XCEL ENERGY
APPLICATION TO THE
PUBLIC UTILITIES COMMISSION
FOR A
ROUTE PERMIT

CANNON FALLS – COLVILL SUBSTATION
TRANSMISSION LINE PROJECT

Alternative Permitting Process
PUC Docket No. E002/TL-06-459

APRIL 25, 2006

Xcel Energy℠

TABLE OF CONTENTS

1.0 Project Summary 1
2.0 Introduction 1
2.1 Eligibility for the Alternative Permitting Process 1
2.2 Certificate of Need Process Summary 4
2.3 Notice to the Commission 4
3.0 Project Information 5
3.1 Statement of Ownership of the Proposal 5
3.2 Permittee/Project Manager 5
3.3 Project Location 5
3.4 Project Proposal 6
3.5 Project Schedule 6
3.6 Project Costs 6
4.0 Detailed Facility Description and Route Selection Rationale 7
4.1 Route Description 7
4.2 Substation Description 8
4.2.1 Colvill Substation 8
4.2.2 Cannon Falls Transmission Substation 9
4.3 Route and Substation site Selection Process 9
4.3.1 Route Selection Process 9
4.3.2 Substation Site Selection Process 10
4.4 Design Options to Accommodate Future Expansion 11
5.0 Engineering Design, Construction and Right-of-Way Acquisition 12
5.1.1 Transmission Structures and Right-of-Way Design 12
5.1.2 Identification of Existing Utility and Public Rights-of-Way 18
5.1.3 Right-of-Way Acquisition 18
5.1.4 Transmission Construction Procedures 19
5.1.5 Restoration Procedures 20
5.1.6 Maintenance Procedures 20
5.2 Electric and Magnetic Fields 20
5.2.1 Electric Fields 20
5.2.2 Magnetic Fields 21
5.2.3 Stray Voltage 24
6.0 Environmental Information 25
6.1 Description of Environmental Setting 25
6.2 Human Settlement 25
6.2.1 Public Health and Safety 25
6.2.2 Commercial, Industrial, Residential Land Use 26

6.2.3 Displacement 26
6.2.4 Noise 27
6.2.5 Aesthetics 29
6.2.6 Socioeconomic 30
6.2.7 Cultural Values 31
6.2.8 Recreation 31
6.2.9 Public Services 32
6.3 Land-Based Economics 32
6.3.1 Agriculture 32
6.3.2 Forestry 33
6.3.3 Tourism 33
6.3.4 Mining 33
6.4 Archaeological and Historic Resources 33
6.4.1 Previous Cultural Surveys 33
6.5 Natural Environment 36
6.5.1 Air Quality 36
6.5.2 Water Quality 37
6.5.3 Flora 38
6.5.4 Fauna 38
6.6 Rare and Unique Natural Resources 39
6.6.1 Mitigative Measures 40
7.0 Agency Involvement, Public Participation and Required Permits and Approvals 41
7.1 Agency Contacts 41
7.1.1 Minnesota Department of Natural Resources 41
7.1.2 Minnesota SHPO 41
7.1.3 Dakota County, Office of Planning 41
7.1.4 Goodhue County, Department of Public Works 42
7.1.5 Minnesota Department of Transportation, Metro District 42
7.2 Identification of Land Owners 42
7.3 Required Permits and Approvals 43
7.3.1 Local Approvals 43
7.3.2 State of Minnesota Approvals 44
8.0 Summary of Factors to be Considered 45
8.1 Effects on human settlement and aesthetics, including but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services 45
8.2 Effects on public health and safety 45
8.3 Effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining 45
8.4 Effects on archaeological and historic resources 46

8.5 Effects on the natural environment, including effects on air and water quality resources, and flora and fauna....46
8.6 Effects on rare and unique natural resources....46
8.7 Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission capacity....46
8.8 Use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries....47
8.9 Use of existing large electric power generating plant site....47
8.10 Use of existing transportation, pipeline, and electrical transmission systems or rights-of-way....47
8.11 Electrical system reliability....47
8.12 Costs of constructing, operating and maintaining the facility which are dependent on design and route....47
8.13 Adverse human and natural environmental effects which cannot be avoided....48
8.14 Irreversible and irretrievable commitments of resources....48
9.0 References....49
10.0 Definitions....52

LIST OF TABLES

Table 1 Completeness Checklist 1
Table 2 Project Location 5
Table 3 Structure Design Summary 13
Table 4 ROW Requirements 15
Table 5 Shared ROW 18
Table 6 Calculated Electric Fields (kV/m) for Proposed 115 kV Transmission Line Designs (3.28 feet above ground) 21
Table 7 Calculated Magnetic Flux Density (milligauss) for Proposed 115 kV Transmission Line Designs (3.28 feet above ground) 23
Table 8 Common Noise Sources and Levels 28
Table 9 Noise Standards by Noise Area Classification 28
Table 10 Population and Economic Characteristics 30
Table 11 Previously Identified Cultural Resources Within 1 Mile 34
Table 12 Previously Identified Architectural Properties Within 1 Mile 35
Table 13 Rare and Unique Resources 40
Table 14 Potential Required Permits 43

LIST OF FIGURES

Figure 1 115 kV Single-Circuit Horizontal Line Post Structure 12
Figure 2 115 kV/115 kV Steel Double-Circuit Davit Arm Structure 14
Figure 3 ROW Requirements Adjacent to Roadways, With ROW Sharing **Error! Bookmark not defined.**
Figure 4 ROW Requirements Cross Country ..... **Error! Bookmark not defined.**

LIST OF APPENDICES

Appendix A	COMMISSION Notice
Appendix B	Maps
B.1	General Vicinity Map
B.2	Project Location Map
B.3	Project Location Map – Aerial
B.4	Colvill Substation Location
B.5	Colvill Substation Layout
B.6	CFT Substation Layout
B.7	Rejected Transmission Route Alternatives
Appendix C	Fauna
C.1	Common Mammal Species
C.2	Common Avian Species
Appendix D	Agency Correspondence
D.1	DNR Response
D.2	SHPO Response
D.3	Response to SHPO
D.4	Dakota County Response
D.5	Dakota County Email
D.6	Goodhue County Public Works Response
D.7	MNDOT Response
Appendix E	Landowner List

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 Public Utilities Commission (COMMISSION) pursuant to Minnesota Rules (Minn. R.) Chapter 4400 and Minnesota Statutes (Minn. Stat.) Chapter 116C. The particular facilities for which the permit is requested (the Project) is comprised of the following:

- A 0.98 mile (5,170 ft) double circuit 115 kV/115 kV transmission line;
- 1.3 miles (6,945 ft) of two single circuit 115 kV transmission lines connecting the existing Cannon Falls Transmission (CFT) Substation to Empire Substation 115 kV transmission line east to the proposed new 161 kV/115 kV Colvill Substation;
- The new 161 kV/115 kV Colvill Substation; and
- The expansion of the Cannon Falls Transmission Substation.

2.0 INTRODUCTION

2.1 ELIGIBILITY FOR THE ALTERNATIVE PERMITTING PROCESS

The COMMISSION rules provide for 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 COMMISSION submittal requirements are listed in Table 1 with cross-references indicating where information can be found elsewhere in this application.

TABLE 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	2.1
Minn. R. 4400.2000, Subp. 2.	Subpart 2. **Notice to COMMISSION**. 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 Commission of such intent, in writing, at least 10 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	4.3 (See also 4400.1150, Subp.2 below)
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	3.1
	(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	3.2
	(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	4.1, 4.2, 3.4, 5.1.1
	(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	6.1-6.6

Authority	Required Information	Where
	(g) the names of each owner whose property is within any of the proposed routes for the high voltage transmission line	7.2.2
	(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
	(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	5.1.2
	(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	5.2, 5.0
	(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	3.6
	(l) a description of possible design options to accommodate expansion of the high voltage transmission line in the future	4.4
	(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	7.3
	(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	2.2
Minn. R.4400.1150, subp. 3	**Environmental Information** (a) a description of the environmental setting for each site or route	6.1
	(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	6.2
	(c) a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	6.3
	(d) a description of the effects of the facility on archaeological and historic resources	6.4
	(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	6.5
	(F) a description of the effects of the facility on rare and unique natural resources	6.6
	(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 described in Section 6
	(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 6
Minn. R. 4400.1350, subp. 2 (applicable per Minn. R. 4400.2300)	**Notice of Project** Notification to persons on Commission's general list, to local officials, and to property owners	Will be mailed within 15 days of application submission

Authority	Required Information	Where
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	8.1
	(b) effects on public health and safety	8.2
	(c) effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	8.3
	(d) effects on archaeological and historic resources	8.4
	(e) effects on the natural environment, including effects on air and water quality resources and flora and fauna	8.5
	(f) effects on rare and unique natural resources	8.6
	(g) application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity	8.7
	(h) use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries	8.8
	(i) use of existing large electric power generating plant sites	8.9 (not applicable)
	(j) use of existing transportation, pipeline, and electrical transmission systems or rights-of-way	8.10
	(k) electrical system reliability	8.11
	(l) costs of constructing, operating, and maintaining the facility which are dependent on design and route	8.12
	(m) adverse human and natural environmental effects which cannot be avoided	8.13
	(n) irreversible and irretrievable commitments of resources	8.14
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	6.5.2, , 5.2, 6.5.1, 6.2.1, 6.5.3, 6.5.4, 6.2.5, 6.6

Authority	Required Information	Where
	(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	4.4, 8.7
	(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 to transmission projects
	(4) Evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants	Not applicable to transmission projects
	(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	6.2, 6, 6.3.1
	(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 6 8.1-8.6
	(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	5.1.2, 8.8
	(9) Evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations	6.3.1, 8.8
	(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	4.4, 8.7
	(11) Evaluation of irreversible and irretrievable commitments of resources should the proposed site or route be approved	8.14
	(12) When appropriate, consideration of problems raised by other state and federal agencies and local entities	7.1

2.2 CERTIFICATE OF NEED PROCESS SUMMARY

Minn. Stat. § 216B.243, subd. 2 states that no large energy facility shall be constructed in Minnesota without the issuance of a Certificate of Need (CON) by the 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). Therefore, no CON is required for the proposed Project.

2.3 NOTICE TO THE COMMISSION

Xcel Energy notified the Commission by letter dated March 20, 2006 that the Company intended to utilize the Alternative Permitting Process for the proposed Project. This complies with the requirement of Minn. R. 4400.2000, subp. 2 to notify the Commission at least 10 days prior to submitting an application. A copy of this notice is attached in Appendix A.

3.0 PROJECT INFORMATION

3.1 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 single and double circuit transmission lines and the Colvill Substation.

3.2 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

3.3 PROJECT LOCATION

The proposed Project is located in Cannon Falls, Minnesota in Dakota and Goodhue Counties, in the following townships, ranges, and sections. Appendix B.1 identifies the Project location.

TABLE 2
PROJECT LOCATION

Sections	Township	Township Name	Range
35, 36	113	Hampton	18
1	112	Stanton	18
6	112	Cannon Falls	17

3.4 PROJECT PROPOSAL

Xcel Energy proposes construction of two new single circuit 115 kV transmission lines tapped from the existing Cannon Falls Transmission to Empire 115 kV transmission line. The two new lines will have a double circuit 115 kV/115 kV component terminating at the proposed new 161/115 kV Colvill Substation.

The proposed facility improvements are required to support the interconnection of a new generation facility proposed by Invenergy Cannon Falls LLC, the Cannon Falls Generation Station. Xcel Energy is also expanding the existing Cannon Falls Transmission (CFT) Substation to accommodate the facilities.

3.5 PROJECT SCHEDULE

Construction is expected to begin on the Colvill Substation in October. Xcel Energy anticipates an in-service date of the Colvill Substation in February 2008. By energizing the substation and associated transmission, the Project will "back feed" energy to the generator, so that power can be used at the plant for system initiation and testing. Construction for the transmission portions of the Project are anticipated to commence in August 2007, but may begin sooner based on line outages and crew availability. The transmission line will need to be constructed by October 2007 to accommodate the generator. The line will be in-service by February 2008.

3.6 PROJECT COSTS

Xcel Energy has prepared a preliminary cost estimate for the transmission line and new substation construction associated with this application. The Project cost is estimated to be $1.35 million for the transmission line, $4.85 million for the new Colvill Substation and $5.5 million for the CFT Substation improvements.

4.0 DETAILED FACILITY DESCRIPTION AND ROUTE SELECTION RATIONALE

4.1 ROUTE DESCRIPTION

This Project involves interconnecting the existing CFT to Empire 115 kV transmission line in two locations. These taps will involve the construction of two new single circuit 115 kV transmission lines that join east of County Road 85 and become a double circuit 115 kV/115 kV transmission line terminating at the new Colvill Substation (Appendix B.2 and B.3). The northern 115 kV transmission line will total approximately 1.0 mile long; whereas, the southern 115 kV transmission line will total approximately 0.3 mile long. The existing 0.6 mile portion of the CFT to Empire 115 kV transmission line between each of the interconnection points will be removed.

The northern line will connect to the CFT to Empire 115 kV transmission line where it currently heads south in Section 35, Township 113, Range 18 (approximately 0.3 mile west of Trunk Highway (TH) 52). The new Empire to Colvill 115 kV line will continue east cross country from the tap for 0.27 mile, to County Road 85, where the it will turn south. The Empire to Colvill 115 kV transmission line will follow the east side of County Road 85 for approximately 0.74 mile until it meets the other new 115 kV transmission line segment at the junction of County Roads 85 and 86. The two lines will then continue to the Colvill substation site on 115 kV/115 kV double circuit structures, following County Road 86 to the southeast along the north side of County Road 86 for approximately 0.73 mile. There the lines will turn northeast, spanning the farm fields and will run cross country for approximately 575 feet. The new lines will then turn north-northeast and go for approximately 540 feet until it will turn east and then enter the proposed Colvill Substation (approximately 180 feet).

The southern single circuit 115 kV segment will connect to the existing CFT to Empire 115 kV transmission line at the location where the line intersects Rochester Road/County Road 86, east of TH 52. The new CFT to Colville 115 kV line will then continue southeast along the south side of County Road 86 for approximately 0.3

mile, where it will cross to the north side of County Road 86 and join the Empire to Colvill segment, continuing as a double circuit segment, as described above.

4.2 SUBSTATION DESCRIPTION

4.2.1 COLVILL SUBSTATION

Xcel Energy will construct the new Colvill Substation approximately 1,000 feet north of the intersection of Rochester Boulevard/County Highway 29/County Highway 86 on a 58-acre parcel in the NW ¼ of Section 6 of Cannon Falls Township (Township 112, Range 17). The new substation is approximately 2 miles north of the CFT Substation, and is located immediately east of the existing CFT to Spring Creek 161 kV transmission line. Approximately 2.3 acres (300 feet by 330 feet) will be fenced for the substation.

The substation will be designed to accommodate the new 115 kV in and out tap of the CFT to Empire 115 kV line. The existing CFT to Spring Creek 161 kV line will be split and terminated in the new Colvill Substation as part of a separate project. From the CFT Substation to the Colvill Substation, the line will be reenergized at 115 kV. From the Colvill Substation to Spring Creek, the line will be re-energized at 161 kV.

The new Colvill substation will include the following design components:

- A 115 kV 5-position ring bus
- A 161 kV bus (1-position)
- One 161 kV/115 kV 187 MVA autotransformer
- Construction of a control house to house the necessary control, relaying and communications equipment.
- New concrete foundations will be installed to support the control house and electrical equipment such as transmission line structures and dead ends, transformers, breakers, and switches.

Plans for the substation location and layout are attached as Appendix B.4 and B.5.

4.2.2 CANNON FALLS TRANSMISSION SUBSTATION

The existing CFT substation footprint will be expanded by approximately 1394 square feet. The existing substation footprint will be expanded to the northwest to allow for a 30 foot drive space between the equipment and fencing. The additional equipment at the CFT substation will be added within the existing footprint and will include the addition of transformers, breakers, and switches. This expansion is necessary due to the addition of a ring bus at the northern edge of the substation. The existing 161 kV/115 kV transformer will be removed and will be used at the Colvill Substation. The equipment that will be added within the existing footprint includes:

- 2 new 115 kV/69 kV transformers
- 4 new 115 kV breakers
- 2 new 69 kV breakers
- New concrete foundations will be installed to support the control house and electrical equipment such as transmission line structures and dead ends, transformers, breakers, and switches.

Plans for the expansion are attached as Appendix B.6.

4.3 ROUTE AND SUBSTATION SITE SELECTION PROCESS

The Project was originally identified during the planning process by a team of siting, right-of-way, and engineering personnel. The team reviewed the general area identified for significant routing issues that may arise. Route alternatives were developed using the process described below and ultimately one route was selected for the route permit application, in accordance with Minnesota Rules 4400.2100.

4.3.1 ROUTE SELECTION PROCESS

Once the significant features of the Project (general location of proposed Colvill Substation and potential tap locations into the existing 115 kV line) were determined, the team developed a Project area for the route using digital data such as aerial photographs and topographic maps. The siting group analyzed the Project area and identified preliminary route options based on opportunities to:

- Minimize impacts to reliability (i.e., consider if existing lines can be double circuited)
- Parallel roads and existing transmission lines, to help decrease the amount of ROW required
- Parallel field lines and property lines, where access is adequate and the transmission line would cause minimal conflicts
- Minimize the length of the transmission line to reduce the impact area and costs for the Project

The routes were further refined by avoiding, to the extent possible, areas where an HVTL could create significant impacts. These areas include:

- Existing or planned high density residential areas;
- Areas where clearances are limited because of trees or nearby structures;
- Impacts to agricultural areas were minimized by paralleling roads and following property lines where practicable; and
- Environmentally sensitive sites such as wetlands, archaeologically significant sites, areas with threatened, endangered and species of special concern, areas of significant biological or cultural significance, and state and federal lands.

Using these criteria, several route alternatives were developed, as shown on Appendix B.7.

Rejected Route Alternatives

Appendix B.7 shows the rejected route segment alternatives. Xcel Energy rejected several preliminary route segment alternatives because of concerns with electrical reliability, conflicts with existing land use and potential environmental impacts. Specifically, the proposed transmission lines cannot exceed one mile of double circuit line, otherwise it would violate the North American Electric Reliability Council (NERC) reliability criteria.

4.3.2 SUBSTATION SITE SELECTION PROCESS

The team located the Colvill Substation using general substation siting criteria and criteria specific to the requirements of the Colvill Substation.

Xcel Energy's general criteria for substation siting include:

- Proximity to transmission lines – Xcel Energy wishes to minimize length of the transmission interconnection between the line and the substation. The site under consideration is located adjacent to the existing CFT to Spring Creek 161 kV line and approximately 1 mile east of the existing CFT to Empire 115 kV line.
- Proximity to generator – By locating the new substation at the generator site, this minimizes the length of the transmission lines needed to connect the generator to the substation.
- Minimal impacts to residences – As with the routing process for transmission lines, Xcel Energy attempts to minimize substation impacts to residences. The primary impacts associated with substations are noise. The substation site is located 1,500 feet from the nearest residence and is located in an area zoned industrial.
- Avoid low areas, wetlands, waterways and wildlife areas. Locating facilities in these areas increases the likelihood of conflicts with environmental resources, and Xcel Energy always attempts to avoid these sensitive areas in planning their facilities. Also, they pose problems both for construction and operation of a substation (i.e. poor soil conditions). The substation site under consideration is not located in low areas, wetlands or wildlife areas, and it is not adjacent to a waterway.
- Ability to secure a suitably sized parcel – Xcel Energy prefers to purchase sufficient land to construct the substation, provide for future expansion, if necessary, and provide for a buffer from residences. Xcel Energy prefers to purchase a single parcel, rather than aggregate multiple smaller parcels for substation sites. The site under consideration is large enough to meet Xcel Energy's needs and is located with the proposed generation site.

4.4 DESIGN OPTIONS TO ACCOMMODATE FUTURE EXPANSION

The transmission line proposed for this Project is being designed to support the interconnection of the Cannon Falls Generation Station. Xcel Energy is not proposing to build the line to accommodate greater capacity than that required for the new generating facility. Xcel Energy has designed the proposed Colvill substation to anticipate opportunities to provide for future expansion of an additional row on the south side, and a future 115 kV line for an ultimate four row breaker-and-a-half configuration.

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

5.1.1 TRANSMISSION STRUCTURES AND RIGHT-OF-WAY DESIGN

Transmission Structures

For the single circuit portion of the lines, the structures are proposed to be wood, galvanized or weathering steel structures, single circuit poles with horizontal line posts. Figure 1 shows an example of wood and galvanized steel structures.

FIGURE 1
115 KV SINGLE-CIRCUIT HORIZONTAL LINE POST STRUCTURE

Wood Pole

Galvanized Steel Pole

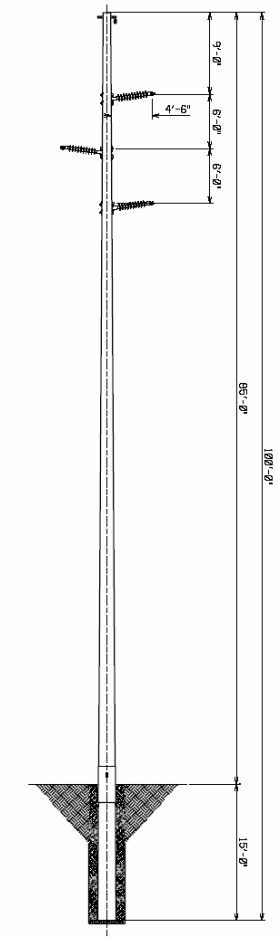


Figure 2 depicts the 115 kV/115 kV double circuit structures. The double circuit line will be constructed with steel single poles with davit arms. Xcel Energy is currently

considering both weathering steel and galvanized steel structures. The conductors on the double-circuit line will be 477 kcmil 26/7 ACSS on the circuit going toward Empire (north circuit route), and 477 kcmil 26/7 ACSS on the circuit going toward Cannon Falls (south circuit route).

Table 3 summarizes the structure design for the line:

TABLE 3
STRUCTURE DESIGN SUMMARY

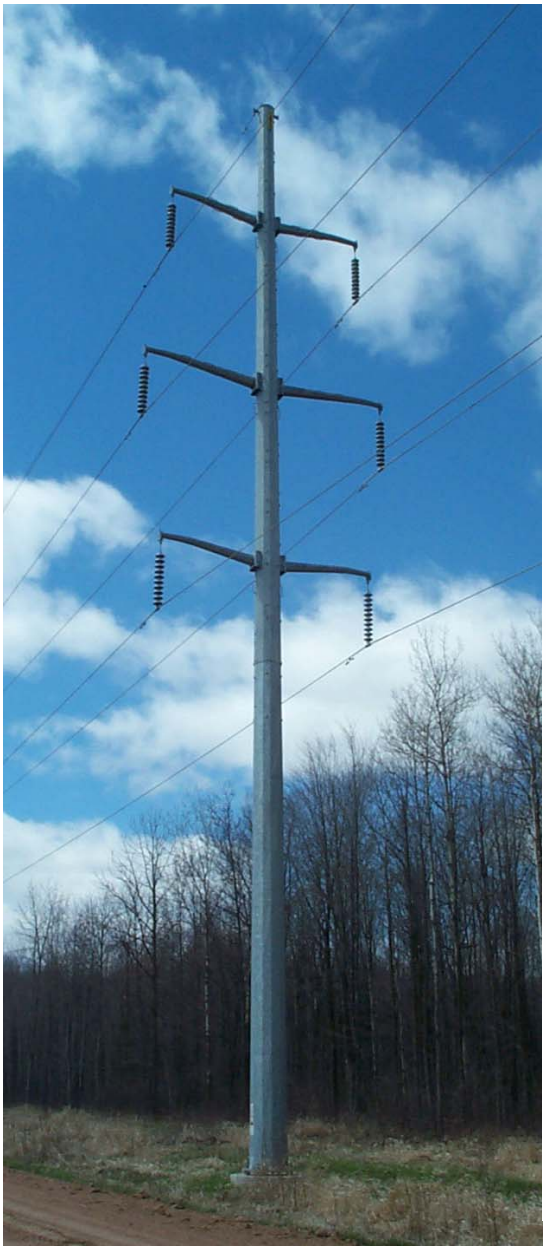
Project Component	Line Voltage	Structure Type	Pole Type	Conductor	Foundation	Double Circuit / Single Circuit	Average Height (feet)
Single Circuit: Colvill Line to Empire Substation	115 kV	Horizontal post	Steel or wood	477 kcmil 26/7 ACSS	Direct Imbed	Single	85
Single Circuit: Colvill Line to CFT Substation	115 kV	Horizontal post	Steel or wood	477 kcmil 26/7 ACSS	Direct Imbed	Single	85
Double Circuit Line to Empire Substation	115 kV/ 115 kV	Davit Arm	Steel	477 kcmil 26/7 ACSS	Concrete	Double	95
Double Circuit Line to CFT Substation	115 kV/ 115 kV	Davit Arm	Steel	477 kcmil ACSS	Concrete	Double	95

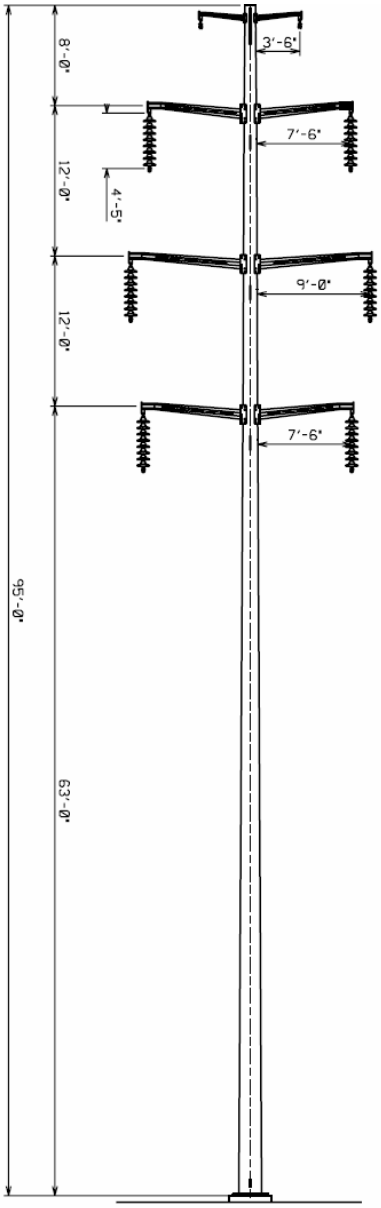
The proposed transmission line will be designed to meet or surpass all relevant local and state codes, NERC and Xcel Energy standards. Appropriate standards will be met for construction and installation and all applicable safety procedures will be followed during and after installation.

Right of Way

The new 115 kV/115 kV transmission line will parallel existing roadway Right of Way (ROW) for 78 percent of its route. Xcel Energy will acquire a 40-foot ROW adjacent to roadways and overhang to allow for right-of-way sharing (**Error! Reference source not found.**). Approximately 0.51 mile of the new route will go cross-country and will require a 75-foot ROW (**Error! Reference source not found.**). A summary of the ROW required for the Project is in Table 4.

FIGURE 2
115 KV/115 KV STEEL DOUBLE-CIRCUIT DAVIT ARM STRUCTURE



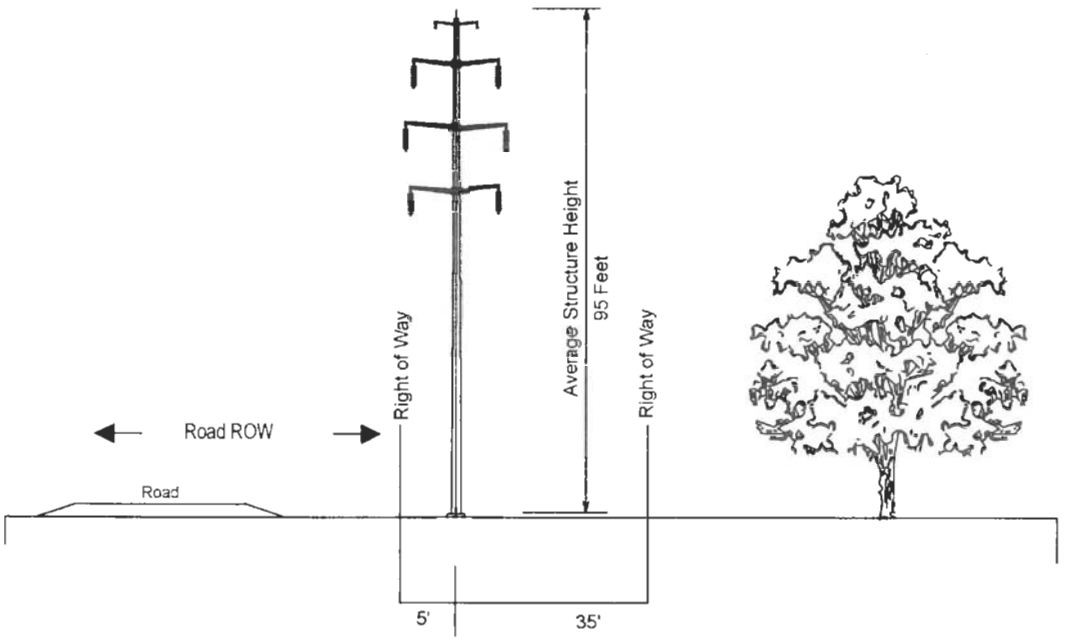


Note: Structures may be galvanized or weathering steel.

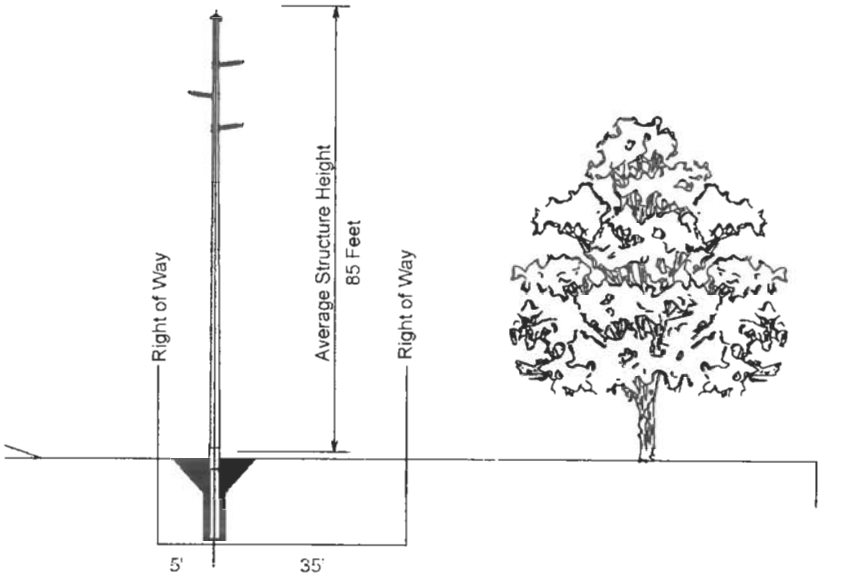
TABLE 4
ROW REQUIREMENTS

Project Component	Length (miles)	Structure Type	Average Structure Height (feet)	Average Span Length (feet)	ROW (feet)
Southern CFT Single Circuit Tap – Shared ROW	0.30	Horizontal line post	85	400-500	40
Northern CFT Single Circuit Tap – Shared ROW	0.74	Horizontal line post	85	400-500	40
Northern CFT Single Circuit Tap – Cross Country	0.26	Horizontal line post	85	400-500	75
CFT Double Circuit – Shared ROW	0.73	Davit arm	95	400-500	40
CFT Double Circuit – Cross Country	0.25	Davit arm	95	400-500	75

FIGURE 3
ROW REQUIREMENTS ADJACENT TO ROADWAYS, WITH ROW SHARING

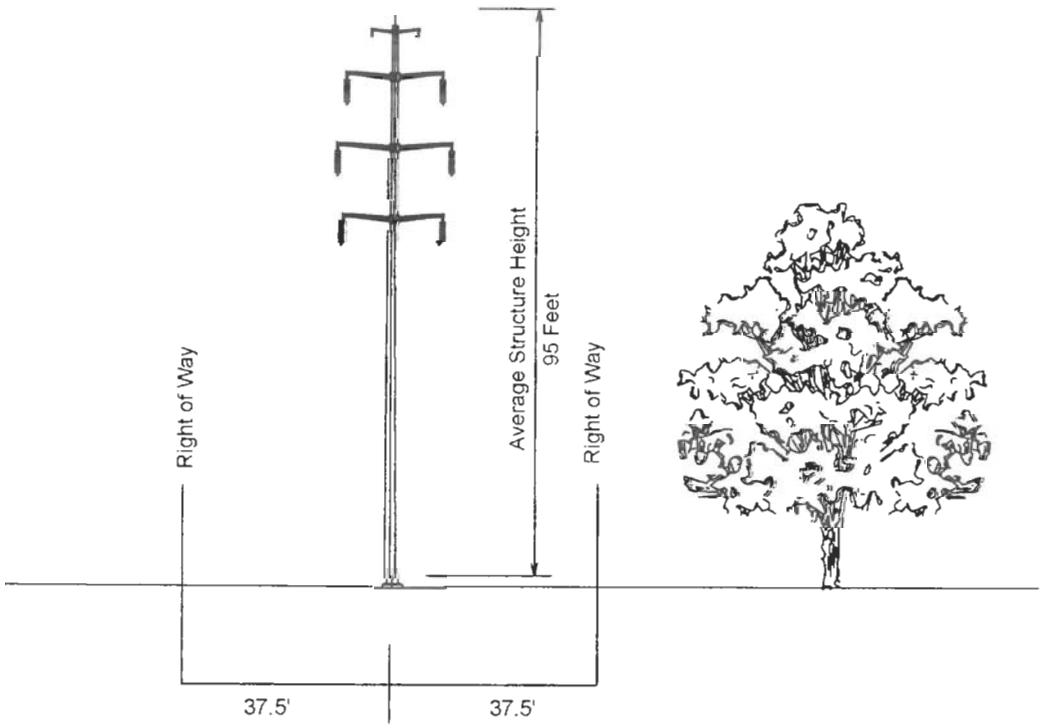


Xcel Energy 115 kV/115 kV Double Circuit Davit Arm Structure
Right-of-Way Requirements
Adjacent to a Road Right of Way

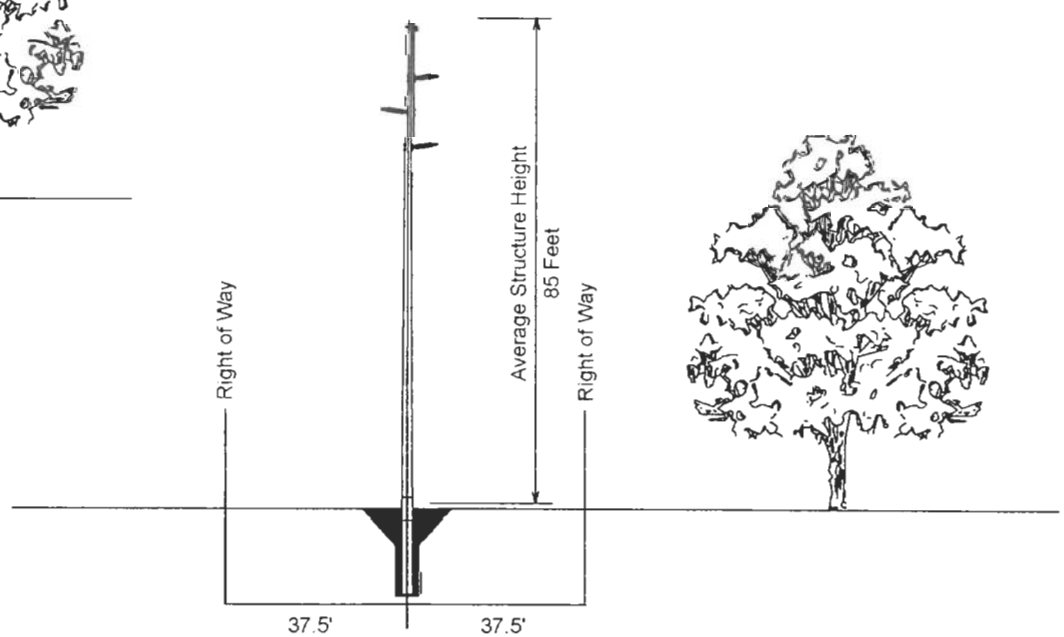


Xcel Energy 115 kV Single Circuit Horizontal Line Post Structure
Right-of-Way Requirements
Adjacent to a Road Right of Way

FIGURE 4
ROW REQUIREMENTS CROSS COUNTRY



Xcel Energy 115 kV/115 kV Double Circuit Davit Arm Structure
Right-of-Way Requirements
Cross-Country



Xcel Energy 115 kV Single Circuit Horizontal Line Post Structure
Right-of-Way Requirements
Cross-Country

5.1.2 IDENTIFICATION OF EXISTING UTILITY AND PUBLIC RIGHTS-OF-WAY

The Project will follow and share existing public ROW for 78 percent of the route. Table 5 identifies the corridors shared for the Project.

TABLE 5
SHARED ROW

Description	Length (miles)	Existing Transmission ROW (miles)	Roadway ROW (miles)	Railroad ROW (miles)	New ROW (miles)
Northern CFT Single Circuit Tap	1.0	0	0.74	0	0.26
Southern CFT Single Circuit Tap	0.30	0	0.30	0	0
CFT Double Circuit	0.98	0	0.73	0	0.25

5.1.3 RIGHT-OF-WAY ACQUISITION

After approvals to construct the Project are secured, Xcel Energy will initiate contact with landowners. The Company will meet 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.

The Colvill substation property will be purchased from Invenergy Cannon Falls LLC.

5.1.4 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 single circuit 115 kV line are approximately 2 to 3 feet in diameter. Each pole will be directly imbedded and will require a hole dug 15 to 30 feet deep and 3 to 4 feet in diameter. A culvert will be placed in the hole and the pole will be set within the culvert and backfilled with crushed rock. The steel poles for the double circuit 115 kV/115 kV line will be supported by concrete pier foundations approximately 5 to 7 feet in diameter.

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, 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.

5.1.5 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.

5.1.6 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 5 years to remove undesired vegetation that may interfere with the safe and reliable operation of the proposed transmission line.

5.2 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).

5.2.1 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 it 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 1 meter). Table 6 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 6
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'
Single Circuit 115 kV Single Steel Pole Horizontal Arm	121 kV	0.01	0.01	0.05	0.20	1.05	0.18	0.05	0.01	0.01
Double Circuit 115 kV/115 kV Single Steel Pole Davit Arm	121/121 kV	0.01	0.01	0.02	0.07	0.74	0.07	0.02	0.01	0.01

The proposed 115 kV/115 kV transmission line will have a maximum electric field density of approximately 0.74 kV per meter, at centerline, one meter above ground and is based on unlike phasing of ABC and CBA ground to top. The proposed 115 kV single circuit transmission line will have a maximum electric field density of approximately 1.05 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 State of Minnesota in other HVTL applications. This standard was designed by the Minnesota Environmental Quality Board in the 1970s 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.

5.2.2 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 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, Commission and Pollution Control Agency conducted research related to EMF, which resulted in similar findings to the NIEHS report. The group issued "A White Paper on 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 7 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 phase current has been calculated at various distances from the center of the pole in milligauss.

TABLE 7
CALCULATED MAGNETIC FLUX DENSITY (MILLIGAUSS) FOR PROPOSED 115 KV TRANSMISSION LINE DESIGNS (3.28 FEET ABOVE GROUND)

Structure Type		Condition	Amps	Distance to Proposed Centerline								
				-300'	-200'	-100'	-50'	0'	50'	100'	200'	300'
Single Circuit Single Steel Pole Horizontal Post	115 kV	Normal	736	0.54	1.18	4.30	14.0	76.9	17.9	5.12	1.34	0.64
		Normal	340	0.25	0.55	1.99	6.48	35.5	8.28	2.37	0.62	0.30
		Contingency	742	0.54	1.19	4.34	14.1	77.5	18.1	5.16	1.35	0.65
		Contingency	891	0.65	1.43	5.21	17.0	93.0	21.7	6.20	1.62	0.78
Double Ciruit Single Steel Pole Davit Arm	115/ 115 kV	Normal	736/340	0.68	1.59	6.73	24.4	81.8	8.88	3.16	1.07	0.52
		Contingency	742/0	1.17	2.65	10.4	34.5	98.2	22.6	7.94	2.29	1.06

5.2.3 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. Therefore, no stray voltage issues are anticipated with this Project.

6.0 ENVIRONMENTAL INFORMATION

This section provides a description of the environmental setting, potential impacts and mitigative measures Xcel Energy has proposed, where necessary, to minimize the impacts of siting, constructing and operating the proposed Project. If the 115 kV line and/or substation were removed in the future, the land could be restored to its prior condition and/or put to a different use. Minn. Rules part 4400.1150, subpart 3h require an applicant to provide cost estimates for the various mitigative measures proposed to address impacts. The majority of the measures proposed are part of the standard construction process at Xcel Energy. Unless otherwise identified in the following text, the costs of the mitigative measures proposed are considered nominal.

6.1 DESCRIPTION OF ENVIRONMENTAL SETTING

The proposed route and substation are located just northwest of the city of Cannon Falls in Douglas, Hampton and Randolph Townships in Dakota County and Cannon Falls Township in Goodhue County. The area between the CFT to Empire transmission line and the proposed Colvill Substation is primarily agricultural. The area to the south and east is developing. Several commercial and residential developments are being constructed or planned along Harry Avenue, south of the proposed tap.

6.2 HUMAN SETTLEMENT

6.2.1 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 falling 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.

Mitigative Measures

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

6.2.2 COMMERCIAL, INDUSTRIAL, RESIDENTIAL LAND USE

The southern single circuit transmission tap line crosses areas identified in the Land Use Plan as low density residential land use, southwest of County Road 86. The northern single circuit transmission tap line and the double circuit transmission line cross areas identified in the Land Use plan as industrial land use and future industrial land use (City of Cannon Falls, MN, 2003). There are scattered residences and businesses along County Road 86.

The Colvill Substation is in an area that is identified in the Land Use plan as industrial land use (City of Cannon Falls, MN, 2003). The proposed substation site is located within an area currently being used for industrial activities. Additionally, the substation will be located within the proposed generation site. The proposed Project should not affect the existing or planned land uses in the area.

Mitigative Measures

No mitigative measures are proposed since no impacts are anticipated.

6.2.3 DISPLACEMENT

Displacement of residential homes or businesses will not occur as a result of this Project.

Mitigative Measures

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

6.2.4 NOISE

Noise is defined as unwanted sound. It may be comprised of a variety of sounds of different intensities across the entire frequency spectrum. 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 may 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 8 shows noise levels associated with common, everyday sources and places the magnitude of noise levels discussed here in context.

TABLE 8
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. Table 9 identifies the established daytime and nighttime noise standards by NAC. The standards are expressed as a range of permissible dBA within a one hour period; L_{50} is the dBA that may be exceeded 50 percent of the time within an hour, while L_{10} is the dBA that may be exceeded 10 percent of the time within the hour.

TABLE 9
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 is one residence located within 200 feet of the proposed southern single circuit 115 kV transmission line route and three residences within 300 feet of the double circuit 115kV/115kV transmission line route. All the residences fall within NAC 1. The audible noise generated from the transmission lines is not expected to exceed the

background noise levels nor the noise standards established for NAC 1, as shown in Table 9 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.

The substation will be located adjacent to the new Cannon Falls Generation Station. It is anticipated that the Covill substation will be a minor source of noise in the area, especially when the Cannon Falls Generation Station is in operation. There are no residences near the Colvill substation site. Xcel Energy does not expect that there will be any noise impacts from the substation.

Mitigative Measures

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

6.2.5 AESTHETICS

The transmission line poles will be in contrast to the primarily agricultural land along the proposed route. However, the area is developing and includes a mixture of residential, commercial, and industrial land uses. There are existing transmission lines within 0.5 mile of all the residences and businesses along the proposed route, and the majority of the route follows existing roadway corridors. The proposed Substation site is located adjacent to an area that has existing industrial and commercial buildings.

Mitigative Measures

Although the line will be a contrast to some 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 pole types and location and/or substation aesthetics.

6.2.6 SOCIOECONOMIC

Population and economic characteristics based on the 2000 U.S. Census are presented in Table 10.

TABLE 10
POPULATION AND ECONOMIC CHARACTERISTICS

Location	Population	Minority Population (Percent)	Caucasian Population (Percent)	Per Capita Income	Percentage of Population Below Poverty Level
State of Minnesota	4,919479	11.8%	88.2%	$23,198	7.9%
Goodhue County	44,127	3.9%	96.1%	$21,934	5.7%
Cannon Falls Township	1,236	0.6%	99.4%	$29,568	1.5%
Stanton Township	1,080	2.0%	98.0%	$23,473	2.8%
Dakota County	355,904	10.0%	90.0%	$27,008	3.6%
Hampton Township	986	1.2%	98.8%	$25,576	2.2%

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

According to the 2000 Census race demographics, Dakota County is 90 percent Caucasian, and Goodhue County is 96 percent Caucasian. Of the townships within the Project area, the population ranges from 98 to over 99 percent Caucasian. Minority groups in the area constitute a very small percentage of the total population.

Per capita incomes within the townships in the Project area are similar to those found through Dakota and Goodhue Counties. The percentages of the population within the townships in the Project area are comparable to the levels found in Dakota and Goodhue Counties. 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 4 to 6 workers will be required by Xcel Energy for transmission line construction and 8 to 10 workers will be needed, on average, for the substation construction. The transmission crews are expected to spend approximately 13 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.

Mitigative Measures

Mitigative measures are not necessary.

6.2.7 CULTURAL VALUES

Cultural Values

Cultural values include those perceived community beliefs or attitudes that provide a framework for unity in a given community. The communities near the Project corridor, including the City of Cannon Falls, appear to value pioneer roots and the local history.

The economy of these areas depends on agricultural practices (typically corn, soybeans, grains, and grazing), manufacturing, and tourism. Tourist attractions are centered primarily around the Cannon River. Additionally, throughout the year, the City of Cannon Falls proudly hosts many community events and activities. Many of these activities are within the Cannon Falls city limits and will not be impacted by the Project.

Museums and visitor centers are also found within Cannon Falls and the surrounding area. These museums highlight the history of the area, which include information on the area's Swedish-American roots and Cannon Falls' history.

No impacts are anticipated to cultural values.

Mitigative Measures

No impacts are anticipated, therefore no mitigation is proposed.

6.2.8 RECREATION

Recreational opportunities near the Project area include the Richard J. Dorer Memorial Hardwood State Forest, Cannon Country Club Golf Course, Lake Byllesby County Park, the Cannon River (a state wild and scenic river), Cannon Valley Trail, and several local City of Cannon Falls parks (Explore Minnesota, 2006; MN DNR, 2006). The Project will not directly impact these resources and it is not anticipated that the transmission line will be visible from these resources.

Mitigative Measures

No mitigation is necessary.

6.2.9 PUBLIC SERVICES

The City of Cannon Falls provides typical public infrastructure to the community (Cannon Falls Chamber of Commerce, 2005). It is not anticipated that the Project will affect public services.

Mitigative Measures

Since no impacts are anticipated, no mitigation is required.

6.3 LAND-BASED ECONOMICS

6.3.1 AGRICULTURE

According to the 2002 Census of Agriculture, there are 235,763 acres of land in farms in Dakota County, and 384,108 acres of land in farms in Goodhue County. The 2002 market value of production was $112 million in Dakota County, and $157.01 million in Goodhue County. Primary crops in the area are corn and soybean (USDA, 2002). The Project area is planted in corn and soybeans.

Approximately 1,500 ft^2 (0.03 acre) of agricultural land will be permanently impacted by the proposed Project. Permanent impacts will occur due to the placement of the transmission line poles and construction of the substation. Temporary impacts may include soil compaction and crop damages within the ROW. Temporary impacts are estimated at 2.6 acres.

Mitigative Measures

Landowners will be compensated for the use of their land through easement payments. Additionally, to minimize loss of farmland and to ensure reasonable access to the land near the poles, Xcel Energy intends to place the poles approximately 5 feet from and overhang the roadway 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.

The Colvill substation is located in an industrial park and will not have an impact on agriculture.

6.3.2 FORESTRY

The nearest forested area where red and white oak, maple, and white pine trees are harvested is the Richard J. Dorer Memorial Hardwood State Forest, approximately 2 miles east of the Project area (Breining, 2000). The proposed Project will not affect this forestry-based economy. For potential impacts to Flora, please see Section 6.5.3.

Mitigative Measures

No mitigative measures will be required.

6.3.3 TOURISM

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

Mitigative Measures

No mitigative measures are anticipated with regard to tourism.

6.3.4 MINING

There is a commercial aggregate operation in the northwest corner of Section 7 of Cannon Falls Township, north of the railroad line and southwest of Rochester Road (MNDOT, 2001). The Project transmission line will not impact active mining operations.

Mitigative Measures

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

6.4 ARCHAEOLOGICAL AND HISTORIC RESOURCES

6.4.1 PREVIOUS CULTURAL SURVEYS

Information regarding the general cultural background of the Project area can be found in regional archaeological and historical overviews, including Johnson (1978) and DeMallie (2001). However, the previously identified sites and architectural properties in the study area inform more accurately on the pre-contact and historic-period land use in the vicinity.

In February 2006, a review of records at the Minnesota State Historical Preservation Office (SHPO) indicated seven previously recorded archaeological resources within 1

mile of the corridor (Table 11). None of these site forms includes a bibliographic reference so the surveys and reports that identified these sites are currently unknown. According to the site forms, three sites in Dakota County (21DK0032, 21DK0033 and 21DK0071) and two sites in Goodhue County (21GD0175 and 21GD0179) were recorded during a survey by the Institute for Minnesota Archaeology in 1987 near the Lake Byllesby Reservoir. This report was not located in the SHPO during the background review. The remaining two sites in Goodhue County (21GD0140 and 21GD0141) were recorded during the Minnesota Historical Society statewide survey in 1979 (Minnesota Historical Society, 1981). Three additional cultural resource surveys were previously documented within 1 mile of the proposed Project area (Harrison 2003, Skaar 1997, Sluss 1994). These survey reports identified no cultural resources.

TABLE 11
PREVIOUSLY IDENTIFIED CULTURAL RESOURCES WITHIN 1 MILE

County	Township	Range	Section	Site Number	Site Type	NRHP Status
Dakota	112	18	11	21DK0032	Lithic Scatter	Unknown
Dakota	112	18	14	21DK0033	Lithic Scatter	Unknown
Dakota	112	18	14	21DK0071	Lithic Scatter	Unknown
Goodhue	112	18	13	21GD0140	Lithic Scatter	Unknown
Goodhue	112	18	13	21GD0141	Lithic Scatter	Unknown
Goodhue	112	18	14	21GD0175	Lithic Scatter	Unknown
Goodhue	112	18	14	21GD0179	Lithic Scatter	Unknown

The seven previously recorded pre-contact sites consist of lithic scatters; the eligibility of these sites for listing on the National Register of Historic Places (NRHP) has not been determined.

In addition, there are 12 architectural properties listed within 1 mile of the Project route (Table 12). The properties include a dam, barns, a farmstead, feed company buildings, grain and malting company buildings, a railroad boxcar, and a mill. These properties were recorded during a 1978 survey (MNSHPO 2006). None of these inventoried properties has been evaluated for eligibility for listing in the NRHP.

TABLE 12
PREVIOUSLY IDENTIFIED ARCHITECTURAL PROPERTIES WITHIN 1 MILE

County	Township	Range	Section	Site Number	Site Type	NRHP Status
Dakota	112	18	1	DK-RDT-001	Barn	Unknown
Dakota	112	18	2	DK-RDT-002	Barn	Unknown
Dakota	112	18	14	DK-RDT-004	Dam (Same as GD-STN-001)	Unknown
Goodhue	112	17	7	GD-CFC-007	Grain Company	Unknown
Goodhue	112	17	7	GD-CFC-022	Malting Company	Unknown
Goodhue	112	17	7	GD-CFC-051	Fair Ground	Unknown
Goodhue	112	17	7	GD-CFC-063	Feed Company	Unknown
Goodhue	112	17	7	GD-CFC-065	Feed Store	Unknown
Goodhue	112	17	6	GD-CFT-004	Mill	Unknown
Goodhue	112	17	6	GD-CFT-005	Farmstead	Unknown
Goodhue	112	17	7	GD-CFT-006	Railroad Boxcar	Unknown
Goodhue	112	18	14	GD-STN-001	Dam (Same as DK-RDT-004)	Unknown

Currently Xcel Energy does not anticipate impacts to previously identified resources as a result of the Project. In the event that an impact would occur, Xcel Energy would determine the nature of the impact and consult with the SHPO on whether or not the resource was eligible for listing in the NRHP.

Mitigative Measures

Mitigation for Project-related impacts on NRHP-eligible archaeological resources may include an effort to minimize impacts on the resource and/or additional documentation through data recovery.

If human remains should be inadvertently encountered during the excavation and construction, Xcel Energy will appropriately handle such a discovery in a manner compliant with Minnesota's Private Cemeteries Act (Chapter 307.08).

6.5 NATURAL ENVIRONMENT

6.5.1 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 8-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest 8-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.

Mitigative Measures

Xcel Energy anticipates nominal impacts to air quality, therefore no mitigation is proposed.

6.5.2 WATER QUALITY

During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading, and construction traffic. 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 Project include a small (0.18 acre) palustrine scrub shrub (PSS1C) NWI wetland located 800 feet north of the proposed substation, and an intermittent stream (a tributary to Goodhue County Ditch No. 1), which is approximately 0.4 mile from the northeast corner of the substation (USFWS, 1990; USGS, 2004). The Cannon River is approximately 0.9 miles from the proposed Project and Pine Creek (a trout stream) is approximately 0.5 mile from the proposed Project. Construction of the substation and associated access roads will not directly affect the surface water resources. The nearest construction feature is approximately 800 feet away from the wetland, and the other surface water resources are outside of the construction area. The Project is not within a mapped 100-year floodplain (FEMA, 1981). No direct impacts to the surface water resources are anticipated.

No permanent impacts to water bodies or wetlands are anticipated.

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 minimize impacts to adjacent water resources. An NPDES permit and SWPPP will be prepared for the Project. No additional mitigation is necessary.

6.5.3 FLORA

Impacts to trees may occur where the southern single circuit transmission line parallels County Road 86. 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 0.5 acre (20,000 ft^2). A width of 40 feet will be cleared for the 115 kV transmission line ROW along this portion of the route.

A majority of the rest of the Project is agricultural land along the transmission line and industrial park land for the Covill substation site. Row crops such as corn and soybean dominate the area. For a discussion on impacts to agriculture, please see Section 4.3.1.

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.

6.5.4 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 trees that will be removed for the Project and organisms that inhabit agricultural areas will likely be displaced. Comparable habitat is adjacent to the route for both habitat types, and it is likely that these organisms would only be displaced a short distance. A list of common mammal and avian species recorded in the Project area is included as Appendix C.

Raptors, waterfowl and other bird species may 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, wetlands and open water. There are no areas that meet these criteria along the transmission line routes and at the Covill substation site.

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, so there are no concerns about avian electrocution as a result of the proposed Project.

Mitigative Measures

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

Xcel Energy has been working with various state and federal agencies over the past 20 years to address avian issues. Company personnel work to address problem areas as quickly and efficiently as possible. In 2002, Xcel Energy Inc.'s operating companies including Northern States Power Company, 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, Pubic Service of Colorado 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.
- Attempting to avoid areas known as major flyways or migratory resting spots.

This project has been assessed for these types of areas and none have been found. Given that, there is a low likelihood of any avian impacts from the construction of these facilities.

6.6 RARE AND UNIQUE NATURAL RESOURCES

The following is a list of rare or unique resources identified by the DNR Natural Heritage Database in the Project area. Twelve known occurrences of rare species or special communities have been identified within the vicinity of the proposed route (NHDB 2000). The resources in Table 13 were compiled using the DNR Natural Heritage Database (NHNRP Contact #: ERDB 20060689).

TABLE 13
RARE AND UNIQUE RESOURCES

Common Name	Number of Occurrences	Scientific Name	Federal Status [1]	MN Status [1]	State Rank [2]
Kitten-tails	2	Besseya bullii	None	THR	S2
Paddlefish	2	Polyodon spathula	None	THR	S2
Eastern Racer	1	Coluber constrictor	None	SPC	S3
Eastern Fox Snake	1	Elaphe vulpina	None	Non	S4
Long-bearded Hawkweed	1	Hieracium longipilum	None	Non	SU
Dry hill prairie (southern) type	1	Dry hill prairie (southern) type	None	NA	S2
Native Plant Community, Undetermined Class	2	Native Plant Community, Undetermined Class	None	NA	SU
White pine - oak woodland (sand) type	2	White pine - oak woodland (sand) type	None	NA	S1

1) THR: Threatened; SPC: Special Concern; NA: natural communities do not have state status; Non: no legal status
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). SU: Undetermined, more information is needed.

The DNR did not identify any known occurrences of rare and unique resources that would be affected by the proposed Project (Appendix D.1). All of the listed species and natural communities are outside of the Project area; the closest record is approximately 0.3 mile from the proposed substation (Long-bearded Hawkweed).

6.6.1 MITIGATIVE MEASURES

It is not anticipated that mitigative measures will be necessary. Sarah Hoffman, on behalf of the DNR, stated that, based on review, the species potentially impacted by the Project include the dry sand-gravel prairie native plant community and Kitten-Tails. These areas will be avoided.

7.0 AGENCY INVOLVEMENT, PUBLIC PARTICIPATION AND REQUIRED PERMITS AND APPROVALS

7.1 AGENCY CONTACTS

7.1.1 MINNESOTA DEPARTMENT OF NATURAL RESOURCES

The DNR Natural Heritage and Non-game Research Program was contacted on February 20, 2006, to review the Project area for State threatened and endangered species and rare natural features. In the DKNY's response, March 16, 2006, Ms. Hoffman stated that, based on review, the species potentially impacted by the Project include the dry sand-gravel prairie native plant community and Kitten-Tails (Appendix D.1). These areas will be avoided.

7.1.2 MINNESOTA SHPO

On February 20, 2006, SHPO was asked to provide comments regarding potential effects to known or suspected archaeological sites or historic standing structures in the Project area. On March 23, 2006 Xcel Energy received comments related to the proposal (Appendix D.2). The SHPO indicated that it believed there to be a good probability that unreported archaeological properties might be present in the Project area. A survey was recommended. On April 7, 2006, HDR Engineering, on behalf of Xcel Energy responded suggesting an archaeological survey was not necessary for the Project (Appendix D.3). Future correspondence on this issue will be forwarded the Commission when received.

7.1.3 DAKOTA COUNTY, OFFICE OF PLANNING

Xcel Energy contacted the Dakota County Office of Planning for comments on the Project. On March 6, 2006 Xcel Energy received comments related to the proposal (Appendix D.4). The County requested the following:

- The new substation will be located near the existing Cannon Falls Transmission Substation by the dam on Lake Byllesby
- The new transmission lines be placed in CSAH 86 road right-of-way or that the line be as close to the edge of the road right-of-way line as possible.
- That future improvements to the County road require the utility to relocate the line at their expense
- More detailed drawings of the expansion of the Cannon Falls Transmission Substation.

HDR Engineering, on behalf of Xcel Energy, provided clarification on item 1 and the County withdrew its first request in an email dated March 15, 2006 (Appendix D.5).

Xcel Energy plans to meet with the Dakota County Office of Planning about their concerns within the next few weeks. We will follow up with a summary of that meeting to the Commission Staff.

7.1.4 GOODHUE COUNTY, DEPARTMENT OF PUBLIC WORKS

Xcel Energy contacted the Goodhue County Department of Public Works for comments on the Project. On March 31, 2006 Xcel Energy received comments related to the proposal (Appendix D.6). The County suggested that the new transmission lines be consolidated with existing transmission lines when possible. It also suggested that we contact the Dakota County Parks department for the Cannon Falls Substation Expansion. Xcel Energy contacted the County Parks Department by phone regarding the project. No response was received.

7.1.5 MINNESOTA DEPARTMENT OF TRANSPORTATION, METRO DISTRICT

Xcel Energy contacted the Minnesota Department of Transportation, Metro District (MNDOT) to provide the agency with an opportunity to comment on the transmission line improvements prior to filing this application. On March 20, 2006 MNDOT provided comments on the Project (Appendix D.7). Comments were received about power lines crossing or using MNDOT ROW and the necessary permits required. There are no lines crossing MNDOT ROW.

MNDOT did not have any specific comments about the substation property. ON April 12, 2006, on behalf of Xcel Energy, HDR Engineering responded formally to MNDOT's comments regarding the potential impacts of the Project on the safety and capacity of n/DOT's transportation infrastructure (Appendix D.8).

7.2 IDENTIFICATION OF LAND OWNERS

A list of all the landowners is in Appendix E. . There are 11 landowners along the proposed route included in this application. This list does not include landowners along the rejected route alternatives.

7.3 REQUIRED PERMITS AND APPROVALS

Table 14 shows the permits potentially required for the Project.

TABLE 14
POTENTIAL REQUIRED PERMITS

Permit	Jurisdiction
Road Crossing Permits	County, Township, City
Lands Permits	County, Township, City
Over-width Loads Permits	County, Township, City
Driveway/Access Permits	County, Township, City
Route Permit Application (Alternative Process)	MN Public Utilities Commission
NPDES Permit	MPCA

7.3.1 LOCAL APPROVALS

The following local approvals may be required for the Project:

Road Crossing Permits

These permits may be required to cross or occupy county, township, and city road ROW.

Lands Permits

These permits may be required to occupy county, township, and city lands such as park lands, watershed districts, and other properties owned by these entities.

Building Permits

These permits may be required by the local jurisdictions for substation modifications and construction.

Over-width Loads Permits

These permits may be required to move over-width loads on county, township, or city roads.

Driveway/Access Permits

These permits may be required to construct access roads or driveways from county, township, or city roadways.

7.3.2 STATE OF MINNESOTA APPROVALS

Route Permit (Alternative Process)

A HVTL cannot be constructed without a route permit approved by the Commission. 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 1 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 required since the substation work impacts more than 1 acre.

8.0 SUMMARY OF FACTORS TO BE CONSIDERED

In determining whether to issue a permit for a high voltage transmission line, the Commission 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.

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

The proposed Project will not result in displacement of existing homes or businesses. The noise related to the proposed line will be minimal, as described in Section 4.4.4 of this Application. No impacts are anticipated associated with recreation. Aesthetics impacts will be minor. Portions of the new transmission line routes will be a contrast to adjacent residential land uses, but as industrial development in northern Cannon Falls continues, this contrast will lessen. The Project will have no impact on cultural values or public services within the Project corridor.

8.2 EFFECTS ON PUBLIC HEALTH AND SAFETY

No effects on public health or safety are anticipated. The proposed lines and substations 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 0.74 kV per meter underneath the conductors at 1 meter above ground level, and the proposed 115 kV transmission line will have a maximum electric field density of approximately 1.05 kV per meter. This is significantly less than the Commission's standard of 8 kV per meter. The Commission standard was designed to minimize the hazard of shocks from the line touching large objects under extra HVTL of 500 kV or greater. Moreover, the most recent scientific studies on EMF have not found any significant link between EMF and health effects.

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

No impacts to forestry, tourism, or active sand and gravel mining operations will occur. Approximately 1500 ft^2 (0.03 acres) of agricultural land will be permanently impacted. Impacts will be minimized by using existing corridors and locating poles adjacent to roadway ROW, where practicable. Xcel Energy will work with

landowners to alleviate temporary impacts such as soil compaction following construction. The Covill substation site is located in an industrial park and is a compatible use with the powerplant.

8.4 EFFECTS ON ARCHAEOLOGICAL AND HISTORIC RESOURCES

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

8.5 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. There is the possibility of sediment reaching surface waters during construction as the ground is disturbed by excavation, grading, and construction traffic. Xcel Energy will implement practices 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. However, since agricultural and industrial lands are the primary areas to be impacted and no native vegetation should be impacted. Only trees and shrubs that would interfere with the safe operation of the line will be removed. Given the limited wildlife habitats available along the transmission line routes and at the substation sites, there will be a low chance that wildlife may be displaced due to loss of habitat. This impact will be temporary since similar habitat is adjacent to the site.

8.6 EFFECTS ON RARE AND UNIQUE NATURAL RESOURCES

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

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

The proposed facility improvements are required to support the interconnection of a new generation facility proposed by Invenergy Cannon Falls LLC, the Cannon Falls Generation Station. Xcel Energy is not proposing to build the Colvill substation and new 115 kV transmission lines to accommodate greater capacity than that required for the new generating facility.

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

The Project parallels existing roadway ROW for 78 percent of the route.

8.9 USE OF EXISTING LARGE ELECTRIC POWER GENERATING PLANT SITE

The proposed substation will be located on the site of a large electric power generating plant site property. No additional property will be required for the substation construction.

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

Existing transportation ROW will be utilized by the new transmission line. Approximately 78 percent of the new transmission lines will parallel existing transportation ROW.

8.11 ELECTRICAL SYSTEM RELIABILITY

The proposed facility improvements are required to support the interconnection of a new generation facility proposed by Invenergy Cannon Falls LLC, the Cannon Falls Generation Station. The new lines will also continue to ensure reliable service to the Cannon Falls area. The route was chosen to maximize the amount of double circuit transmission line for the Project. MAPP reliability criteria allow 1 mile of double circuit line from a generation facility and Xcel Energy is proposing 0.98 mile of double circuit line.

8.12 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 Cannon Falls Generation Station, not any greater capacity. In addition, 78 percent of the line's proposed route will use existing roadway ROW. Finally, the line is designed to require nothing more than standard transmission line construction and maintenance procedures.

8.13 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 that cannot be avoided include visual impacts associated with the Project, as well as those impacts related to the placement and use of land for the transmission poles and substation construction.

8.14 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. Steel and concrete will be required for the substation and transmission line poles and foundations. During construction vehicles will be traveling to and from the Project area, utilizing hydrocarbon fuels.

9.0 REFERENCES

Breining, Greg. 2000. *Richard Dorer's Forest*. Minnesota Conservation Volunteer, September/October 2000. http://www.dnr.state.mn.us/volunteer/sepoct00/dorer.html. Retrieved February 2006.

Cannon Falls Chamber of Commerce. 2004. *New Residents Guide*. http://www.cannonfalls.org/residentsguide.html.retrieved.Feb2006.

Cannon Falls Chamber of Commerce. 2004. *Cannon Falls Area Recreation Guide*. http://www.cannonfalls.org/recreationguide.html. Retrieved February 2006.

City of Cannon Falls, Minnesota. 2003. Cannon Falls Comprehensive Plan. http://cannonfalls.govoffice.com/index.asp?Type=B_BASIC&SEC={55D3F138-1F99-4CAC-908A-3933512A930E}. Retrieved February 2006.

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

Explore Minnesota. 2006. *Cannon Falls Attractions*. http://www.exploreminnesota.com/attractions. Retrieved February 2006.

Farm Service Agency. 2003. *NAIP Orthophotos, Dakota County, Minnesota.*

Farm Service Agency. 2003. *NAIP Orthophotos, Goodhue County, Minnesota.*

Federal Emergency Management Agency. 1981. Q3 Flood Data, Dakota County, Minnesota.

Harrison, Christina 2003 Report on Cultural Resource Survey Conducted for the Towering Bluffs of Cannon Falls Residential Development, City of Cannon Falls, Goodhue County, Minnesota. Archaeological Research Services, Minneapolis.

Johnson, Elden. 1978. *The Prehistoric Peoples of Minnesota*. Minnesota Prehistoric Archaeology Series Number 3. Minnesota Historical Society, St. Paul.

Minnesota Agricultural Statistics Service. 2004 Minnesota Agricultural Statistics. http://www.nass.usda.gov/mn/Agstat04/p097100.pdf. Retrieved February 2006.

Minnesota Department of Natural Resources, 2006. *Minnesota's Canoe Routes:* Cannon River. http://www.dnr.state.mn.us/canoeing/index.html. Retrieved February 2006.

Minnesota Department of Natural Resources. 2006. *Minnesota's Wild and Scenic Rivers: Cannon River.* http://www.dnr.state.mn.us/waters/watermgmt_section/wild_scenic/wsrivers/rivers.html. Retrieved February 2006.

Minnesota Historical Society. 1981. *Minnesota Statewide Archaeological Survey, Summary 1977-1980.* Minnesota Historical Society, St. Paul.

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

MNSHPO. 2006. *Minnesota Historic Places Survey Site Forms - Goodhue County.* Site Forms: GD-STN-001; GD-CFC-007; GD-CFC-022; GD-CFC-051; GD-CFC-063; GD-CFC-065;GD-CFT-004; GD-CFT-005; GD-CFT-006.

MNDOT. 2001. General Highway Map, Goodhue County, MN – County Pit Maps. http://www.mrr.dot.state.mn.us/geotechnical/aggreate/maps/goohue.pdf. Retrieved February 2006.

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.

Skaar, Kent 1997 *MNDNR Public Shorefishing Site, Lake Byllesby, Goodhue County.* Preliminary Project Report. Trails and Waterways Cultural Resources Program, Minnesota Department of Natural Resources, St. Paul.

Sluss, Jackie, Kent Skarr, Michael S. Edwards and Shawna Kruger 1994 *MnDOT S.P. 2504-10 For Replacement of T.H. 20 Bridges 4759 and 4760 in Cannon Falls, Goodhue County.* Draft Phase I Cultural Resources Reconnaissance Survey Report. Trunk Highway Cultural Resources Program, Minnesota Historical Society, St. Paul.

United States Census Bureau. American Factfinder. http://factfinder.census.gov. Retrieved February 2006.

United States Department of Agriculture (USDA). 2002. Census of Agriculture, Dakota County, Minnesota, Profile. Washington, D.C. http://www.nass.usda.gov/Census_of_Agriculture/index.asp. Retrieved February 2006.

United States Department of Agriculture (USDA). 2002. Census of Agriculture, Goodhue County, Minnesota, Profile. Washington, D.C. http://www.nass.usda.gov/Census_of_Agriculture/index.asp. Retrieved February 2006.

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

United States Geological Survey. 1993. Digital Raster Graphic, Cannon Falls Quadrangle. Washington, D.C.

10.0 DEFINITIONS

Avian	Of or relating to birds.
A-weighted Scale	The sensitivity range for human hearing.
Caisson	A watertight structure within which construction work is carried on under water.
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
COMMISSION NOTICE

APPENDIX B
MAPS

APPENDIX C
FAUNA

APPENDIX D
AGENCY CORRESPONDENCE

APPENDIX E
LANDOWNER LIST

APPENDIX E
LANDOWNERS LIST

Name	Company
	CFTS Real Estate LLC
Irene Carnel	
James and Bonnie Simon	
James and Mary Jo Carnel	
Karen Conzemius	
Kristina Gustafson	
Michael Toohey	
Samuel Barth	
Terri Ziemer	
Wayne and Sherry Bell	
William and Micki Callister	