource, but the substation may be visible from the trail. Screening or similar options mentioned above could be employed to help mitigate the effect. There should be no impacts to recreational opportunities near the Stoney Creek Substation site or along the proposed route from the Stoney Creek Substation to the Pohl Road Substation.

Television and Radio Interference

The corona effect on transmission line conductors in rare circumstances can produce electromagnetic interference or high frequency (~120 Hz) electric noise that can potentially cause radio, television, and communication system interference. Radio interference is limited to amplitude modulation broadcast bandwidths and typically does not impact frequency modulation broadcasts. Television interference caused by corona usually occurs during foul weather when the conditions for corona are ideal. Corona-related television interference is rare and generally only a concern for conventional receivers within approximately 600 feet from the transmission line. Satellite and cable receivers are not affected by corona-generated electromagnetic interference.

This phenomenon is generally associated with transmission lines that are operating at 345 kV or greater. No impacts are anticipated. If radio or television interference occurs because of the transmission line, the Applicants would be required to work with the affected landowner to restore reception to the quality prior to construction.

Archaeological and Historical Properties

An October 2007 review of records at the Minnesota State Historic Preservation Office (SHPO) identified five historic architectural properties located within one mile of the proposed South Bend Substation. These include Rapidan School, grain elevators, a creamery, Rapidan Station Bungalows and Bridge No. 90534. None of these properties is listed on the National Register of Historic Places (NRHP). There were no historic architectural properties located within one mile of the proposed Stoney Creek Substation or the proposed route from the Stoney Creek Substation to the Pohl Road Substation. However, the Applicants have committed to surveying proposed substation locations for buried artifacts.

Although there are no identified resources that would be impacted by the proposed route and substation locations, unreported properties could exist in limited areas. The proposed route would avoid impacts to identified archaeological and historic resources to the extent possible. Should an impact be identified, Xcel Energy or Great River Energy would consult with SHPO on whether the resource is eligible for listing in the NRHP. Avoidance would be a preferred action or mitigation for Project-related impacts on NRHP-eligible archaeological and historic resources. Spanning across the area is also a potential mitigation for certain archaeological findings.

Transportation

Throughout the construction phase of the project, local motorists may be temporarily inconvenienced by the increase in construction vehicles on the roadways and minimal delays in traffic. Construction will not impact the community's emergency public infrastructure that is provided by the city of Mankato. Impacts to transportation would be localized and short term. Conductors and overhead wire stringing operations would use guard structures to eliminate potential delays. When appropriate, lead vehicles would accompany the movement of heavy equipment. Traffic control barriers and warning devices would be used when appropriate.

4.2 Public Health and Safety

The transmission line and associated facilities as proposed would be designed to meet or exceed all relevant local and state codes, the National Electric Safety Code as noted on p. 9, and Xcel Energy and Great River Energy standards. Standards would be met for, but not limited to, clearance to ground, clearance to crossing utilities, clearance to buildings, right-of-way widths, erection of power poles, and stringing of transmission line conductors. All applicable safety procedures would be followed during and after installation. The proposed transmission lines would be equipped with protective devices to safeguard the public from the transmission lines if an accident should occur and a structure or conductor would fall to the ground. The protective equipment would de-energize the line should an event occur. In addition, the substation facilities would be fenced and access limited to authorized personnel.

Electric and Magnetic Fields

Electric and magnetic fields arise from the voltage and the flow of electricity (current) through a conductor (wire or transmission line). The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the electric current. The electric field associated with high voltage transmission lines "extend" from the energized conductors to other nearby objects whereas the magnetic field "surrounds" the conductor. Together, these fields are generally referred to as electric and magnetic fields or EMF. A summary of electric and magnetic properties is summarized below in Table 5.

Table 5. Summary of Electric and Magnetic Field Properties [4]

Electric Fields	Magnetic Fields
Electric fields arise from voltage.	Magnetic fields arise from current flows.
Their strength is measured in volts per meter (V/m).	Their strength is measured in amperes per meter (A/m). Commonly, EMF investigators use a related measure, flux density (in microtesla (μT) or millitesla (mT) instead.
An electric field can be present even when a device is switched off.	Magnetic fields exist as soon as a device is switched on and current flows.
Field strength decreases with distance from the source.	Field strength decreases with distance from the source.
Most building materials shield electric fields to some extent.	Magnetic fields are not attenuated by most materials.

Electrical fields are created by voltage. Voltage can be described as the potential difference between two points and will always try to drive an electric current. The voltage on any conductor produces an electric field that extends from the wire in all directions. The intensity of electric fields is associated with the voltage of the transmission line and is measured in kilovolts

[4] World Health Organization, "What are Electromagnetic Fields?", *Health and Environment Briefing Pamphlet*, Series 32 (1999).

per meter (kV/m). Some typical electric field strengths measured near common household appliances are presented in Table 6.

Table 6. Typical Electric Fields (kV/m) from Common Appliances [5]

Source	Electric Filed Strength (at a distance of 30 cm)
Iron	.12
Refrigerator	.12
Toaster	.08
Coffee machine	.06
Vacuum cleaner	.05

Transmission line electric field levels are typically greatest near the center of the right-of-way with levels decreasing moving away from the central alignment. The electric field associated with a high voltage transmission line may extend from the energized conductors to other nearby objects such as the ground, towers, vegetation, buildings, and vehicles. These objects are commonly referred to as screeners. The screening effect associated with these and other objects reduces the strength of transmission line electric fields. Electrical fields at maximum conductor voltage for the proposed project are presented in Table 7. Maximum conductor voltage is defined as the nominal voltage plus 5 percent, or 121 kV.

Table 7. Calculated Electric Fields (kV/m) for Proposed 115 kV Transmission Line Designs

Structure Type	Maximum Voltage (kV)	Distance to Proposed Centerline										
		-300'	-200'	-100'	-50'	-25'	0'	25'	50'	100'	200'	300'
H-Frame 115kV Wood Pole Single Circuit	121	0	0.01	0.09	0.52	1.26	0.47	1.25	0.52	0.09	0.01	0
Davit Arm 115kV/69kV Steel Pole Double Circuit	121	0	0.01	0.03	0.10	0.62	0.71	0.22	0.05	0	0	0

[5] Ibid.

Structure Type	Maximum Voltage (kV)	Distance to Proposed Centerline										
		-300'	-200’	-100'	-50'	-25’	0'	25’	50'	100'	200'	300'
Davit Arm 115kV/69kV Steel Pole Double Circuit with Distribution Underbuild	121	0	0	0.01	0.08	0.18	0.13	0.06	0.03	0	0	0
Horizontal Post 115kV Pole Single Circuit	121	0	0.01	0.06	0.25	0.53	0.89	0.62	0.21	0.06	0.01	0
Horizontal Post 115kV Wood Pole Single Circuit with Distribution Underbuild	121	0	0.02	0.07	0.20	0.24	0.15	0.30	0.17	0.06	0.02	0
H-Frame 115 kV Steel Pole Single Circuit	121	0	0.01	0.09	0.52	1.26	0.47	1.25	0.52	0.09	0.01	0

The proposed 115 kV transmission line would have a maximum electric field intensity range of approximately 0.13 to 1.26 kV per meter, one meter above ground, significantly less than the maximum limit of 8 kV per meter permit condition imposed by the Commission in other high voltage transmission line applications. The standard was designed to prevent serious hazard from shocks when touching large objects, such as tractors, parked under extra high voltage transmission lines of 500 kV or greater.

Magnetic Fields

Electric current passing through a conductor produces a magnetic field in the area surrounding the wire. Similar to electric fields, magnetic fields are strongest near the conductor and diminish with distance. Magnetic fields however, are not shielded by most common materials and easily pass through them. The magnetic field may also be called magnetic flux density (or magnetic induction) and is measured in units of milligauss or microtesla. The estimated magnetic fields based on the proposed line and structure designs are presented in Table 8. The expected magnetic fields for the structure type and voltage have been calculated at various distances from the centerline.

Table 8. Calculated Magnetic Flux Density (milligauss) for Proposed 115 kV Transmission Line Designs

Structure Type	System Condition	Current (Amps)	Distance to Proposed Centerline								
			-300'	-200'	-100'	-50'	0'	50'	100'	200'	300'
H-Frame 115kV Wood Pole Single Circuit	Peak	78	0.13	0.30	1.20	4.28	16.50	4.41	1.28	0.34	0.16
	Average	46.8	0.08	0.18	0.72	2.57	9.90	2.65	0.77	0.20	0.09
Davit Arm 115kV/69kV Steel Pole Double Circuit	Peak	78	0.02	0.05	0.29	1.48	7.79	1.56	0.32	0.05	0.02
	Average	46.8	0.01	0.03	0.18	0.89	4.67	0.94	0.19	0.03	0.01
Davit Arm 115kV/69kV Steel Pole Double Circuit with Distribution Underbuild	Peak	78/500	0.36	0.72	2.35	6.84	21.46	6.05	1.81	0.50	0.24
	Average	78/300	0.22	0.43	1.41	4.10	14.67	3.63	1.09	0.30	0.15
Horizontal Post 115kV Wood Pole Single Circuit	Peak	78	0.07	0.17	0.66	2.11	8.38	2.44	0.76	0.21	0.10
	Average	46.8	0.04	0.10	0.39	1.26	5.03	1.46	0.46	0.13	0.06
Horizontal Post 115kV Wood Pole Single Circuit with Distribution Underbuild	Peak	78/40	0.10	0.21	0.64	1.62	4.42	1.87	0.65	0.18	0.08
	Average	46.8/24	0.06	0.12	0.39	0.97	2.65	1.12	0.39	0.11	0.05
Horizontal Post 115 kV Steel Pole Single Circuit	Peak	78	0.07	0.17	0.66	2.11	8.38	2.44	0.76	0.21	0.10
	Average	46.8	0.04	0.10	0.39	1.26	5.03	1.46	0.46	0.13	0.06

Magnetic fields are not singularly associated with transmission lines. People are exposed to varying magnetic fields to a greater or lesser extent throughout each day whether at home or in schools and offices. A U.S. government study conducted by EMF Research and Public Information Dissemination Program determined that most people in the United States on average are exposed to magnetic fields of 2 mG or less daily. Median magnetic field readings for a select number of common home and business appliances are presented in Table 9.

Table 9. Typical Magnetic Fields (milligauss) from Common Appliances [6]

Source	Distance from Source			
	0.5-foot	1-foot	2-feet	4-feet
Baby Monitor	6	1	-	-
Computer Displays	14	5	2	-
Fluorescent Lights	40	6	2	-
Copy Machines	90	20	7	1
Microwave Ovens	200	4	10	2
Electric Pencil Sharpeners	200	70	20	2
Vacuum Cleaner	300	60	10	1
Can Opener	600	150	20	2
Color Televisions	NA	7	2	-

There are currently no state or federal exposure standards for magnetic fields. Florida and New York are the only two states in the country that have set standards for magnetic field exposure (150 mG limit in Florida and 200 mG limit in New York). These exposure limits were not based on scientific analysis, but in response to maintaining transmission systems within historic levels. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has developed occupational and residential guidelines for EMF exposure (see Table 10 below). They have also concluded that available data regarding potential long-term effects, such as increased risk of cancer, are insufficient to provide a basis for setting exposure restrictions.

Table 10. Voluntary Exposure Guidelines for EMF [7]

Exposure	Electric Field (kV/m)	Magnetic Field (mG)
Occupational	8.3	4,200
General Public	4.2	833

Research on the effects of electric and magnetic fields to human health have been studied and debated since the 1970's. Conclusions have ranged from no significant association between exposure to EMF and health effects to a weak association between the two. A number of national and international health agencies (e.g., The Minnesota Department of Health, The World Health Organization, and The National Institute of Environmental Health Sciences) have generally concluded in their research that there is insufficient evidence to prove a connection between EMF exposure and health effects. Research has not been able to establish a cause and effect relationship between exposure to magnetic fields and human disease, nor a plausible biological mechanism by which exposure to EMF could cause disease.

[6] The National Institute of Environmental Health Science. *Electric and Magnetic Fields Associated with the Use of Electric Power*, (June 2002): 34-36.
[7] Ibid. 13: 47.

In Fact Sheet, WHO/322, *Electromagnetic Fields and Public Health: Exposure to Extremely Low Frequency Fields*, June 2007, The World Health Organization provided an update. In many studies, a weak, statistical link between exposure to EMF and incidence of childhood leukemia has been noted. Additionally, some epidemiologic studies making a regression analysis of leukemia cases have found a statistical association. A similar link has not been noted with other types of cancer. In its report, after reviewing recent studies, the World Health Organization concludes that laboratory evidence does not support these findings:

> … epidemiological evidence is weakened by methodological problems, such as potential selection bias. In addition, there are no accepted biophysical mechanisms that would suggest that low-level exposures are involved in cancer development. … Additionally, animal studies have been largely negative. Thus, on balance, the evidence related to childhood leukaemia is not strong enough to be considered causal. … Regarding long-term effects, given the weakness of the evidence for a link between exposure to ELF [extremely low frequency] magnetic fields and childhood leukaemia, the benefits of exposure reduction on health are unclear.

Although scientists are still debating whether EMF is a hazard to health, at the current time in the United States, there are no federal standards for occupational or residential exposure to 60-Hz EMF.

The following resource provides additional information regarding electric and magnetic fields: *Electric and Magnetic Fields Associated with the Use of Electric Power*, The National Institute of Environmental Health Sciences, June 2002, and can be found on the internet at: http://www.niehs.nih.gov/health/topics/agents/emf/docs/emf2002.pdf.

To assist the public in understanding this issue, Applicants can provide information to the public, interested customers and employees. Applicants can also provide measurements (i.e. distances from transmission lines, substations, and associated equipment) for landowners, customers and employees who request them. In addition, the applicants would use structure designs that minimize magnetic field levels and where practicable, locate facilities in areas affecting the fewest number of people. Access to any substations would be restricted by fences or barriers.

Pacemakers

Research has established that EMF can potentially interfere with cardiac pacemakers and implantable cardioverter defibrillators under certain circumstances. Electric and magnetic fields may interfere with an implanted cardiac device's ability to sense normal electrical activity in the heart if the electric field intensity is high enough to induce body currents strong enough to cause interaction. Modern bipolar devices are much less susceptible to interactions with electric fields. Medtronic and Guidant, manufacturers of pacemakers and implantable cardioverter defibrillators, have indicated that electric fields below 6 kV/m are unlikely to cause interactions affecting operation of most of their devices. Older unipolar designs are more susceptible to interference from electric fields. Research suggests that the earliest evidence of interference occurred in electric fields ranging from 1.2 to 1.7 kV/m.

In the unlikely event a pacemaker is impacted, the effect is typically a temporary asynchronous pacing. The pacemaker would return to its normal operation when the person moves away from the source of the interference. Individuals using such devices should consult with their doctor regarding recommended precautions or avoidance. The interference of a cardiac pacemaker

implant by high voltage transmission line electric and magnetic fields cannot be excluded, but the risk of the interference inhibition in everyday life is small. No mitigation is necessary.

Stray Voltage

Electrical supply systems delivering power to farms, homes, and businesses are grounded to the earth to make them safe and to ensure their reliability. Grounding of these electrical supply systems results in a small amount of current moving through the earth. A small voltage called neutral-to-earth voltage may develop at each point where the electrical system is grounded. When neutral-to-earth voltage is found near animal contact points at levels considered to have potential impact on animals, it is often called stray voltage. Stray voltage is the difference in voltage measured between two points contacted simultaneously by a person or animal (typically less than 10 volts).

Stray voltage arises from poor electrical connections, deteriorated insulation, or faulty equipment. Some sources of stray voltage are cathodic protection systems, telephone systems, and direct current power lines. Stray voltage has been raised as a concern on some dairy farms because of the potential for dairy cows to come into contact with two points and provide a conducting path for current to flow, thereby impacting operations and milk production.

In instances when transmission lines have been shown to contribute to stray voltage, the electric distribution system directly serving the farm/structure was directly under or parallel to the transmission line. These circumstances are considered when installing transmission lines and can be readily mitigated. Appropriate measures would be taken during transmission line detailed design and construction to prevent the potential for any stray voltage problems for this project. Applicants would be required by permit condition to promptly address and rectify any stray voltage problems that arise during transmission line operation.

4.3 Land-based Economies

Along with human impacts, an energy facility installation may have an impact on local economies as well. Land-based economies in particular have a potential interface with transmission or substation projects.

Agriculture

Blue Earth County has strong economic ties to agriculture. It ranks among the top 20 counties in the state in hogs and pigs, corn for grain and soybeans. According to the 2002 Census of Agriculture, United States Department of Agriculture, Minnesota Agricultural Statistics Service, approximately $210 million was generated in both crop and livestock sales in 2002.

Approximately 13.28 acres of land would be permanently impacted by the Project. Approximately 0.08 acres of land (primarily agricultural) would be permanently impacted by the installation of the transmission line structures. Approximately 6.6 acres of agricultural land would be permanently impacted by the installation of the substation at the South Bend site. The 6.6-acre impact area includes the fenced-in area of the substation footprint, storm water pond, access road and set back area. There would be approximately four acres of permanent impacts to agriculture due to construction of the Stoney Creek Substation.

Construction of the Project would require repeated access to structure locations to install foundations, structures and conductors. Equipment used in this process includes drill rigs, concrete trucks, backhoes, cranes, boom trucks and assorted small vehicles. Operation of these vehicles on farm fields can cause rutting and compaction, particularly during springtime and otherwise wet conditions.

Where additional right-of-way or land is required, landowners would be compensated for the use of their land through easement or fee payments. Additionally, to minimize loss of farmland and to ensure reasonable access to the land near the poles, Applicants intend to place the poles approximately five feet from the roadway right-of-way. When possible, Applicants would attempt to rebuild the transmission lines before crops are planted or following harvest.

Where possible, springtime construction would be avoided. However, if construction during springtime is necessary, disturbance to farm soil from access to each structure location would be minimized by using the shortest access route. This may require construction of temporary driveways between the roadway and the structure, but would limit traffic on fields between structures. Construction mats may also be used to minimize impacts on the access paths and in construction areas.

The Applicants would compensate landowners for any crop damage or soil compaction that occurs as a result of the Project.

Forestry

There are no forested areas where species are harvested along the proposed route. The proposed substations and transmission line would be located on what was historically the prairie grassland region of Minnesota. The primary tree cover in the area is associated with waterways and homesteads. No economically important forestry resources are located along the proposed route.

Tourism

Rapidan Township is primarily an agricultural area while Mankato Township is more urban, falling partially within the city limits of Mankato. Visitors to the area are most likely to visit the city of Mankato for activities related to tourism. For instance, Mankato plays host to the Minnesota Vikings training camp in the late summer. Possible impacts on the Red Jacket Trail were addressed earlier. No additional impacts are anticipated.

Mining

Surficial features ranging from glacial lakes, outwash channels and ground moraines predominantly cover the area. Aggregate resources (glacial deposits) range in quality from slightly desirable to moderately and highly desirable for mining sand and gravel. The primary underlying bedrock includes Odovician and Cambrian sandstone, shale and dolomite to the south and clay to the north (MN DNR, Land and Minerals Division).

According to MN DOT county pit maps for Blue Earth County, there are no inactive or active gravel pits located near the proposed substation sites or the portions of the transmission line being rebuilt. In addition, the proposed substation sites and line rebuild areas would not impact active mining operations.

4.4 Environmental Impacts

In addition to potential impacts on the population and local economies, a transmission project holds the potential to have an impact on resources within the natural environment as well.

Soils and Geology
Nominal disturbance or compaction of soils would likely result in areas where the transmission line structures and substation would be placed. In addition, soils exposed during construction may be vulnerable to erosion until stabilized. It is not anticipated that bedrock would be encountered during the construction of the project. Also, construction, except for the South Bend substation location, should not result in any farmland conversion.

Soil erosion control best management practices would be employed to minimize loss of topsoil. Areas disturbed would be returned to their pre-construction condition. Transmission line route permits generally require use of soil erosion controls and require soils compacted by construction activities to be restored to pre-construction condition upon project completion. If de-watering due to groundwater intrusion is necessary, de-watered groundwater would be properly stored and sediments settled out and removed before the water would be discharged.

The Applicants would implement best management practices during construction in an effort to reduce dust, erosion, and minimize compaction. Methods commonly used to control soil erosion and assist re-establishing vegetation may include prompt seeding, silt fences, construction during frozen conditions where practicable, and erosion control blankets. No permanent impacts to the soil or geology within the proposed project area are anticipated.

Larger disturbed areas (e.g., the proposed substations) would be regulated by the Minnesota Pollution Control Agency (MPCA) through a National Pollution Discharge Elimination System (NPDES) permit and Stormwater Pollution Prevention Plan (SWPPP) prepared for the project. Mitigation under the NPDES includes implementation of the SWPPP with the appropriate erosion control methods developed specifically for the site. Compliance with the MPCA stormwater program would be a condition of the route permit.

Air Quality Resources
There are minimal air quality impacts associated with transmission line construction and operation. The only potentially direct air quality issue associated with transmission lines is the production of ozone and nitrogen oxides resulting from the corona effect. The corona effect is the ionization of air in the electric field at the surface of a transmission line and may be a contributing source of audible noise, electromagnetic radiation, and chemical reactions. In this case, the chemical reactions that take place when corona is present result in minute amounts of ozone and nitrogen oxides being produced. Approximately 90 percent are ozones (oxidant produced), with the remaining 10 percent principally nitrogen oxides.

Corona is an undesirable occurrence for electric transmission line facilities, as it is oftentimes caused by imperfect conductor support hardware, faulty insulators or cracks and separations in the line. The corona effect is cumulative in that its presence contributes to increased deterioration of the transmission facility components and could reduce electric transmission reliability if left unchecked.

The Clean Air Act, National Ambient Air Quality Primary Standard (2008) for ozone in an area is 0.075 parts per million (ppm). Studies designed to monitor the production of ozone under transmission lines have essentially been unable to detect a significant increase in ozone from a 115 kV transmission line. Calculations referenced from the Bonneville Power Administration (BPA), *Corona and Field Effects Program Ver. 3* (U.S. Department of Energy, BPA, Undated) for a standard single circuit 115 kV transmission line project predicted the maximum ozone concentration of 0.008 ppm near the conductor and 0.003 ppm at one meter above ground during foul weather or worst case conditions.

During a mist (rain at 0.01 inch per hour) the maximum concentrations decreased to 0.0003 ppm near the conductor and 0.0001 ppm at one meter above ground level. In both instances the detectable ozone levels were well below Environmental Protection Agency standards. Given this, there are no anticipated impacts relating to ozone for the proposed project.

During project construction there will be emissions and fugitive dust from vehicles and other construction related equipment. The magnitude of the construction emissions is influenced heavily by weather conditions and the specific construction activity occurring. Adverse impacts to the surrounding environment would be minimal due to the short and intermittent nature of project construction. The Applicants would employ Best Management Practices (BMP) to minimize the amount of fugitive dust created by the construction process. Tracking control at access roads and wetting road surfaces are examples of BMP that will be used to minimize fugitive dust.

Surface Water and Wetlands

No direct impacts to the surface water resources are anticipated. The transmission line rebuild project will span the Le Sueur River, listed as Public Water according to the Minnesota Department of Natural Resources (MN DNR). There are no trout streams listed by the MN DNR along the proposed route. The line traverses few freshwater emergent wetlands. The proposed route crosses both 100-year and 500-year floodplains that are associated with the river channel system of the Le Sueur (MN DNR Data Deli). There are no surface water resources, wetlands, or floodplains associated with the proposed substation locations.

If waters of the United States, as defined by the U.S. Army Corps of Engineers, or wetlands defined under the Minnesota Wetland Conservation Act are impacted, the Applicants would need to obtain the pertinent permits, such as a federal Section 10 permit. However, no impacts are anticipated.

Minn. Statute Section 84.415 requires that the Applicants obtain a license from the MN DNR for the passage of any utility over, under, or across any state land or public waters (see Table 1). Xcel Energy's line Century – Ballard Corner Switches 69 kV line currently spans the Le Sueur River and three unnamed streams connected to the Le Sueur River. Applicants will obtain any required license for the Le Sueur River crossings.

The Applicants would follow standard erosion control measures identified in the MPCA Stormwater Best Management Practices Manual, such as using silt fencing to minimize impacts to adjacent water resources. During construction, the Applicant would control construction operations to prevent materials from falling into the water. If material did enter the stream, the material would promptly be removed and disposed of properly. During construction, there is the possibility of sediment reaching surface waters due to ground disturbance by excavation, grading

and construction traffic. Once the Project is complete it should have no impact on surface water quality.

Flora

The impact to flora by the Project would be minimal because the majority of the land along the transmission line rebuild is agricultural, with some residential land around the proposed route from the Stoney Creek Substation to the Pohl Road Substation. Areas adjacent to streams, rivers and wetlands are likely to contain native vegetation. The transmission line traverses a Sugar Maple-Basswood Forest native plant community. The Minnesota County Biological Survey has identified a site of Moderate Biodiversity Significance. The MN DNR has recommended construction BMP to minimize impacts to this area. The MN DNR letter outlining the BMP is presented in Appendix D.1 of the Route Permit Application.

To minimize impacts to trees in the Project corridor, the Applicants would only remove trees located in the right-of-way for the transmission line or that would impact the safe operation of the facility. The Applicants would implement the MN DNR recommended BMP when working in the Sugar Maple-Basswood community.

Fauna

There are no Wildlife Management Areas along the proposed route or adjacent to the proposed substations. However, habitats for species exist along the watercourses described earlier. Fallow farm fields, fencerows and woodlots in cultivated areas also provide cover for species along the Project corridor and near the proposed substations. A list of species known to occur in habitats of this region of Minnesota is included in Table 11.

During construction phase, there will be minimal displacement of wildlife, with only small amounts of habitat impacted. Organisms that inhabit agricultural areas will likely be displaced. Comparable habitat is available near the proposed route, and it is likely that these organisms would only be displaced a short distance.

The construction process may affect raptors, waterfowl and other bird species. Avian collisions are a possibility after the construction process is complete in areas where there are agricultural fields that serve as feeding areas, wetlands and open water. Electrocution is commonly a concern with electrical facilities. The electrocution of large birds, such as raptors, is more commonly associated with distribution lines. Electrocution occurs when birds with large wingspans come in contact with two conductors or a conductor and a grounding device. Xcel Energy and Great River Energy transmission and distribution line design standards provide adequate spacing to eliminate the risk of raptor electrocution, so there are no concerns about avian electrocution as a result of the proposed Project.

Displacement of fauna is anticipated to be temporary in nature. No long-term population-level effects are anticipated; therefore, no mitigation is proposed.

Table 11. Common Mammal and Avian Species

Type	Species
Lake Fish	Carp, Buffalo, Bullhead, Largemouth Bass, Bluegill, Walleye, Yellow Perch and Crappie
Waterfowl	Canada Goose, Mallard, Redhead, Blue-wing Teal, and Wood Duck
Land Avian	Ring-necked Pheasant, Gray Partridge, Morning Dove, Sandhill Crane, and various songbirds
Mammals	Cottontail White Tail Jackrabbit, White Tail Deer, Fox, Skunk, and Squirrel

Xcel Energy has been working with various state and federal agencies over the past 20 years to address avian issues as quickly and efficiently as possible. In 2002, Xcel Energy, Inc. Operating Companies, including Xcel Energy, entered into a voluntary memorandum of understanding to work together to address avian issues through its territory. This includes the development of Avian Protection Plans (APP) for each state Xcel Energy serves. Work is currently under way on the Minnesota APP. Standard reporting methods were also developed. As part of the APP, the Project would be examined for collision risks, and if a potential risk was identified, mitigation procedures would be recommended.

In cooperation with the MN DNR and the United States Fish and Wildlife Service (USFWS), Xcel Energy will identify areas where installation of swan flight diverters on the shield wire may be warranted. In most cases, the shield wire of an overhead transmission line is the most difficult part of the structure for the bird to see. Xcel Energy has had success in reducing collisions on transmission lines by marking the shield wires with swan flight diverters (SFD). Swan flight diverters are pre-formed spiral shaped devices made of polyvinyl chloride that are wrapped around the shield wire.

Rare and Unique Natural Resources

The MN DNR Natural Heritage database has record of two occurrences of rare and unique natural resources within one mile of the transmission line. Neither is considered endangered. One, the Eastern Spotted Skunk, is ranked as S2 (Imperiled in Minnesota because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state). The other is the Snow Trillium and is ranked S3 (Vulnerable in Minnesota either because rare or uncommon, or found in a restricted range, or because of other factors making it vulnerable to extirpation). The S2 species was an isolated sighting from 1968, and the S3 species was last observed in the area in 1999.

The Project is not expected to adversely impact the listed species.

4.5 Route Segment and Substation Alternative

The Mankato Township alternative would:

- Construct the new Stoney Creek Substation at the intersection of CSAH 90 and Pohl Road.

- Construct a new 69/115 kV double-circuit line along CSAH 90 from Highway 16 to Pohl Road on double-circuit structures. Xcel Energy's single-circuit Century – Ballard Corner Switches 69 kV transmission line along 200th Street, from Highway 16 to Pohl Road, would be removed.

- Replace the existing 69 kV transmission line with a single-circuit 115 kV transmission line running north from the Stoney Creek Substation along Pohl Road.

Both the proposal and the alternative cover the same distance and require the same amount of right-of-way; however the alternative would require two miles of new right-of-way and the acquisition of property for the new Stoney Creek Substation. If the alternative were employed, the existing 69 kV line would be dismantled and double-circuited with the new 115 kV line along CSAH 90. Since the alternative requires new ROW, it impacts new areas and land owners that had not previously been under impact. Applicants have estimated the cost of the alternative to be approximately $2.45 million.

Table 12. Comparison of Proposal and Alternative

Criteria	Proposed	Alternative
Residences within 100 feet of new or existing lines*	0	0
Residences within 100-200 feet of new or existing lines*	9	5
Length along existing easements/corridor sharing (miles)	3	1
Length of new easement acquisition (miles)	0	2
Total Length (miles)	3	3
Length of double circuit (miles)	2	2
Transmission Line Cost (million)	$2.47	$2.45

(* from center of transmission alignment)

According to Mankato Township zoning, both the proposal and alternative route segment traverse primarily agriculture-zoned areas. The proposed route crosses a rural residence-zoned area for about one-half mile. Mankato Township foresees future expansion of residential development in Mankato Township north and south of 200th Street, although an actual plan is not in place at this time. The Alternative does not cross residential-zoned areas.

According to Mankato Township, the Mankato school district has purchased land north of 200th Street between Monks Avenue and Pohl Road with plans to build a new school campus. This property was purchased with 69 kV lines currently aligned along 200th Street. Proposed Project impacts would be incremental from 69 kV to 115 kV transmission lines. In effect, the existing 50-60 foot 69 kV structures would be replaced with double-circuit 75-85 foot 115 kV structures. Potentially, the ROW could be expanded from 50 feet to 75 feet in some cases; however, the Applicants' expressed intention is to replace the new structures close to the existing locations. The Township would place the lines and the new substation one mile south of any development along 200th Street.

One impact of the alternative of placing the Stoney Creek Substation along CSAH 90 is to take a small amount of prime farmland out of production. The Applicants' proposal uses an abandoned farmstead that is not currently under cultivation. The alternate route has the potential to impact a third local government. If the substation were sited south of CSAH 90, it would be located in Decoria Township.

5.0 Feasibility

According to the Applicants' engineering analyses of the alternative route segment, the cost of constructing, operating, and maintaining the facilities along the proposed route is essentially the same ($2.47 million versus $2.45 million) as along the alternative route they evaluated (during the planning process). The proposed route relies on existing rights-of-way to the extent technically and economically feasible.

The proposed route and the alternative have comparable impacts. The alternative was rejected by the Applicants because it would require two miles of new right-of-way and acquisition of property for the Stoney Creek Substation. The proposed segment was rejected by Mankato Township under planning considerations.

Nothing in this Environmental Assessment finds reason that a transmission and substation project as proposed by Applicants along the line from South Bend Substation through Stoney Creek Substation to Pohl Substation would not be feasible. Transmission lines and rural residences are not necessarily exclusive land uses of one another.

Equally, the alternative segment proposed by Mankato Township is also feasible.

Unavoidable Impacts

The South Bend-Stoney Creek Project would have no significant unavoidable adverse impacts. It would not have the same level of impacts that are usually associated with the construction of new transmission line due to the fact that it is a rebuild of an existing line. As the project is a rebuild, the bulk of the new impacts would be related to those short term impacts that are associated with the construction of the transmission line project. The Alternative would differ only in that it would require two miles of new ROW. However, that ROW would be along an existing highway through an agriculture-zoned area.

The long term impacts of the transmission line, those related to land and visual impacts, have already been realized with the existing line. As the proposed line would be located in essentially the same place as the existing line, the incremental long term impacts of changing out the structures would not result in significant changes to the transmission line. Operating the transmission line at the higher voltage level of 115 kV would also not result in a significant environmental impact. In addition, the significant ROW sharing associated with this project would further mitigate the direct impacts associated with the construction of the new line.

In addition, there are few commitments of resources associated with this project that are irreversible and irretrievable, but those that do exist are primarily related to construction. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action. Construction resources that would be used include aggregate resources, concrete, steel, and hydrocarbon fuel. These resources would be used to construct the project. During construction, vehicles would be traveling to and from the site utilizing hydrocarbon fuels.

Appendix A: Scoping Decision

In the Matter of the Application for a Route Permit for the South Bend to Stoney Creek 115 Kilovolt High Voltage Transmission Line and Substations

ENVIRONMENTAL ASSESSMENT SCOPING DECISION
PUC Docket No. E-T2, E-002/TL-08-734

The above matter has come before the Director of the Office of Energy Security (OES) for a decision on the scope of the Environmental Assessment (EA) to be prepared for the South Bend to Stoney Creek 115 kilovolt (kV) High Voltage Transmission Line and Substations Project (Project) application for a permit to construct and operate in Rapidan and Mankato townships in Blue Earth County, Minnesota.

Great River Energy, a not-for-profit generation and transmission cooperative based in Maple Grove, Minnesota, and Northern States Power dba Xcel Energy, an investor-owned utility headquartered in Minneapolis, Minnesota, are proposing the Project. A route permit application was filed on August 7, 2008, and accepted by the Minnesota Public Utilities Commission on September 15, 2008.

The Project includes the following components of a 69 kV transmission line that would be rebuilt within the existing easement to a 115 kV transmission line to loop around Mankato.

- Two new substations: 115-161/69 kV South Bend Substation and 115/69 kV Stoney Creek Substation and a 69 kV breaker station.
- Approximately four miles of an existing Xcel Energy-Minnesota 69 kV transmission line would be rebuilt to 115 kV from South Bend Substation to Ballard Corner switches.
- Approximately two miles of an existing Xcel Energy-Minnesota 69 kV transmission line would be rebuilt to 115/69 kV double-circuits from Ballard Corner switches to Stoney Creek Substation.
- Approximate two miles of an existing Xcel Energy-Minnesota and Great River Energy 69 kV transmission line would be rebuilt to 115 kV from the Stoney Creek Substation to the existing Pohl Substation.

The applicants state that the facilities are needed to support load growth in the city of Mankato and to improve system reliability by eliminating low voltage and equipment overloads during certain transmission outages.

The OES Energy Facility Permitting (EFP) staff held a public information and environmental assessment scoping meeting on November 12, 2008, at the National Guard Armory and Community Center in Mankato, Minnesota, to discuss the project with the public and gather public input on the scope of the Environmental Assessment to be prepared. Sixteen people attended the meeting.

Participants at the meeting asked the Applicants a number of questions about eminent domain, the use of existing easements, easements in relation to road right-of-way (ROW), landscaping and expansion at cleared substation areas, mitigation for construction and maintenance work within the ROWs, and the potential for future expansion of the system.

Meeting participants also recommended that OES staff study several environmental questions in the Environmental Assessment including: possible impacts of electromagnetic fields, potential interference of transmission lines with communications such as TV, radio and cell phones, and a question of substation impact on the bald eagle population.

Residents of Rapidan Township expressed displeasure that the substation was being built in Rapidan Township using the name "South Bend." A letter was received from a South Bend Township official expressing the same sentiment.

The public was given until November 26, 2008, to submit written comments. OES EFP received a total of three comment letters that were reviewed and considered during preparation of the scope of the Environmental Assessment.

Two letters from Mankato Township officials voiced preference for an alternative to the Applicants' proposed placement of the Stoney Creek Substation. The alternative would require an alteration of two miles of the route as well. Applicants' had reviewed the a1ternative, "SC-2" as defined in the application, and rejected the same for consideration for the Project.

The criteria for including analysis of an alternate route in the EA is "The (director) shall include the suggested site or route in the scope of the environmental assessment only if the (director) determines that evaluation of the proposed site or route will assist in the [commission's] ultimate decision on the permit application." (Minn. Rule 7849.5700 subp. 2B.) In this case, evaluating the positions of the Applicants and Mankato township as to benefits and impacts of the opposing recommendations could prove useful in either confirming or modifying the Applicants' preferred route.

Having reviewed the matter, consulted with the EFP staff, and in accordance with Minnesota Rule 7849.5700, I hereby make the following Scoping Decision:

MATTERS TO BE ADDRESSED

The Environmental Assessment on the proposed South Bend to Stoney Creek 115 kV High Voltage Transmission Line and Substations Project will address the following matters:

A. GENERAL DESCRIPTION OF THE PROPOSAL

1. Purpose of the Transmission Line
2. Project Location and Environmental Setting
3. Engineering and Operation Design
    a. Transmission Line and Structures
    b. Transmission Capacity
    c. Construction Procedures
    d. Right-of-Way Maintenance

B. IMPACTS AND MITIGATIVE MEASURES

1. Human Settlement
2. Public Health and Safety (including electromagnetic fields [EMF] and safety codes)
3. Noise
4. Aesthetics
5. Recreation
6. Transportation
7. Soils and Geology
8. Land Use
9. Archaeological and Historic Features
10. Air Quality Resources
11. Surface Water Resources
12. Wetlands
13. Flora
14. Fauna
15. Rare and Unique Natural Resources
16. Radio, Television, and Cellular Phone Interference

C. ALTERNATIVES TO BE ADDRESSED IN THE ENVIRONMENTAL ASSESSMENT

The "SC-2" route alternative will be evaluated in the Environmental Assessment, including the location of the Stoney Creek Substation and any inherent route alterations. The definition of the alternate is as in the Route Permit Application, specifically as described on pages 22-23, and shown in Figure 6.

D. IDENTIFICATION OF PERMITS

The Environmental Assessment will include a review of permits that will be required or likely required for construction of this project.

ISSUES OUTSIDE THE SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The EA will not consider whether a different size or type of transmission line should be built instead, nor will the EA consider the no-build option. The EA will also not consider the following:

1. The manner in which land owners are paid for transmission rights-of-way easements, as that is outside the jurisdiction of the Commission.
2. Alternatives not described specifically in this Scoping Decision.
3. Any specific appellations for any segment or segments of the Project.

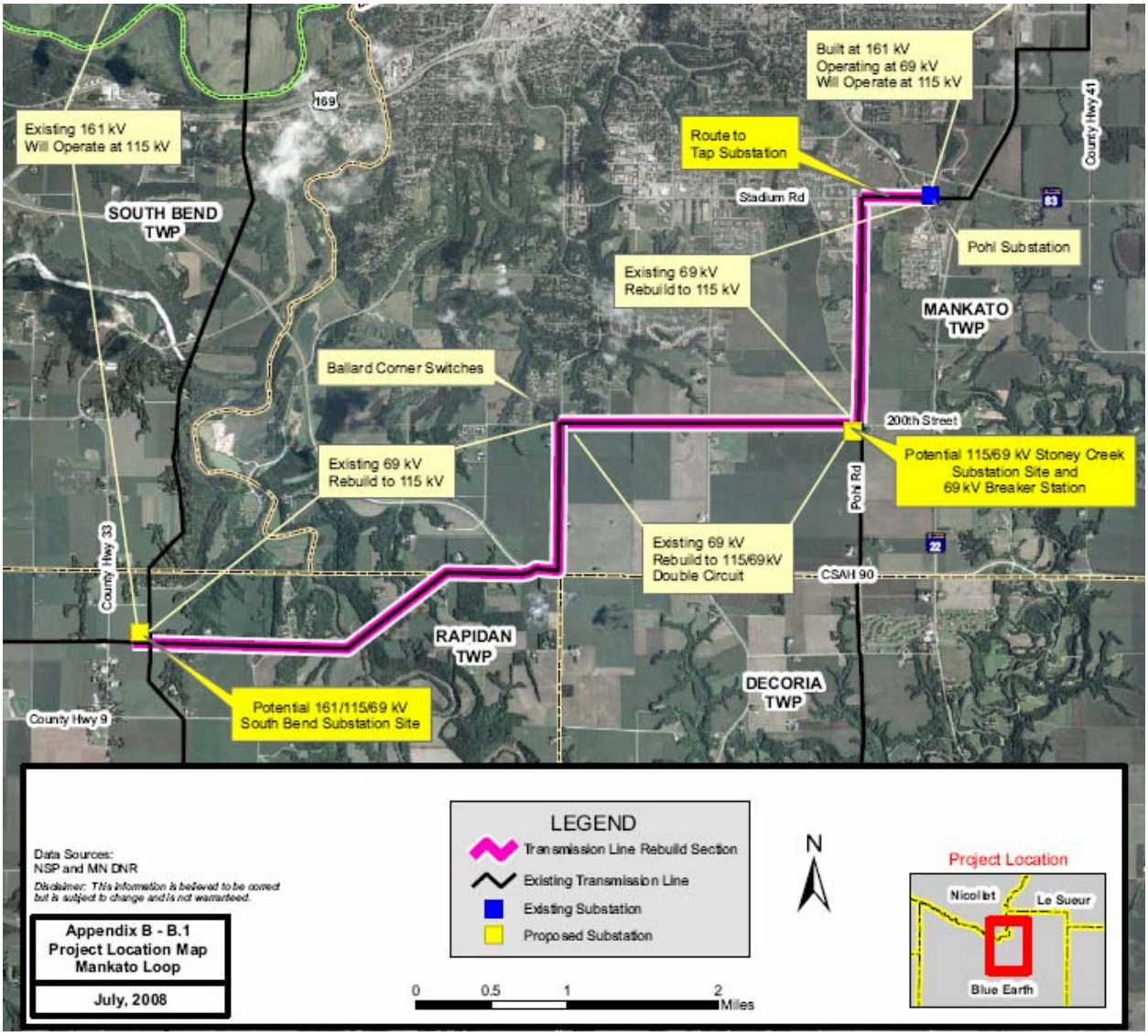
SCHEDULE

The Environmental Assessment shall be completed and available by January 31, 2009. A public hearing will be held in the Mankato, Minnesota, area after the Environmental Assessment has been issued and notice served.

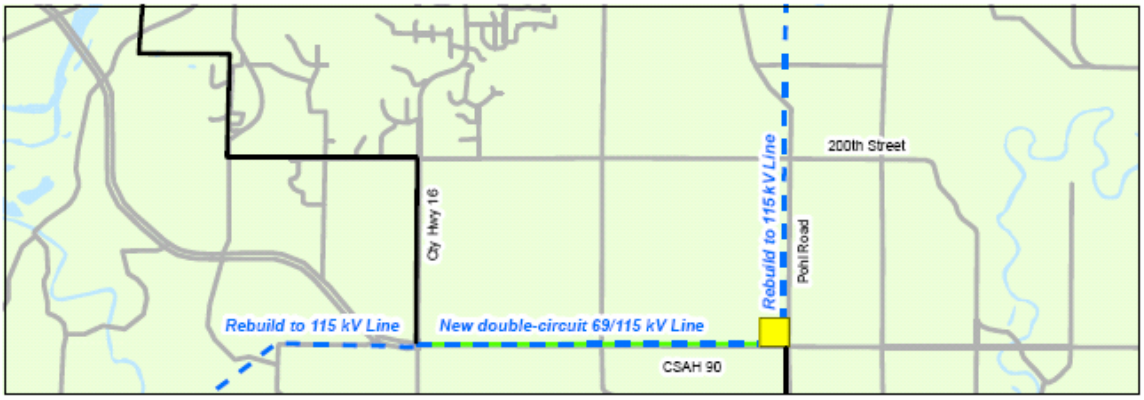
Signed this 11th day of December, 2008

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE
OFFICE OF ENERGY SECURITY

William Glahn, Director



Alternative SC-2, Stoney Creek Substation at the Intersection of Pohl Road and CSAH 90 and Relocate 69 kV Line from 200th Street



Appendix B: Draft Route Permit

ROUTE PERMIT FOR CONSTRUCTION OF A HIGH VOLTAGE TRANSMISSION LINE IN

LINCOLN COUNTY, MINNESOTA

ISSUED TO NORTHERN STATES POWER COMPANY d/b/a XCEL ENERGY

PUC DOCKET No. E002/TL-07-1626

In accordance with the requirements of Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7849, this route permit is hereby issued to:

Northern States Power d/b/a Xcel Energy

Northern States Power Company, d/b/a Xcel Energy (hereinafter referred to as Xcel Energy), is authorized by this route permit to construct the six and one-half mile segment located within the State of Minnesota, of a new 115 kilovolt (kV) high voltage transmission line between the Yankee Substation in Lincoln County, Minnesota to the Brookings Substation in Brookings County, South Dakota.

The transmission line shall be built within the route identified in this permit and as portrayed on the attached official route map, and in compliance with the conditions specified in this permit.

Approved and adopted this _____ day of August, 2008
BY ORDER OF THE COMMISSION

_____

Burl W. Haar,
Executive Secretary

I. ROUTE PERMIT

The Minnesota Public Utilities Commission (PUC or Commission) hereby issues this route permit to Xcel Energy (Xcel Energy or permittee) pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7849. This permit authorizes Xcel Energy to construct approximately six and one-half miles of 115 kV high voltage transmission line and associated facilities at the substations to accommodate the new transmission line.

II. PROJECT DESCRIPTION

Xcel Energy is authorized to build an approximately six and one-half mile segment of 115 kV transmission line located in Minnesota that will create a second connection between the Yankee Substation in Lincoln County, Minnesota and the Brookings Substation located in Brookings County, South Dakota including necessary modifications to the existing Yankee Substation.

Xcel Energy will use the same structures for the entire transmission line route. The structures will be steel, single circuit poles with three davit arms. The steel poles are to have a galvanized or weathering steel finish and will be anchored with concrete pier foundations that may vary from 6.5 to 9 feet in diameter and 12 or more feet in depth from ground surface. The poles will average 90 feet in height and approximately 42 inches in diameter for tangent poles and 65 inches in diameter for dead-end poles, with an average span of 500 feet between the structures.

The transmission line authorized by this permit will be three-phase, bundled conductor, single circuit configurations for the entirety of the project. The phases for this project will consist of bundled conductors comprised of two aluminum conductor steel supported cables or similar, made of seven steel wires in the center, surrounded by 26 aluminum strands. The separate conductors will be 795,000 circular mils or approximately 1.1 inches in diameter. There will also be shield wires strung above the phases to prevent damage from potential lightning strikes. The shield wire may include a fiber optic cable that allows for substation protection equipment to communicate with other terminals on the line.

The Yankee Substation will be modified to accommodate the switching gear, bus work and new transformers necessary to integrate the proposed 115 kV transmission line into the transmission network. The construction and new equipment will be located within the substation's existing fenced area. The new equipment includes a 115 kV dead end structure with a 115 kV, 2000A motor-operated disconnect; two empty circuit breaker bays; a 115 kV, 3000A breaker between the Main Bus #1 and the second transformer; a single-phase coupling capacitor voltage transformer on the second transformer position; and four 115 kV, 3000A group-operated disconnects.

All controls and protection for the new breaker need to be installed, in addition to all foundations, steel, conductor, trenching, and grounding for the equipment installations. No additional grading will be required at the existing substation.

III. DESIGNATED ROUTE / SITE

The route designated by the Commission in this permit comprises the six and one-half mile segment located in Minnesota and as described in detail below, as analyzed in the environmental assessment, and shown on the official route map attached to this permit.

The route width approved by this permit is 400 foot wide; 200 feet each side of the road centerline for the six and one-half mile route with the exception of one segment. A 1,200 foot route width is approved near the intersection of 180th Street and 110th Avenue to provide greater flexibility during detailed design to develop the best method for avoiding a large wetland and the existing Yankee to Brookings #1 high voltage transmission line. The approved right-of-way width is up to 75 feet.

The route that begins at the Yankee Substation located at the southeast corner of 120th Avenue and 160th Street in Lincoln County. The line will exit the substation from the west and extend approximately 600 feet to County Road 1. The line will continue north approximately 1,300 feet along County Road 1 until it reached 160th Street. The line then proceed west, following 160th Street for approximately one mile to 110th Avenue where it turns north along 110th Avenue for an estimated 1.7 miles. An approximate 500 foot segment along 110th Avenue just south of 170th Street may be located 35 to 40 feet west of an existing north/south positioned 34.5 kV PPM Energy, Inc. owned feeder line to minimize impacts to a shelterbelt for a residence located on the east side of 110th Avenue. A large wetland located to the south of the 110th Avenue and 180th Street intersection will require that the route be detoured to the west and around the wetland, thereby avoiding construction within the wetland. Following the detour around the wetland the proposed route will continue north along 110th Avenue for approximately 2.2 miles to a half-section line about one-half mile north of 200th Street. The route will then be directed northwest and then west along the half-section line towards the Minnesota/South Dakota border. The route will then proceed north along the state line for one-third mile turning west at 209th Street where it will enter South Dakota.

The proposed transmission lines and substation will be designed to meet or surpass all relevant local and state codes, and North American Electric Reliability Council and Xcel Energy standards. Appropriate standards will be met for construction and installation, and all applicable safety procedures will be followed during and after installation.

IV. PERMIT CONDITIONS

The permittee shall comply with the following conditions during construction of the transmission line and associated facilities and the life of this permit.

A. Plan and Profile. At least 14 calendar days before right-of-way preparation for construction begins, the permittee shall provide the commission with a plan and profile of the right-of-way and the specifications and drawings for right-of-way preparation, construction, cleanup, and restoration for the transmission line. The permittee may not commence construction until the 14 days has expired or until the commission has advised the permittee in writing that it has completed its review of the documents and determined that the planned construction is consistent with this permit. If the permittee intends to make any significant changes in its plan and profile or the specifications and drawings after submission to the commission, the permittee shall notify the commission at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

B. Construction Practices.

1. Application. The Permittee shall follow those specific construction practices and material specifications described in the Xcel Energy Application to the Public Utilities Commission for a Route Permit, dated January 18, 2008, and as described in the environmental assessment unless this permit establishes a different requirement, in which case this permit shall prevail.

2. Field Representative. At least 10 days prior to commencing construction, the permittee shall advise the commission in writing of the person or persons designated to be the field representative for the permittee with the responsibility to oversee compliance with the conditions of this permit during construction. The field representative's address, phone number, and emergency phone number shall be provided to the commission and shall be made available to affected landowners, residents, public officials and other interested persons.
The permittee may change its field representative at any time upon written notice to the commission.

3. Local Governments. The Xcel Energy shall cooperate with county and city road authorities to develop appropriate signage and traffic management during construction.

4. Cleanup. All waste and scrap that is the product of construction shall be removed from the area and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

5. Vegetation Removal in the Right-of-Way. The permittee shall minimize the number of trees to be removed in selecting the right-of-way. As part of construction, low growing brush or tree species are allowable at the outer limits of the easement area. Taller tree species that endanger the safe and reliable operation of the transmission facility need to be removed. To the extent practical, low growing vegetation that will not pose a threat to the transmission facility or impede construction should remain in the easement area.

6. Erosion Control. The permittee shall implement reasonable measures to minimize runoff during construction and shall promptly plant or seed, erect silt fences, and/or use erosion control blankets in non-agricultural areas that were disturbed where structures are installed. All areas disturbed during construction of the facilities will be returned to their pre-construction condition.

7. Temporary Work Space. The permittee shall limit temporary easements to special construction access needs and additional staging or lay-down areas required outside of the authorized right-of-way.

8. Restoration. The permittee shall restore the right-of-way, temporary work spaces, access roads, abandoned right-of-way, and other private lands affected by construction of the transmission line. Restoration within the right-of-way must be compatible with the safe operation, maintenance, and inspection of the transmission line. Within 60 days after completion of all restoration activities, the permittee shall advise the commission in writing of the completion of such activities.

9. Notice of Permit. The permittee shall inform all employees, contractors, and other persons involved in the transmission line construction of the terms and conditions of this permit.

C. Periodic Status Reports. Upon request, the permittee shall report to the commission on progress regarding finalization of the route, design of structures, and construction of the transmission line. The permittee need not report more frequently than quarterly.

D. Complaint Procedure. Prior to the start of construction, the permittee shall submit to the commission, the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements set forth in the complaint procedures attached to this permit.

E. Notification to Landowners. The permittee shall provide all affected landowners with a copy of this permit at the time of the first contact with the landowners after issuance of this permit.

Xcel Energy shall contact landowners prior to entering the property or conducting maintenance along the route and avoid maintenance practices, particularly the use of fertilizer or pesticides, inconsistent with the landowner's or tenant's use of the land.

Xcel Energy shall work with landowners to locate the high voltage transmission lines to minimize the loss of agricultural land, forest, and wetlands, and to avoid homes and farmsteads.

F. Completion of Construction.

1. Notification to Commission. At least three days before the line is to be placed into service, the permittee shall notify the commission of the date on which the line will be placed into service and the date on which construction was complete.

2. As-Builts. Upon request of the commission, the permittee shall submit copies of all the final as-built plans and specifications developed during the project.

3. GPS Data. Within 60 days after completion of construction, the permittee shall submit to the commission, in the format requested by the commission, geo-spatial information (GIS compatible maps, GPS coordinates, etc.) for all above ground structures associated with the transmission lines, each switch, and each substation connected.

G. Electrical Performance Standards.

1. Grounding. The permittee shall design, construct, and operate the transmission line in a manner that the maximum induced steady-state short-circuit current shall be limited to five milliamperes, root mean square (rms) alternating current between the ground and any non-stationary object within the right-of-way, including but not limited to large motor vehicles and agricultural equipment. All fixed metallic objects on or off the right-of-way, except electric fences that parallel or cross the right-of-way, shall be grounded to the extent necessary to limit the induced short circuit current between ground and the object so as not to exceed one milliampere rms under steady state conditions of the transmission line and to comply with the ground fault conditions specified in the National Electric Safety Code.

2. Electric Field. The transmission line shall be designed, constructed, and operated in such a manner that the electric field measured one meter above ground level immediately below the transmission line shall not exceed 8.0 kV/m rms.

3. Interference with Communication Devices. If interference with radio or television, satellite or other communication devices is caused by the presence or operation of the transmission line, the permittee shall take whatever action is prudently feasible to restore or provide reception equivalent to reception levels in the immediate area just prior to the construction of the line.

H. Special Conditions

1. Archaeological and Historic Resources. Xcel Energy shall make every effort to avoid impacts to identified archaeological and historic resources when installing the high voltage transmission line on the approved route. In the event that an impact would occur, the applicants will consult with State Historic Preservation Office and invited consulting parties. Where feasible, avoidance of the resource is required. Where not feasible, mitigation for project-related impacts on National Register of Historic Properties-eligible archaeological and historic resources must include an effort to minimize project impacts on the resource.

2. Wetlands/Water Resources. Wetland impact avoidance measures that shall be implemented during design and construction of the transmission line will include spacing and placing the power poles at variable distances to span and avoid wetlands. Unavoidable wetland impacts as a result of the placement of poles shall be limited to the immediate area around the poles. To minimize impacts, construction in wetland areas shall occur in the winter. If necessary, wooden or composite mats will be used to protect wetland vegetation. All requirements of the U.S. Army Corps of Engineers (wetlands under federal jurisdiction), Minnesota Department of Natural Resources (Public Waters/Wetlands), and County (wetlands under the jurisdiction of the Minnesota Wetland Conservation Act) shall be met.

Impacts to floodplains, in particular the placement of power pole structures, shall be avoided to the maximum extent possible by placing these structures above the floodplain contours outside of the designated floodplain, and by spanning the floodplain with the transmission line.

If construction activities will result in the disturbance of one acre or more of soils, a National Pollutant Discharge Elimination System stormwater permit from the Minnesota Pollution Control Agency will be required. Standard erosion control measures outlined in Minnesota Pollution Control Agency guidance and best management practices regarding sediment control practice during construction. These practices include, but are not limited to, protecting storm drain inlets, use of silt fences, protecting exposed soil, immediately stabilizing restored soil, controlling temporary soil stockpiles, and controlling vehicle tracking.

3. Avian Collision. The applicant will evaluate mitigative measures in areas of the project where the chance of avian collision or electrocution is higher. Areas will be identified by Xcel Energy in cooperation with the Minnesota Department of Natural Resources and the U.S. Fish and Wildlife Service where swan flight diverters could be incorporated into the transmission line design to prevent swan and other large avian collisions attributed to visibility issues.

4. Rare and Unique Resources. The unnamed wetland tributary to Medary Creek, located south of 180th Street and 110th Avenue and directly in-line with the proposed project route is designated as critical habitat for the Topeka shiner, a federally endangered and state specie of special concern. Mitigation measures for potential impacts to the Topeka shiner and its habitat will include construction techniques and sediment control measures such as following recommendations outlined in the USFWS, *Recommendations for Projects Affecting Waters Inhabited by Topeka Shiners (Notropis topeka) in Minnesota*; May 11, 2007; utilizing silt fences, practicing prompt re-seeding, and using erosion control blankets; and placing structures to either span critical watercourses or avoidance by routing around the area, as in the case of the large wetland tributary to Medary Creek.

5. Accommodation of Existing and Planned Infrastructure. Xcel Energy is required to work with the landowners, townships, cities, and counties along the route to accommodate their concerns regarding snow drifts, drain tiles, pole depth and placement in relationship to existing roads and road expansion plans. The permittee shall work with the owners of existing distribution lines identified along the route to either "underbuild" on the new structures or bury the distribution lines, if deemed feasible.

6. Alignment Alternative. Mr. Theodore Schwing suggested that the transmission line be routed along the east side of 110th Avenue through Section 19 to approximately the three quarter point (residential structure) of Section 18, the line would then cross to the west side of 100th Avenue at this point and continue north as proposed. This would avoid the residence located on the east side of 110th Avenue in the northwest quadrant of Section 18. The permittee will consult with Mr. Schwing and consider the feasibility of the suggested alternative prior to final location of structures and rights-of-way.

I. Other Requirements.

1. Applicable Codes. The permittee shall comply with applicable North American Electric Reliability Council construction standards and requirements of the National Electric Safety Code including clearances to ground, clearance to crossing utilities, clearance to buildings, right-of-way widths, erecting power poles, and stringing of transmission line conductors.

2. Other Permits. The permittee shall comply with all applicable state rules and statutes. The permittee shall obtain all required local, state and federal permits for the project and comply with the conditions of these permits. A list of the required permits is included in the permit application and the environmental assessment. The permittee shall submit a copy of such permits to the commission upon request.

3. Pre-emption. Pursuant to Minnesota Statutes 216E.10, subdivisions 1 and 2, this route permit shall be the sole route approval required to be obtained by the permittee and this permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

J. Delay in Construction. If the permittee has not commenced construction or improvement of the route within four years after the date of issuance of this permit, the commission shall consider suspension of the permit in accordance with Minnesota Rule 7849.5970.

V. PERMIT AMENDMENT

The permit conditions in Section IV may be amended at any time by the commission. Any person may request an amendment of the conditions of this permit by submitting a request to the commission in writing describing the amendment sought and the reasons for the amendment. The commission will mail notice of receipt of the request to the permittee. The commission may amend the conditions after affording the permittee and interested persons such process as is required.

VI. TRANSFER OF PERMIT

The permittee may request at any time that the commission transfer this permit to another person or entity. The permittee shall provide the name and description of the person or entity to whom the permit is requested to be transferred, the reasons for the transfer, a description of the facilities affected, and the proposed effective date of the transfer. The person to whom the permit is to be transferred shall provide the commission with such information as the commission shall require to determine whether the new permittee can comply with the conditions of the permit. The commission may authorize transfer of the permit after affording the permittee, the new permittee, and interested persons such process as is required.

VII. REVOCATION OR SUSPENSION OF THE PERMIT

The commission may initiate action to revoke or suspend this permit at any time. The commission shall act in accordance with the requirements of Minnesota Rules part 7849.6010 to revoke or suspend the permit.

PUBLIC UTILITIES COMMISSION
COMPLAINT REPORT PROCEDURES FOR
HIGH VOLTAGE TRANSMISSION LINES

1. Purpose

To establish a uniform and timely method of reporting complaints received by the permittee concerning the permit conditions for site preparation, construction, cleanup and restoration, special conditions, other requirements, and resolution of such complaints.

2. Scope

This reporting plan encompasses complaint report procedures and frequency.

3. Applicability

The procedures shall be used for all complaints received by the permittee.

4. Definitions

***Complaint* –** A statement presented by a person expressing dissatisfaction, resentment, or discontent as a direct result of the high voltage transmission line and associated facilities. Complaints do not include requests, inquiries, questions or general comments.

Telephone Complaint – A person presenting a complaint by telephone shall indicate whether the complaint relates to (1) a substantive routing permit matter, (2) a high voltage transmission line location matter, or (3) a compensation matter. All callers must provide the following information when presenting a complaint by telephone: (1) name; (2) date and time of call; (3) phone number; (4) email address (if available); (5) home address; (6) parcel number.

Substantial Complaint – Written complaints alleging a violation of a specific route permit condition that, if substantiated, could result in permit modification or suspension pursuant to the applicable regulations.

Person – An individual, partnership, joint venture, private or public corporation, association, firm, public service company, cooperative, political subdivision, municipal corporation, government agency, public utility district, or any other entity, public or private, however organized.

5. Responsibilities

Everyone involved with any phase of the high voltage transmission line is responsible to ensure expeditious and equitable resolution of all complaints. It is therefore necessary to establish a uniform method for documenting and handling complaints related to this high voltage transmission line project. The following procedures will satisfy this requirement:

A. The permittee shall document all complaints by maintaining a record of all applicable information concerning the complaint, including the following:

1. Name of the permittee and project.
2. Name of complainant, address and phone number.
3. Precise property description or tract numbers (where applicable).
4. Nature of complaint.
5. Response given.
6. Name of person receiving complaint and date of receipt.
7. Name of person reporting complaint to the PUC and phone number.
8. Final disposition and date.

B. The permittee shall assign an individual to summarize complaints for transmittal to the PUC.

6. Requirements

The permittee shall report all complaints to the PUC according to the following schedule:

Immediate Reports – All substantial complaints shall be reported to the PUC by phone or by e-mail the same day received or on the following working day for complaints received after working hours. Such reports are to be directed to high voltage transmission line permit compliance at the following: DOC.energypermitcompliance@state.mn.us or 1-800-657-3794. Voice messages are acceptable.

Monthly Reports – By the 15th of each month, a summary of all complaints, including substantial complaints received or resolved during the proceeding month. Such summaries shall be sent to Dr. Burl W. Haar, Executive Secretary, Minnesota Public Utilities Commission, Metro Square Building, 121 7th Place East, Suite 350, St. Paul, MN 55101-2147. A copy of each complaint shall be sent to Permit Compliance, Minnesota Department of Commerce, 85 7th Place East, Suite 500, St. Paul, MN 55101-2198.

Unresolved Complaints – The permittee shall submit all unresolved complaints to the PUC for resolution by the PUC, where appropriate, no later than 45 days after the date of the submission.

7. Complaints Received by the PUC

Copies of complaints received directly by the PUC from aggrieved persons regarding site preparation, construction, cleanup, restoration, operation and maintenance shall be promptly sent to the permittee.

Initial Screening – Commission staff shall perform an initial evaluation of unresolved complaints submitted to the Commission. Complaints raising substantive routing permit issues shall be processed and resolved by the Commission. Staff shall notify permitee and the complaintant if it determines that the complaint is a substantial complaint. With respect to such complaints, each party shall submit a written summary of its position to the Commission no later than ten days after receipt of the staff notification. Staff shall present briefing papers to the Commission, which shall resolve the complaint within twenty days of submission of the briefing papers.

Condemnation/Compensation Issues – If the Commission's staff initial screening determines that a complaint raises issues concerning the just compensation to be paid to landowners on account of permittee acquisition of high voltage transmission line easements, staff shall recommend to the Executive Secretary that the matter be resolved under the provisions of Minnesota Statutes, Chapter 117. If the Executive Secretary concurs, he shall so report to the Commission and the matter shall be dealt with in the high voltage transmission line condemnation proceedings as an issue of just compensation.