XCEL ENERGY
APPLICATION TO THE MINNESOTA ENVIRONMENTAL QUALITY BOARD FOR A ROUTE PERMIT

EASTWOOD 115 kV/115 KV TRANSMISSION LINE & SUBSTATION PROJECT

ALTERNATIVE PERMITTING PROCESS
EQB DOCKET NO. 05-95-TR

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Xcel Energy
NORTHERN STATES POWER

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List of Acronyms and Abbreviations

BMP	best management practice
CON	Certificate of Need
dB	Decibels
dBA	A-weighted sound level recorded in units of decibels
d/b/a	doing business as
DNR	Minnesota Department of Natural Resources
EMF	electromagnetic field
EQB	Minnesota Environmental Quality Board
G	Gauss
HVTL	high voltage transmission line
Hz	Hertz
kV	Kilovolt
MDH	Minnesota Department of Health
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MVA	Megavolt ampere
MW	megawatt
NAC	noise area classification
NERC	North American Electric Reliability Council
NESC	National Electrical Safety Code
NEV	Neutral-to-earth voltage
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollution Discharge Elimination System
NWI	National Wetlands Inventory
ppm	parts per million
PUC	Public Utilities Commission
ROW	Right-of-Way
SHPO	State Historic Preservation Office
SWPPP	Stormwater pollution prevention plan
TLE	Temporary Limited Easement
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 PROJECT SUMMARY

Northern States Power Company, d/b/a Xcel Energy (Xcel Energy or the Company), submits this application for a Route Permit to the Minnesota Environmental Quality Board (EQB) pursuant to Minnesota Rules Chapter 4400 and Minnesota Statutes Chapter 116C. The particular facility for which the permit is requested is a 3.5-mile double circuit 115 kV/115 kV transmission line connecting the existing Summit to Loon Lake 115 kV transmission line south to the Eastwood Substation.

1.1 ELIGIBILITY FOR THE ALTERNATIVE PERMITTING PROCESS

The EQB rules provide an Alternative Permitting Process for certain facilities. Minn. R. 4400.2000, subp. 1. The 115 kV transmission line qualifies for the Alternative Permitting Process because it meets Minn. R. 4400.2000, subp. 1.C. (high voltage transmission lines (HVTL) between 100 and 200 kV). The EQB submittal requirements are listed on Table 1.1 with cross-references indicating where information can be found elsewhere in this application.

1.2 CERTIFICATE OF NEED REQUIREMENTS

Minn. Stat. § 216B.243, subd. 2 states that no large energy facility shall be sited or constructed in Minnesota without the issuance of a Certificate of Need (CON) by the Public Utilities Commission. However, the 115 kV transmission line proposed for the Project does not qualify as a "large energy facility" because it is less than 10 miles long. *See* Minn. Stat. § 216B.2421, subd. 2(3). So no CON is required for the proposed Project.

Table 1.1
Completeness Checklist

Authority	Required Information	Where
Minn. R. 4400.2000, subp. 1(C)	Subpart 1. **Eligible Projects**. An applicant for a site permit or a route permit for one of the following projects may elect to follow the procedures of parts 4400.2000 to 4400.2950 instead of the full permitting procedures in parts 4400.1025 to 4400.1900: high voltage transmission lines of between 100 and 200 kilovolts	1.1
Minn. R. 4400.2000, subp. 2.	Subpart 2. **Notice to EQB**. An applicant for a permit for one of the qualifying projects in subpart 1, who intends to follow the procedures of parts 4400.2000 to 4400.2750, shall notify the EQB of such intent, in writing, at least ten days before submitting an application for the project	Appendix A
Minn. R. 4400.2100	**Contents of Application** (alternative permitting process) The applicant shall include in the application the same information required in part 4400.1150, except the applicant need not propose any alternative sites or routes to the preferred site or route. If the applicant has rejected alternative sites or routes, the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them	See Minn. R. 4400.1150, subp.2 below
Minn. R. 4400.1150, subp. 2 (applicable per Minn. R. 4400.2100)	**Route Permit for HVTL** A. a statement of proposed ownership of the facility at the time of filing the application and after commercial operation	2.1
	B. the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated	2.2
	C. at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference	Not applicable, per Minn. R. 4400.2100
	D. a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line	2.4, 3.1, 3.2
	E. the environmental information required under 4400.1150, Subp. 3	See Minn. R. 4400.1150, subp. 3 (A)-(H) below
	F. identification of land uses and environmental conditions along the proposed routes	4.1-4.6
	G. the names of each owner whose property is within any of the proposed routes for the high voltage transmission line	5.2.2
	H. United States Geological Survey topographical maps or other maps acceptable to the chair showing the entire length of the high voltage transmission line on all proposed routes	Appendix B

Authority	Required Information	Where
	I. identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share right-of-way with the proposed line	3.2.2.1, 3.2.4, 3.3.1
	J. the engineering and operational design concepts for the proposed high voltage transmission line, including information on the electric and magnetic fields of the transmission line	3.2, 3.4
	K. cost analysis of each route, including the costs of constructing, operating, and maintaining the high voltage transmission line that are dependent on design and route	2.6
	L. a description of possible design options to accommodate expansion of the high voltage transmission line in the future	3.2.3
	M. the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction, and maintenance of the high voltage transmission line	3.3
	N. a listing and brief description of federal, state, and local permits that may be required for the proposed high voltage transmission line	5.3
	O. a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required	1.2
Minn. R. 4400.1150, subp. 3	**Environmental Information** A. a description of the environmental setting for each site or route	4.1
	B. a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services	4.2
	C. a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	4.3
	D. a description of the effects of the facility on archaeological and historic resources	4.4
	E. a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna	4.5
	F a description of the effects of the facility on rare and unique natural resources	4.6
	G. identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route	See all of the effects identified in Section 4
	H. a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures	See all of the mitigative measures identified in Section 4

Authority	Required Information	Where
Minn. R. 4400.1350, subp. 2 (applicable per Minn. R. 4400.2300)	**Notice of Project** Notification to persons on EQB's general list, to local officials, and to property owners	Will be mailed within 15 days of application submission
Minn. R. 4400.1350, subp 4	Publication of notice in a legal newspaper of general cirulation in each county in which the route is proposed to be located.	Will be published within 15 days of application submission
Minn. R. 4400.1350, subp. 5	Confirmation of notice by affidavits of mailing and publication, with copies of the notices	Will be submitted within 30 days of notice being mailed and published
Minn. R. 4400.3150	**Factors to be Considered in Permitting a HVTL** A. effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services	6.1
	B. effects on public health and safety	6.2
	C. effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	6.3
	D. effects on archaeological and historic resources	6.4
	E. effects on the natural environment, including effects on air and water quality resources and flora and fauna	6.5
	F. effects on rare and unique natural resources	6.6
	G. application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity	6.7
	H. use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries	6.8
	I. use of existing large electric power generating plant sites	6.9 (not applicable)
	J. use of existing transportation, pipeline, and electrical transmission systems or rights-of-way	6.10
	K. electrical system reliability	6.11
	L. costs of constructing, operating, and maintaining the facility which are dependent on design and route	6.12
	M. adverse human and natural environmental effects which cannot be avoided	6.13
	N. irreversible and irretrievable commitments of resources	6.14

Authority	Required Information	Where
Minn. R. 4400.3350, subps. 1 and 2	Prohibited Routes **Wilderness areas**. No high voltage transmission line may be routed through state or national wilderness areas **Parks and natural areas**. No high voltage transmission line may be routed through state or national parks or state scientific and natural areas unless the transmission line would not materially damage or impair the purpose for which the area was designated and no feasible and prudent alternative exists. Economic considerations alone do not justify use of these areas for a high voltage transmission line	Not Applicable
Minn. Stat. §116C.57, subd. 4 (applicable per Minn. Stat. §116C.575, subd. 8)	**Considerations in designating sites and routes** (1) Evaluation of research and investigations relating to the effects on land, water and air resources of large electric power generating plants and high voltage transmission lines and the effects of water and air discharges and electric and magnetic fields resulting from such facilities on public health and welfare, vegetation, animals, materials and aesthetic values, including base line studies, predictive modeling, and evaluation of new or improved methods for minimizing adverse impacts of water and air discharges and other matters pertaining to the effects of power plants on the water and air environment	3.4; 4.1-4.6; 6.1-6.3, 6.5, 6.6, 6.13
	(2) Environmental evaluation of sites and routes proposed for future development and expansion and their relationship to the land, water, air and human resources of the state	3.2.3, 6.7
	(3) Evaluation of the effects of new electric power generation and transmission technologies and systems related to power plants designed to minimize adverse environmental effects	Not applicable
	(4) Evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants	Not applicable
	(5) Analysis of the direct and indirect economic impact of proposed sites and routes including, but not limited to, productive agricultural land lost or impaired	4.2.2, 4.3, 6.3
	(6) Evaluation of adverse direct and indirect environmental effects that cannot be avoided should the proposed site and route be accepted	See all of the effects identified in Section 4, 6.1-6.6
	(7) Evaluation of alternatives to the applicant's proposed site or route proposed pursuant to subdivisions 1 and 2	Not applicable to alternative process
	(8) Evaluation of potential routes that would use or parallel existing railroad and highway rights-of way	3.2.2.1, 3.2.4, 6.8
	(9) Evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations	4.3.1, 6.8
	(10) Evaluation of the future needs for additional high voltage transmission lines in the same general area as any proposed route, and the advisability of ordering the construction of structures capable of expansion in transmission capacity through multiple circuiting or design modifications	3.2.3, 6.7
	(11) Evaluation of irreversible and irretrievable commitments of resources should the proposed site or route be approved	6.14
	(12) When appropriate, consideration of problems raised by other state and federal agencies and local entities	5.3

1.3 NOTICE TO THE EQB

Xcel Energy notified the EQB by letter dated May 11, 2005 that the Company intended to utilize the Alternative Permitting Process for the proposed Eastwood 115 kV Transmission Line Project. This complies with the requirement of Minn. R. 4400.2000, subp. 2 to notify the EQB at least 10 days prior to submitting an application. A copy of this notice is attached in Appendix A.

2.0 INTRODUCTION

2.1 STATEMENT OF OWNERSHIP OF THE PROPOSAL

Xcel Energy is headquartered in Minneapolis, Minnesota. It is a wholly owned subsidiary of Xcel Energy, Inc., the fourth-largest combination electricity and natural gas energy company in the United States. Xcel Energy provides electricity services to approximately 1.2 million residential, commercial, and industrial customers in Minnesota, and natural gas services to 400,000 such customers.

Xcel Energy will construct, own, operate, and maintain the 115 kV/115 kV transmission line.

2.2 PERMITTEE / PROJECT MANAGER

The permittee for the Project will be:

Permittee: Northern States Power Company, a Minnesota Corporation
d/b/a Xcel Energy
414 Nicollet Mall
Minneapolis, Minnesota 55401

Contact: Pamela J. Rasmussen, Team Lead, Siting and Permitting
Address: P.O. Box 8
Eau Claire, Wisconsin 54702-0008
Phone: (715) 839-4661
Fax: (715) 839-2480
Email: pamela.jo.rasmussen@xcelenergy.com

2.3 PROJECT LOCATION

The Project will be located in Blue Earth County, Minnesota (Appendix B.1 and B.2). Table 2.1 summarizes the project location:

Table 2.1
Proposed Transmission Line Locations

County	Township Name	Township	Range	Section
Blue Earth	Lime	109N	26W	34, 35
	Mankato	108N	26W	2, 3, 10

2.4 PROJECT PROPOSAL

Xcel Energy proposes to construct a new double circuit 115/115 kV transmission line tapped from the existing Summit-Loon Lake 115 kV transmission line continuing south to the Eastwood Substation.

The project is part of a series of transmission projects that will allow the electrical system to support the interconnection of the Mankato Energy Center into the Wilmarth Substation. Xcel Energy is also converting an existing 69 kV transmission line between the Eastwood substation and the Wilmarth substation to 115 kV. A request for a minor alteration permit for the conversion has been submitted to the MEQB.

2.5 PROJECT SCHEDULE

Xcel Energy anticipates an in-service date of June 2006 for all the facilities. Construction is expected to begin on the transmission portion of the Project in November 2005.

2.6 PROJECT COSTS

Xcel Energy has prepared a preliminary cost estimate for the transmission line construction associated with this application. The Project costs are estimated to be $1.35 million.

3.0 ENGINEERING DESIGN, CONSTRUCTION, AND RIGHT-OF-WAY ACQUISITION

3.1 ROUTE DESCRIPTION

This project involves construction of a new double circuit 115 kV/115 kV transmission line between the Eastwood Substation and the existing Summit to Loon Lake transmission line (Appendix B.3).

The line will be approximately 3.5 miles long and line will begin as a tap off of the Summit to Loon Lake 115 kV transmission line near the intersection of 232nd Street and County Road 12. It will continue south along the east side of County Road 12 for approximately 0.75 miles.

At the junction of County Road 12 and 589th Avenue, the line will cross to the west side of the road and continue south paralleling the railroad for approximately 1.25 miles to the intersection of 589th Avenue and Thompson Ravine Road.

Due to potential development in the area and landowner concerns, the line will continue west at Thompson Ravine Road for up to 0.5 miles before turning south for about 0.5 miles and crossing T.H. 14. Xcel Energy will work with the interested parties to identify the best location for the new 115 kV/115 kV transmission line between Thompson Ravine Road and T.H. 14.

Upon crossing T.H. 14, the new 115 kV/115 kV line will continue south approximately 0.25 miles until it enters the Eastwood Substation, paralleling the existing Wilmarth-to-Eastwood 69 kV transmission line that enters the northwestern edge of the substation.

3.2 ENGINEERING AND OPERATIONAL DESIGN

3.2.1 TRANSMISSION STRUCTURES AND ROW DESIGN

3.2.2 TRANSMISSION STRUCTURE DESIGN

Figure 3.1 depicts the double circuit structures that are proposed to be used for the 115 kV/115 kV line. The double circuit line will be constructed on a single steel pole with a concrete caisson foundation. The conductor will be 795 ACSS and the conductor capacity will be approximately 1555 amps.

Figure 3.1: 115 kV/115 kV Steel Double Circuit Davit Arm Structure

Table 3.1 summarizes the structure design for the line:

Table 3.1
Structure Design Summary

Project Component	Line Voltage	Structure Type	Pole Type	New / Existing Poles	Foundation	Double Circuit / Single Circuit	Average Height (feet)
Eastwood to Summit – Loon Lake Tap	115 kV/ 115 kV with underbuild	Davit Arm	Steel	New	Concrete	Double	80

The proposed transmission line will be designed to meet or surpass all relevant local and state codes, and North American Electric Reliability Council (NERC) 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.

3.2.2.1 Right-of-Way

The new 115 kV/115 kV transmission line will parallel existing roadway ROW for 77 percent of its route. Xcel Energy will acquire a 45 foot ROW adjacent to roadways (Figure 3.2). Approximately one mile of the new route will go cross-country and will require an 80 foot ROW (Figure 3.3). A summary of the ROW required for the project is in Table 3.2.

Table 3.2
ROW Requirements

Project Component	Length (miles)	Structure Type	Average Structure Height (feet)	Average Span Length (feet)	ROW (feet)
Eastwood to Summit to Loon Lake	3.5	Single Pole, Steel Davit Arm	85-90	650	80

Figure 3.2: ROW Requirements Adjacent to Roadways

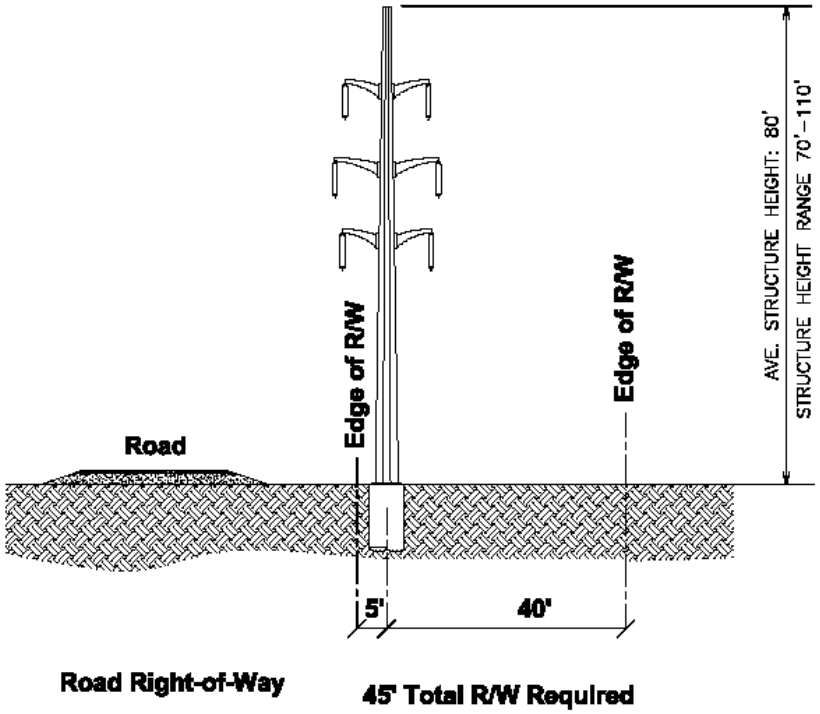
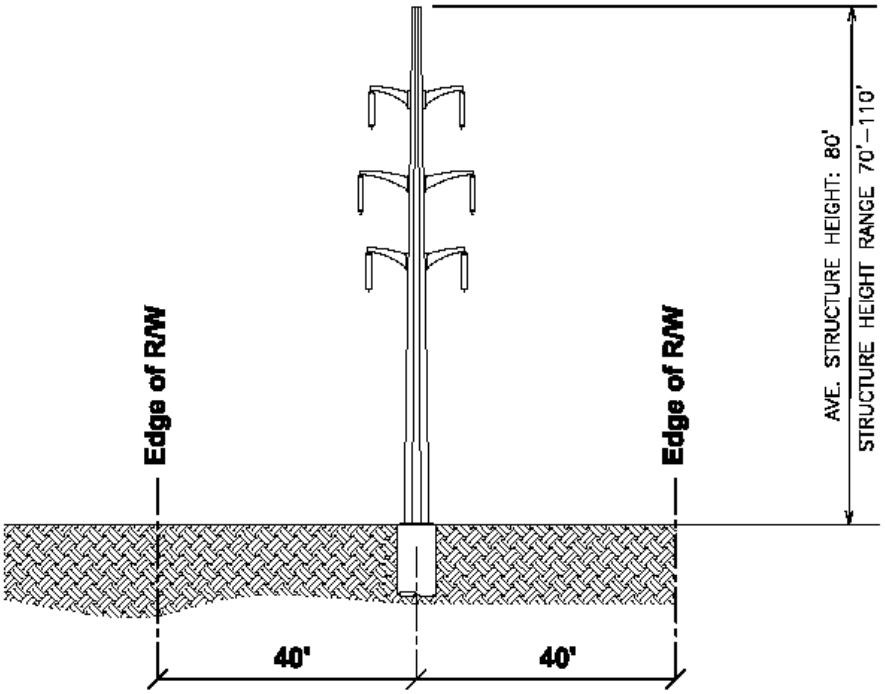


Figure 3.3: ROW Requirements Cross Country



80' Total Right-of-Way

3.2.3 Design Options to Accommodate Future Expansion

The transmission line proposed for this Project is being designed to support the voltage required to handle the projected capacity from the Mankato Energy Center. Xcel Energy is not proposing to build the line to accommodate greater capacity than that required for the new generating facility.

3.2.4 Identification of Existing Utility and Public Rights-of-Way

The project will follow existing utility and public ROW for 77 percent of the route. Table 3.3 below identifies the corridors shared for the project.

Table 3.3
Shared ROW Corridors

Description	Length (miles)	Existing Transmission ROW (miles)	Roadway ROW (miles)	Railroad ROW (miles)	New ROW (miles)
Eastwood to Summit – Loon Lake Tap	3.5	0[1]	2.4	0.7	0.8

[1] Parallels a distribution line for 1.0 mile, which will be under built on new double circuit structures.

3.3 RIGHT-OF-WAY ACQUISITION, CONSTRUCTION, RESTORATION, AND MAINTENANCE PROCEDURES

3.3.1 RIGHT-OF-WAY ACQUISITION

After approvals to construct the Project are secured, Xcel Energy will initiate contact with landowners. The Company will consult with the landowners to discuss the Project in detail prior to conducting any necessary surveys and soil investigations. As the design of the line is further developed, contacts with the owners of affected properties will continue and the negotiation and acquisition phase will begin for Xcel Energy to obtain the necessary land or easement rights for the facilities.

During the acquisition phase, individual property owners will be advised as to the construction schedules, needed access to the site, and any vegetation clearing required for the Project. The ROW will be cleared of the amount of vegetation necessary to construct, operate and maintain the proposed transmission line. It is standard practice to remove any vegetation that at a mature height would be a danger to the line. Also, any vegetation that is in the way of construction equipment may have to be removed. Wood from the clearing operation will be offered to the landowner or removed from the site. Brush will be chipped and disposed of on the ROW.

Some structure locations may require soil analysis to assist with the design of the line. The Company will inform the landowners at the initial survey consultation that these borings may occur. An independent geotechnical testing company will take and analyze these borings.

Where possible, staging and lay down areas will be located within the ROW and limited to previously disturbed or developed areas. When additional property is temporarily required for construction, temporary limited easements (TLE) may be obtained from landowners for the duration of construction. TLEs will be limited to special construction access needs or additional staging or lay down areas required outside of the proposed transmission line ROW.

3.3.2 TRANSMISSION CONSTRUCTION PROCEDURES

Construction is planned to begin once required approvals are obtained. A detailed construction schedule will be developed based upon availability of crews, outage restrictions for lines that may be affected, weather conditions, and any restrictions placed on certain areas for minimizing impacts from construction.

The steel poles for the double circuit 115 kV line are approximately three to four feet in diameter and will require a hole drilled approximately 15 to 30 feet deep. Drilled concrete pier foundations or steel caissons approximately five to eight feet in diameter will support the 115 kV steel structures.

Any structures located in poor or wet soil conditions may require a specially engineered foundation (such as a steel caisson) that would be vibrated into the ground. The poles will then be placed within the caisson.

Erosion control methods will be implemented to minimize runoff during construction. Xcel Energy construction crews or an Xcel Energy contractor will comply with local, state, National Electrical Safety Code (NESC), and Xcel Energy standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, ROW widths, erection of power poles, and stringing of transmission line conductors.

Insulators and other hardware will be attached while the pole is on the ground. The pole will then be lifted, placed, and secured on the foundation by a crane. Once the structures have been erected, conductors will be installed.

3.3.3 RESTORATION PROCEDURES

During construction, crews will attempt to limit ground disturbance wherever possible. Disturbed areas will be restored to their original condition to the maximum extent practicable. Post-construction reclamation activities include the removing and disposing of debris, dismantling all temporary facilities, employing appropriate erosion control measures, and reseeding areas disturbed by construction activities with vegetation similar to that which was removed.

3.3.4 MAINTENANCE PROCEDURES

Xcel Energy will periodically perform inspections, maintain equipment, and make repairs over the life of the line. Xcel Energy will also conduct regular routine maintenance approximately every five years to remove undesired vegetation that may interfere with the safe and reliable operation of the proposed transmission line.

3.4 ELECTRIC AND MAGNETIC FIELDS

The term EMF refers to electric and magnetic fields that are coupled together such as in high frequency radiating fields. For the lower frequencies associated with power lines, EMF should be separated into electric and magnetic fields. Electric and magnetic fields arise from the flow of electricity and the voltage of a 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 current flow through the conductors. Transmission lines operate at 60 hertz (cycles per second).

3.4.1 ELECTRIC FIELDS

Voltage on any wire (conductor) produces an electric field in the area surrounding the wire. The electric field associated with a high voltage transmission line extends from the energized conductors to other nearby objects such as the ground, towers, vegetation, buildings, and vehicles. The electric field from a power line gets weaker as one moves away from the line. Nearby trees and building material also greatly reduce the strength of power line electric fields.

The intensity of electric fields is associated with the voltage of the line and is measured in kilovolts per meter (kV/m). Power line electric fields near ground are designated by the difference in voltage between two points (usually one meter). Table 3.4 provides the electric fields at maximum conductor voltage for the proposed 115 kV transmission line. Maximum conductor voltage is defined as the nominal voltage plus five percent.

Table 3.4
Calculated Electric Fields (kV/m) for Proposed 115 kV Transmission Line Designs
(3.28 Feet Above Ground)

Type	Voltage	Distance to Proposed Centerline								
		-300'	-200'	-100'	-50'	0'	50'	100'	200'	300'
115/115 kV Single Pole Davit Arm	121/121 kV	0.020	0.041	0.083	0.218	2.518	0.225	0.077	0.040	0.020

The proposed 115 kV/115 kV transmission line will have a maximum electric field density of approximately 2.52 kV per meter, at centerline, one meter above ground. This is significantly less than the maximum limit of 8 kV per meter that has been a permit condition imposed by the Minnesota EQB in other HVTL applications. The Minnesota EQB 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.

3.4.2 MAGNETIC FIELDS

Current passing through any conductor, including a wire, produces a magnetic field in the area around the wire. The magnetic field associated with a high voltage transmission line surrounds the conductor and decreases rapidly with increasing distance from the conductor. The magnetic field is expressed in units of magnetic flux density, expressed as gauss (G).

The question of whether exposure to power-frequency (60 hertz) magnetic fields can cause biological responses or even health effects has been the subject of considerable research for the past three decades. There is presently no Minnesota statute or rule that pertains to magnetic field

exposure. The most recent and exhaustive reviews of the health effects from power-frequency fields conclude that the evidence of health risk is weak. The National Institute of Environmental Health Sciences (NIEHS) issued its final report, "NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields" on June 15, 1999, following six years of intensive research. NIEHS concluded that there is little scientific evidence correlating EMF exposures with health risk.

The Minnesota State Interagency Working Group on EMF Issues, consisting of members from the Minnesota Department of Health, Department of Commerce, PUC, Pollution Control Agency and EQB conducted research related to EMF, which resulted in similar findings to the NIEHS report. The group issued "A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options" in September of 2002 wherein it stated:

> Research on the health effects of EMF has been carried out since the 1970s. Epidemiological studies have mixed results – some have shown no statistically significant association between exposure to EMF and health effects, and some have shown a weak association. More recently, laboratory studies have failed to show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer.

The group concluded:

> *The Minnesota Department of Health (MDH) concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health effects.* However, as with many other environmental health issues, the possibility of health risk from EMF cannot be dismissed. (Emphasis added.)

The conclusions of the Minnesota State Interagency Working Group are also consistent with those reached by the Minnesota Department of Health in 2000.

While the general consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields potentially can cause biological responses or even health effects continues to be the subject of research and debate. In addressing this issue, Xcel Energy provides information to the public, interested customers and employees for them to make an informed decision about EMF. Xcel Energy will provide measurements for landowners, customers, and employees who request them. In addition, Xcel Energy has followed the "prudent avoidance" guidance suggested by most public agencies. This includes using structure designs that minimize magnetic field levels and siting facilities in locations with the fewest number of people living nearby.

Table 3.5 provides the existing and estimated magnetic fields based on the proposed line and structure design. The expected magnetic field for the proposed structure type and voltage has been calculated at various distances from the center of the pole in milligauss.

Table 3.5
Calculated Magnetic Flux Density (milligauss) for Proposed
115 kV Transmission Line Designs (3.28 feet Above Ground)

Type	Condition	Amps	Distance to Proposed Centerline								
			-300'	-200'	-100'	-50'	0'	50'	100'	200'	300'
115/115 kV Double Circuit, Single Steel Pole Davit Arm	Average	375/800	2.69	5.87	20.96	58.78	133	50.0	18.5	5.4	2.51
	Peak	614/1276	1.99	4.57	18.4	59.32	149	22.4	7.72	2.64	1.32

3.4.3 STRAY VOLTAGE

Stray voltage is defined as a natural phenomenon that can be found at low levels between two contact points in any animal confinement area where electricity is grounded. Electrical systems, including farm systems and utility distribution systems, must be grounded to the earth by code to ensure continuous safety and reliability. Inevitably, some current flows through the earth at each point where the electrical system is grounded and a small voltage develops. This voltage is called neutral-to-earth voltage (NEV). When a portion of this NEV is measured between two objects that may be simultaneously contacted by an animal, it is frequently called stray voltage. Stray voltage is not electrocution, ground currents, EMFs, or earth currents.

Stray voltage has been raised as a concern on some dairy farms because it can impact operations and milk production. Problems are usually related to the distribution and service lines directly serving the farm or the wiring on a farm affecting farm animals that are confined in areas of electrical use. In those instances when transmission lines have been shown to contribute to stray voltage, the electric distribution system directly serving the farm or the wiring on a farm was directly under and parallel to the transmission line. These circumstances are considered in installing transmission lines and can be readily mitigated. No stray voltage issues are anticipated with this Project.

4.0 ENVIRONMENTAL INFORMATION

4.1 DESCRIPTION OF ENVIRONMENTAL SETTING

The proposed route is located just northeast and east of the city of Mankato in Lime and Mankato Townships, Blue Earth County. The area between the Summit-Loon Lake transmission line and the Eastwood Substation is primarily agricultural. The area to the west is rapidly developing. Several commercial, industrial, and residential developments are being constructed or planned along TH 22, County Road 12, and Thompson Ravine Road.

4.2 HUMAN SETTLEMENT

4.2.1 PUBLIC HEALTH AND SAFETY

The Project will be designed in compliance with local, state, NESC, and Xcel Energy standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and ROW widths. Xcel Energy construction crews and/or contract crews will comply with local, state, NESC, and Xcel Energy standards regarding installation of facilities and standard construction practices. Established Xcel Energy and industry safety procedures will be followed during and after installation of the transmission line. This will include clear signage during all construction activities.

The proposed transmission line will be equipped with protective devices to safeguard the public from the transmission line if an accident occurs, such as a structure or conductor falls to the ground. The protective devices are breakers and relays located where the line connects to the substation. The protective equipment will de-energize the line should such an event occur. In addition, the substation facility will be fenced and access limited to authorized personnel. Proper signage will be posted warning the public of the risk of coming into contact with the energized equipment.

The costs associated with these measures have not been tabulated separately from the overall Project costs since these measures are standard practice for Xcel Energy.

4.2.1.2 Mitigative Measures

There are no mitigative measures necessary to address human health and safety.

4.2.2 COMMERCIAL, INDUSTRIAL RESIDENTIAL LAND USE

The transmission line crosses areas zoned agriculture in Lime Township. The line will cross T.H. 14 which is zoned Transition District. The line will also be adjacent to an industrial area. These areas

are zoned light industrial and planned industrial.

The Mankato Regional Airport is located northeast of where the new 115 kV/115 kV line will tap the existing Summit-Loon Lake transmission line. Xcel Energy has consulted with the airport engineer to assure there are no conflicts with the airport's requirements. The Mankato Airport Engineer verified that the proposed structure nearest to the existing runway provides approximately 20 feet of clearance from the top of the structure to the bottom of the 7:1 transition airspace surface. This distance meets the appropriate clearances required by the airport (Appendix C.3).

4.2.2.1 Mitigative Measures

No mitigative measures are proposed since no impacts are anticipated.

4.2.3 DISPLACEMENT

Displacement of residential homes or businesses will not occur.

4.2.3.1 Mitigative Measures

Since no displacement will occur, no mitigative measures are required.

4.2.4 NOISE

Noise is comprised of a variety of sounds of different intensities across the entire frequency spectrum. Humans perceive sound when sound pressure waves encounter the auditory components in the ear. These components convert these pressure waves into perceivable sound. Transmission conductors and transformers at substations produce noise under certain conditions. The level of noise or its loudness depends on conductor conditions, voltage level, and weather conditions. Noise emission from a transmission line occurs during heavy rain and wet conductor conditions. In foggy, damp, or rainy weather conditions, power lines can create a subtle crackling sound due to the small amount of the electricity ionizing the moist air near the wires. During heavy rain the general background noise level is usually greater than the noise from a transmission line. In addition, very few people are out near the transmission line. For these reasons audible noise is not noticeable during heavy rain. During light rain, dense fog, snow, and other times when there is moisture in the air, the proposed transmission lines will produce audible noise higher than rural background levels but similar to household background levels. During dry weather, audible noise from transmission lines is a nearly imperceptible, sporadic crackling sound.

Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The A-weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA. A noise level change of 3 dBA is imperceptible to human hearing. A 5 dBA change in noise level, however, is clearly noticeable. A 10 dBA change in noise levels is perceived as a doubling of noise loudness, while a 20 dBA change is considered a dramatic change in loudness. Table 4.1 shows noise levels associated with common, everyday sources, providing context for the magnitude of noise levels discussed here.

Table 4.1
Common Noise Sources and Levels

Sound Pressure Level (dB)	Typical Sources
120	Jet aircraft takeoff at 100 feet
110	Same aircraft at 400 feet
90	Motorcycle at 25 feet
80	Garbage disposal
70	City street corner
60	Conversational speech
50	Typical office
40	Living room (without TV)
30	Quiet bedroom at night

Source: Environmental Impact Analysis Handbook, ed. by Rau and Wooten, 1980

The Minnesota Pollution Control Agency has established standards for the regulation of noise levels. First, the land use activities associated with residential, commercial, and industrial land have been grouped together into Noise Area Classifications (NAC) based on the activities' sensitivity to noise. *See* Minn. R. 7030.0050. Each NAC is then assigned both daytime and nighttime standards for the land use activities within the NAC. *See* Minn. R. 7030.0040. The table below identifies the established daytime and nighttime noise standards by NAC. The standards are expressed as a range of dBA within a one hour period; L_{50} is the dBA that is exceeded 50 percent of the time within an hour, while L_{10} is the dBA that is exceeded 10 percent of the time within the hour.

Table 4.2
Noise Standards by Noise Area Classification

Noise Area Classification	Daytime		Nighttime	
	L_{50}	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

There are eight homes along the proposed transmission line route, with the nearest noise sensitive receptor approximately 200 feet from the proposed 115 kV/115 kV transmission line. All the residences fall within NAC 1. The audible noise generated from the transmission line is not expected to exceed the noise standards established for NAC 1, as shown in Table 4.2 above.

Another source of noise associated with transmission lines is an electromagnetic generated noise termed corona. Corona on transmission line conductors can cause interference with radio waves, primarily with AM radio and TV video signals, depending on the frequency and strength of the radio and television signal. Although radio and television interference sometimes occurs, Xcel Energy investigates all such problems and corrects those problems caused by Xcel Energy facilities. Xcel Energy does not expect that there will be any impacts from corona due to the operation of the new line.

4.2.4.1 Mitigative Measures

No mitigative measures are necessary since there will be nominal corona or noise impacts from the Project.

4.2.5 AESTHETICS

There will be a contrast to land uses along the 115 kV/115 kV transmission line route. The transmission line poles will be in contrast to the primarily agricultural land along the proposed route. However, the area to the west is rapidly developing and includes a mixture of residential, commercial, and industrial land uses. The contrast to the north is also less due to the presence of the airport. As the line approaches Eastwood Substation, the contrast is lessened due to the development to the west.

4.2.5.1 Mitigative Measures

Although the line will be a contrast to surrounding land uses, Xcel Energy has identified the route that utilizes existing corridors and avoids homes to the greatest extent practicable. Xcel Energy will work with landowners to identify concerns related to the transmission line and aesthetics.

4.2.6 SOCIOECONOMIC

Population and economic characteristics based on the 2000 U.S. Census are presented in Table 4.3. This is a summary of the information for the county and the block group, which is the smallest geographic unit the census measures.

Table 4.3
Population and Economic Characteristics

Location	Population	Per Capita Income	Percentage of Population Below Poverty Level
Blue Earth County	55,941	$18,712	12.9
Lime Township	1,304	$26,615	2.1
Mankato Township	1,869	$27,189	3.7

Source: 2000 U.S. Census: General Demographic Characteristics

According to the 2000 Census race demographics, Blue Earth County is 95 percent white. Lime Township is 98.6 percent white, whereas Mankato Township is 99.6 percent white. Minority groups in the area constitute a very small percentage of the total population. The 2000 Census shows that the primary minority group in Lime Township is "American Indian and Alaska Native," whereas Mankato Township's only minority population is "Asian." The Project area does not contain disproportionately high minority populations or low-income populations. No impacts are anticipated to minority or low-income populations.

Approximately 15 workers will be required by Xcel Energy for transmission line construction and 15 workers for the substation modifications. The transmission crews are expected to spend approximately six weeks constructing the transmission line. During construction, there will be a small positive impact on the community due to the expenditures of the construction crews in the local community.

4.2.6.1 Mitigative Measures

Mitigative measures are not necessary.

4.2.7 CULTURAL VALUES

Cultural values include those perceived community beliefs or attitudes in a given area that provide a framework for each social group's unity. Mankato was originally an important gateway for commerce between southern Minnesota and Minneapolis/St. Paul using both the Minnesota River and eventually the railroad as means for transporting goods. Today, Mankato is an important regional center for education, health care, commerce, industry, and agriculture. Lime Township was named after the abundance of limestone outcrops in the area, many of which have been mined.

No impacts are anticipated to the communities' cultural values due to the construction of the transmission line.

4.2.7.1 Mitigative Measures

No impacts are anticipated; therefore no mitigative measures are required.

4.2.8 RECREATION

Recreational opportunities near the site include the Eagle Lake, Hodapp Marsh, Sakatah Singing Hills State Trail, and several local City of Mankato parks.

Sakatah Singing Hills State Trail is a 39-mile trail that connects Mankato and Faribault and is part of the Mankato trail system. The new transmission line will cross the trail at the junction of the Dakota, Minnesota and Eastern (DM&E) railroad and 589th Avenue.

There are several recreation facilities near the Project, but the construction and operation of the facilities will not directly impact these resources. The new transmission line structures along County Road 12 and 589th Avenue will contrast with the surrounding landscape.

4.2.8.1 Mitigative Measures

There will be no direct impacts to the recreational resources in the area. To the extent practicable, Xcel Energy has proposed that the line be located near existing corridors such as county and township roads and railroad corridors. This will minimize the visual impact to the surrounding areas.

4.2.9 PUBLIC SERVICES

The City of Mankato provides typical public infrastructure to the community. It is not anticipated that the Project will affect public services.

4.2.9.1 Mitigative Measures

Since no impacts are anticipated, no mitigation is required.

4.3 LAND-BASED ECONOMICS

4.3.1 AGRICULTURE

Blue Earth County is one of the leading agricultural producers in the State. The County is ranked seventh in the state in livestock production – second in hogs and pigs. Primary crops in the area are corn and soybean.

Approximately 1421 ft^2 (0.03 acres) of agricultural land will be permanently impacted by the proposed project. Permanent impacts will occur due to the placement of the transmission line poles. Temporary impacts may include soil compaction and crop damage within the ROW.

4.3.1.1 Mitigative Measures

To minimize loss of farmland and to ensure reasonable access to the land near the poles, Xcel Energy intends to place the poles approximately five feet from the roadway and highway ROW. When possible, Xcel Energy will attempt to construct the transmission line before crops are planted or following harvest. The Company will compensate landowners for crop damage and soil compaction that occurs as a result of the Project. Soil compaction will be addressed by compensating the farmer to repair the ground or by using contractors to chisel plow the site. Normally, a declining scale of payments is set up over a period of a few years.

4.3.2 FORESTRY

There are no forested land based economies within the Project vicinity that will be affected. For potential impacts to Flora, please see Section 4.5.3.

4.3.2.1 Mitigative Measures

No mitigative measures will be required.

4.3.3 TOURISM

The site is not located near any tourist attractions that would be impacted by the Project.

4.3.3.1 Mitigative Measures

No mitigative measures are anticipated with regard to tourism.

4.3.4 MINING

The proposed transmission line will not impact active mining operations.

4.3.4.1 Mitigative Measures

No mitigative measures are necessary because the Project will not impact any mining operations.

4.4 ARCHAEOLOGICAL AND HISTORIC RESOURCES

The State Historical Preservation Office (SHPO) informed HDR Engineering, Inc. (HDR), a consultant assisting Xcel Energy on the Project, that there were no properties listed on the National

or State Registers of Historic Places and no known or suspected archaeological properties in the area that will be affected by the project (Appendix C.2).

4.4.1 MITIGATIVE MEASURES

No mitigation measures will be required since no previously unidentified historic properties are likely to be found in the project area.

4.5 NATURAL ENVIRONMENT

4.5.1 AIR QUALITY

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The national standard is 0.08 ppm on an eight-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest eight-hour daily maximum average in one year.

The only potential air emissions from a 115 kV transmission line result from corona and are limited. Corona consists of the breakdown or ionization of air in a few centimeters or less immediately surrounding conductors, and can produce ozone and oxides of nitrogen in the air surrounding the conductor. For a 115 kV transmission line, the conductor gradient surface is usually below the air breakdown level. Typically, some imperfection such as a scratch on the conductor or a water droplet is necessary to cause corona. Ozone is not only produced by corona, but also forms naturally in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants such as hydrocarbons from auto emissions. The natural production rate of ozone is directly proportional to temperature and sunlight and inversely proportional to humidity. Thus, humidity (or moisture), the same factor that increases corona discharges from transmission lines, inhibits the production of ozone. Ozone is a very reactive form of oxygen and combines readily with other elements and compounds in the atmosphere. Because of its reactivity, it is relatively short-lived. The Project area presently meets all federal air quality standards.

During construction of the proposed transmission line and substation there will be limited emissions from vehicles and other construction equipment and fugitive dust from ROW clearing. Temporary air quality impacts caused by construction-related emissions are expected to occur during this phase of activity.

The magnitude of the construction emissions is influenced heavily by weather conditions and the specific construction activity occurring. Exhaust emissions, primarily from diesel equipment, will vary according to the phase of construction but will be minimal and temporary. Adverse impacts to

the surrounding environment will be minimal because of the short and intermittent nature of the emission and dust-producing construction phases.

4.5.1.1 Mitigative Measures

Xcel Energy does not anticipate significant impacts to air quality, therefore no mitigation is proposed.

4.5.2 WATER QUALITY

No impacts to water bodies or wetlands are anticipated.

During construction there is the possibility of sediment reaching surface waters as excavation, grading, and construction traffic disturb the ground. Once the project is complete it will have no impact on surface water quality. The surface water resources that could be affected by the construction of the transmission line are Hodapp Marsh (76W) and Eagle Lake (60P), which are DNR Public Waters and Public Water Wetlands. No direct impacts to the surface water resources are anticipated.

4.5.2.1 Mitigative Measures

Xcel Energy will follow standard erosion control measures identified in the Minnesota Pollution Control Agency's Stormwater Best Management Practices Manual, such as using silt fencing to prevent impacts to adjacent water resources.

In practice, Xcel Energy attempts to avoid placing poles in wetlands. If placement of poles in wetlands is necessary, Xcel Energy will minimize impacts by using special construction mats or construct during frozen ground conditions to limit disturbance and compaction. If areas of the wetland are disturbed, Xcel Energy will restore the area to preconstruction contours and will allow the existing seed bank to revegetate the area. Any soil removed from the wetlands will not be placed back into the wetland.

4.5.3 FLORA

Impacts to trees may occur where the new transmission line parallels County Road 12 and as the line enters the Eastwood Substation. The area of trees that will be impacted by the proposed project due to the routing of these transmission lines is expected to be approximately 0.1 acres (4,050 ft^2). A width of 45 feet will be cleared for the 115 kV transmission line ROW.

A majority of the eastern part of the project is agricultural land. Row crops such as corn and soybean dominate the area. For a discussion on impacts to agriculture, please see Section 4.3.1.

4.5.3.1 Mitigative Measures

To minimize impacts to trees in the project corridor, Xcel Energy will only remove trees located in the right-of-way for the transmission lines, or that would impact the safe operation of the facility.

4.5.4 FAUNA

There is a potential for temporary displacement of wildlife during construction and the loss of small amounts of habitat from the Project. Wildlife that inhabit the trees that will be removed for the transmission lines will likely be displaced. Comparable habitat is adjacent to the route, and it is likely that these organisms would only be displaced a short distance.

Raptors, waterfowl, and other bird species may also be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission line in areas where there are agricultural fields that serve as feeding areas, or wetlands and open water

Additionally, the electrocution of large birds, such as raptors, can be a concern 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 transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution, however, so there are no concerns about avian electrocution as a result of the proposed Project.

4.5.4.1 Mitigative Measures

Xcel Energy has been working with various state and federal agencies over the past twenty years to address these issues. Company personnel work to address problem areas as quickly and efficiently as possible. In 2002, Xcel Energy, Inc.'s operating companies including Xcel Energy, entered into a voluntary memorandum of understanding (MOU) to work together to address avian issues throughout its territory. This includes the development of avian protection plans (APP) for each state Xcel Energy, Inc. serves. Currently, Xcel Energy, Inc. is finalizing the APP for Colorado and will begin work on other states. Standard reporting methods were also developed.

The primary methods Xcel Energy uses to address avian issues for transmission projects include:

- Working with the DNR to identify any areas that may require marking transmission line shield wires and/or using alternate structures to reduce collisions; and,
- Attempting to avoid areas known as major flyways or migratory resting spots.

No additional mitigation is necessary.

4.6 RARE AND UNIQUE NATURAL RESOURCES

The following is a list of rare or unique resources identified by the DNR in a letter to HDR, dated November 22, 2004. Nine known occurrences of rare species or special communities have been identified within the vicinity of the proposed route. The resources in Table 4.4 were compiled using the DNR Natural Heritage Database (NHNRP Contact #: ERDB 20050373).

Table 4.4
Rare and Unique Resources

Common Name	Number of Occurrences	Scientific Name	Federal Status 1	MN Status 1	State Rank 2
Racer	2	Coluber constrictor		SPC	
Silver Maple	1	Floodplain Forest Silver Maple			S3
Mucket Mussel	1	Actinonaias ligamentina		THR	
Bald Eagle	1	Haliaeetus leucocephalus	LT	SPC	
Mesic Prairie	1	Mesic Praire			S1
Mussel Sampling Sites	2	Mussel Sampling Site #120 and #121			
Paddlefish	1	Polyodon spathula		THR	

1) LT: Listed Threatened; THR: Threatened; SPC: Special Concern

2) State Rank: A rank is assigned to the natural community type, which reflects the known extent and condition of that community in Minnesota. Ranks range from S1 (in greatest need of conservation action in the state) to S5 (secure under present conditions).

The DNR did not identify any known occurrences of rare and unique resources that would be affected by the proposed project (Appendix C.1). Additionally, many of these species are identified in water bodies that will not be impacted by the Project. The native prairie, bald eagle, and silver maple floodplain forest are outside of the Project area.

4.6.1 MITIGATIVE MEASURES

It is not anticipated that mitigative measures will be necessary. Sara Hoffman stated on behalf of the DNR that, based on the nature and location of the Project, none of the known occurrences of rare features will be affected.

5.0 AGENCY INVOLVEMENT, PUBLIC PARTICIPATION AND REQUIRED PERMITS AND APPROVALS

5.1 AGENCY CONTACTS

5.1.1 MINNESOTA DEPARTMENT OF NATURAL RESOURCES

The DNR Natural Heritage and Non-game Research Program was contacted on October 28, 2004, to review the Project area for State threatened and endangered species and rare natural features. In the DNR's response, received November 22, 2004, nine rare species or natural communities were identified within a mile radius of the project (See Table 4.4). However Sara Hoffman stated on behalf of the DNR that, due to the nature and location of the Project, none of the known occurrences of rare features will be affected (Appendix C.1).

5.1.2 MINNESOTA SHPO

On October 28, 2004, SHPO was asked to provide comment regarding potential effects to known or suspected archaeological sites or historic standing structures in the project area. On December 8, 2004, SHPO provided a response stating that no known historic properties will be affected by the project (SHPO Number: 2005-0470) (Appendix C.2).

5.2 PUBLIC PARTICIPATION

5.2.1 PUBLIC INVOLVEMENT

Xcel Energy held an open house on April 26, 2005, to familiarize landowners with the project. Landowners were notified by mail about the meeting, and a notice about the open house was published in the local newspaper. Approximately nine landowners attended the meeting.

5.2.2 IDENTIFICATION OF LAND OWNERS

Landowner names are provided in Table 5.1. A total of 25 landowners have been identified to be potentially impacted by the proposed route.

Table 5.1
Landowner Names

Name	Company
Anthony and Shirley Baker	
Jacobson Properties LTD Part	Katolight Corporation
City of Mankato	
Virginia Schulte	
Gerald Rausch	
Beverly Fitzloff	Del-Anne Corporation
James Olson	
Ray, Jeanne, Marvin Moeri Trust	
Dennis and Linda Van Rossum	
John and Dawn Bartsch	
Veras and Maxine Turner Trust	
Ronald and Firle Haefner	
Dennis and Charlotte Hodapp	
Matthew and Tresa Lacina	
Daniel and Karolynn Hiniker	
State of Minnesota	
James and Elizabeth Sohler	
Lorraine Grimm	
Theodore and Rita Wolfe, Jr.	
Dakota, Minnesota and Eastern Railroad Company	
Sharon Karstens	
Dorothy Sohler	
Rosemary Wenner	Wenner Family Ltd. Partnership
Mary Brau	
T Halter	

5.3 REQUIRED PERMITS AND APPROVALS

Table 5.2 shows the permits potentially required for the Project.

Table 5.2
Potential Required Permits

Permit	Jurisdiction
State of Minnesota Approvals	
Route Permit Application (Alternative Process)	EQB
NPDES Permit	MPCA
Federal Approvals	
Form 7460-1, Notice of Proposed Construction	FAA
Form 7460-2, Part 1, Notice of Actual Construction or Alteration	FAA

5.3.1 LOCAL APPROVALS

No local approvals are required for the Project.

5.3.2 STATE OF MINNESOTA APPROVALS

Route Permit (Alternative Process)

A HVTL cannot be constructed without a route permit approved by the EQB. A route permit under the Alternative Process requires the applicant to be eligible as outlined in Minnesota Rules 4400.2000.

NPDES Permit

A National Pollutant Discharge Elimination System (NPDES) permit is required for storm-water discharges associated with construction activities disturbing soil equal to or greater than one acre in area. A requirement of the permit is to develop and implement a Storm-Water Pollution Prevention Plan (SWPPP), which includes Best Management Practices (BMPs) to minimize discharge of pollutants from the site. This permit will be acquired since the substation work impacts more than one acre.

5.3.3 FEDERAL APPROVALS

Notice of Proposed Construction/Notice of Actual Construction or Alteration

A Notice of Proposed Construction and Notice of Actual Construction or Alteration, using Forms 7460-1 and 7460-2, must be submitted to the FAA since the proposed structures are within 20,000 feet of an airport with a runway greater than 3,200 feet in length, and the object exceeds a slope of 100:1 horizontally.

6.0 SUMMARY OF FACTORS TO BE CONSIDERED

In determining whether to issue a permit for a high voltage transmission line, the EQB considers 14 factors listed in Minnesota Rule 4400.3150. A discussion of each of the relevant factors as they relate to the Project is provided below.

6.1 EFFECTS ON HUMAN SETTLEMENT AND AESTHETICS, INCLUDING BUT NOT LIMITED TO, DISPLACEMENT, NOISE, AESTHETICS, CULTURAL VALUES, RECREATION, AND PUBLIC SERVICES

The proposed route will result in no displacement of existing homes or businesses. The noise related to the proposed line will be minimal, as described in Section 4.2.4 of this Application. The impacts associated with aesthetics and recreation from the Project will be minor. The new double circuit transmission line will be a contrast to adjacent land uses, but as development to the west continues eastward this contrast will lessen. The Project will have no impact on cultural values or public services within the Project corridor.

6.2 EFFECTS ON PUBLIC HEALTH AND SAFETY

No effects on public health or safety are anticipated. The proposed line will be constructed to comply with all NESC and Xcel Energy guidelines and standards. The proposed 115 kV/115 kV transmission line will have a maximum electric field density of approximately 2.52 kV per meter underneath the conductors at one meter above ground level. This is significantly less than the EQB's standard of 8 kV. The EQB standard was designed to minimize the hazard of shocks from the line touching large objects under extra high voltage transmission lines of 500 kV or greater. Moreover, the most recent scientific studies on EMF have not found any significant link between EMF and health effects.

6.3 EFFECTS ON LAND-BASED ECONOMIES, INCLUDING, BUT NOT LIMITED TO, AGRICULTURE, FORESTRY, TOURISM, AND MINING

No impacts to agriculture, forestry, tourism, or active sand and gravel mining operations will occur. Approximately 1421 ft^2 (0.03 acres) of agricultural land will be impacted. Impacts will be minimized by using existing corridors and locating poles adjacent to roadway ROW, where practicable.

6.4 EFFECTS ON ARCHAEOLOGICAL AND HISTORIC RESOURCES

The proposed route is not expected to impact any archaeological sites or historic standing structures.

6.5 EFFECTS ON THE NATURAL ENVIRONMENT, INCLUDING EFFECTS ON AIR AND WATER QUALITY RESOURCES, AND FLORA AND FAUNA

No significant impacts to air quality will result from the Project. The impacts to water quality resources will relate primarily to possible soil disturbance during construction. During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading, and construction traffic. Xcel Energy will implement practices during construction to prevent sediment from entering surface waters, such as silt fences. The amount of flora that will be impacted will not be known until the design is finalized. Only trees and shrubs that would interfere with the safe operation of the line will be removed. Since flora at the site will be impacted, it is possible that wildlife may be displaced due to loss of habitat. This impact will be temporary since similar habitat is adjacent to the site.

6.6 EFFECTS ON RARE AND UNIQUE NATURAL RESOURCES

The USFWS and DNR did not identify any rare or unique natural resources that would be impacted by the Project.

6.7 APPLICATION OF DESIGN OPTIONS THAT MAXIMIZE ENERGY EFFICIENCIES, MITIGATE ADVERSE ENVIRONMENTAL EFFECTS, AND COULD ACCOMMODATE EXPANSION OF TRANSMISSION CAPACITY

The transmission lines proposed for this Project are being designed to support the voltage required to handle the projected capacity from the Mankato Energy Center. Xcel Energy is not proposing to build the lines to accommodate greater capacity than that required for the new generating facility.

6.8 USE OR PARALLELING OF EXISTING RIGHTS-OF-WAY, SURVEY LINES, NATURAL DIVISION LINES, AND AGRICULTURAL FIELD BOUNDARIES

The project parallels existing ROWs for 77 percent of the route. Existing transmission, roadway, and railroad ROW will be utilized for that portion of the route.

6.9 USE OF EXISTING LARGE ELECTRIC POWER GENERATING PLANT SITE

This factor is not applicable to the Project.

6.10 USE OF EXISTING TRANSPORTATION, PIPELINE, AND ELECTRICAL TRANSMISSION SYSTEMS OR RIGHTS-OF-WAY

Existing transportation ROW will be utilized by the new transmission line. A small amount of electrical transmission system ROW will be utilized as the new line enters the Eastwood Substation.

6.11 ELECTRICAL SYSTEM RELIABILITY

The project is necessary to support the addition of the Mankato Energy Center into the transmission line system. Without improvements, the existing transmission line system cannot support the addition of the 650 megawatt Mankato Energy Center power plant. The new lines will also continue to ensure reliable service to the Mankato area.

6.12 COSTS OF CONSTRUCTING, OPERATING AND MAINTAINING THE FACILITY WHICH ARE DEPENDENT ON DESIGN AND ROUTE

As proposed, the project is designed to minimize costs. The transmission line is being designed to support the voltage required to handle the projected capacity from the new Mankato Energy Center, not any greater capacity. In addition, over three-quarters of the line's proposed route will use existing right-of-way. Finally, the line is designed to require nothing more than standard transmission line construction and maintenance procedures.

6.13 ADVERSE HUMAN AND NATURAL ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Unavoidable adverse impacts to the natural environment are minimal. Construction related activities would cause short-term impacts, mainly in the form of disturbed soils. Adverse human and environmental effects which cannot be avoided include visual impacts associated with the project, as well as those impacts related to the use of land for the placement of transmission poles and substation expansion.

6.14 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

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 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. There are few commitments of resources associated with this project that are irreversible and irretrievable, but include those resources primarily related to construction.

Construction resources that will be used include concrete, steel, and hydrocarbon fuel. These resources will be utilized to construct the project. The substation will require steel and concrete for the equipment and steel and concrete will also be needed for the transmission line poles and foundations. During construction vehicles will be traveling to and from the site, utilizing hydrocarbon fuels.

7.0 REFERENCES

City of Mankato, Minnesota. http://www.ci.mankato.mn.us. Retrieved June 1, 2004.

Committee to Review the Research Activities Completed Under the Energy Policy Act of 1992. *Research on Power-Frequency Fields.* National Research Council.

Farm Service Agency. 2003. *NAIP Orthophotos, Blue Earth County, Minnesota.*

Federal Emergency Management Agency. 1998. Q3 Flood Data, Blue Earth County.

LMIC. 1978. *Soils Derived from Soil Survey Information System* (SSIS), Blue Earth County.

Mankato Energy Center, LLC. 2004. *Site Permit Application, Mankato Energy Center, Mankato, Minnesota.* Docket No. 04-76-PPS CALPINE

Minnesota Agricultural Statistics Service. 2004 Minnesota Agricultural Statistics. http://www.nass.usda.gov/mn/Agstat04/p097100.pdf. Retrieved February 2005.

Minnesota Department of Natural Resources. Minnesota River – State Canoe Route: State Highway 4 to Le Sueur. http://www.dnr.state.mn.us/canoeing/minnesotariver/three.html Retrieved June 1, 2004.

Minnesota Department of Natural Resources. *Big Woods.* http://www.dnr.state.mn.us/ecs/broadleaf/ecs_r.html Retrieved June 1, 2004.

Minnesota Department of Natural Resources. *Minnesota River Prairie.* http://www.dnr.state.mn.us/ecs/prairie/ecs_q.html. Retrieved June 1, 2004.

Minnesota Public Utilities Commission. July 1998.*Final Report of the Science Advisors to the Minnesota Public Commission: Research Findings and Recommendations Regarding Claims of Possible Effects of Currents in the Earth on Dairy Cow Health and Milk Production.* St. Paul, Minnesota

Minnesota State Interagency Working Group on EMF Issues. September 2002. *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options*. St. Paul, Minnesota

Ojakangas, Richard W. and Charles L. Matsch. 1982. *Minnesota's Geology*. University of Minnesota Press. Minneapolis.

Olden, Kenneth. 1999. *1999 NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields.* National Institute of Environmental Health Sciences, National Institutes of Health. Research Triangle Park, North Carolina.

Public Service Commission of Wisconsin. 2003. Stray Voltage Website, http://psc.wi.gov/electric/newsinfo/strayvol.htm. Retrieved September 5, 2003.

United States Census Bureau. American Factfinder. http://factfinder.census.gov. Retrieved June 1, 2004.

United States Fish and Wildlife Service. 1990. *National Wetlands Inventory (NWI) Mankato West Quadrangle.* Washington, DC.

United States Fish and Wildlife Service. 1990. *National Wetlands Inventory (NWI) Minnesota.* St. Petersburg, Florida.

United States Geological Survey. 1993. Digital Raster Graphic, Mankato West Quadrangle.

8.0 DEFINITIONS

Avian	Of or relating to birds.
A-weighted scale	The sensitivity range for human hearing
Conductor	A material or object that permits an electric current to flow easily.
Corona	The breakdown or ionization of air in a few centimeters or less immediately surrounding conductors.
Fauna	The collective animals of any place or time that live in mutual association.
Flora	The collective plants of any place or time that live in mutual association.
Hydrocarbons	Compounds that contain carbon and hydrogen, found in fossil fuels.
Ionization	Removal of an electron from an atom or molecule.
Oxide	A compound of oxygen with one other more positive element or radical.
Ozone	A form of oxygen in which the molecule is made of three atoms instead of the usual two.
Raptor	A member of the order Falconiformes, which contains the diurnal birds of prey, such as the hawks, harriers, eagles and falcons.
Scientific and Natural Area	A program administered by the DNR with the goal to preserve and perpetuate the ecological diversity of Minnesota's natural heritage, including landforms, fossil remains, plant and animal communities, rare and endangered species, or other biotic features and geological formations, for scientific study and public edification as components of a healthy environment.
Stray Voltage	A natural phenomenon that can be found at low levels between two contact points in any animal confinement area where electricity is grounded. Electrical systems – including farm systems and utility distribution systems – must be grounded to the earth by code to ensure continuous safety and reliability. Inevitably, some current flows through the earth at each point where the electrical system is grounded and a small voltage develops. This voltage is called neutral-to-earth voltage (NEV). When a portion of this NEV is measured between two objects that may be simultaneously contacted by an animal, it is frequently called stray voltage. Stray voltage is not electrocution and is not DC, ground currents, EMFs or earth currents. It only refers to farm animals that are confined in areas of electrical use and not to humans.
Ultraviolet radiation	A portion of the electromagnetic spectrum with wavelengths shorter than visible light.
Voltage	Electric potential or potential difference expressed in volts.
Wetland	Wetlands are areas that are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. Wetlands include swamps, marshes, bogs and similar areas.

Appendix A

EQB Notice

Appendix B

Project Maps

Appendix C

Agency Letters