MINNESOTA POWER

APPLICATION TO THE

MINNESOTA PUBLIC UTILITIES COMMISSION

FOR A ROUTE PERMIT

39 LINE PROJECT

Alternative Permitting Process

MPUC Docket No. E015/TL-12-1123

November 26, 2012

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1.0 Introduction

Minnesota Power submits this application for a Route Permit to the Minnesota Public Utilities Commission (MPUC or Commission) pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850 to construct an approximately 3.0-mile-long, 115 kilovolt (kV) high voltage transmission line (HVTL) in St. Louis County near the City of Eveleth, Minnesota. Minnesota Power would also, at the request of United Taconite, remove about 1.9 miles of existing 39 Line that runs through United Taconite's north pit.

The 39 Line Project (Project) is needed to provide a new source of power to the surrounding area as a result of United Taconite's plans to extend its mining operation located west of the City of Eveleth.

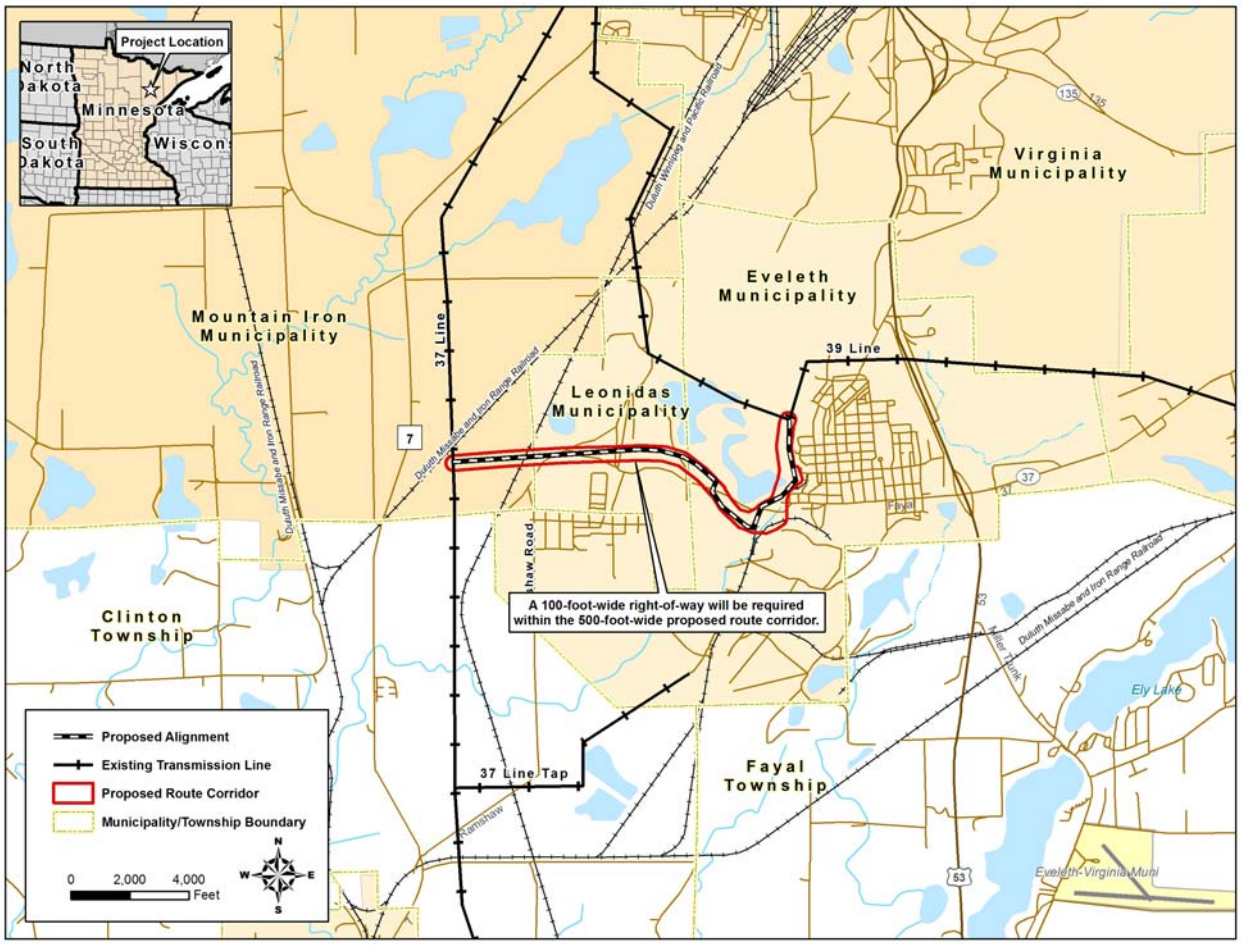
1.1 Project Area

The Project area generally consists of the western edge of the City of Eveleth, United Taconite's existing north pit, and open and scrub/shrub areas north and west of the City of Leonidas. The Project area is located in a primarily commercial/industrial use area, and is anticipated to be adjacent to existing road corridors for much of its length. Some residential development is also located within the Project area. The majority of land (38 percent) crossed by the Project is privately owned. Additionally, about 20 percent is owned Oliver Iron Mining Company, about 19 percent is owned by USX Corporation, 19 percent is owned by the Minnesota Department of Natural Resources (DNR), and about 5 percent is owned by Eveleth Taconite Company.

Minnesota Power's proposed 3.0 miles of 115kV HVTL will be constructed with both monopole and H-Frame direct embedded wood structures. Monopole tangent structures will use wood or laminated wood poles. The structures will range in height from 60 to 105 feet above ground, and the spans adjacent to these structures will range from 250 to 350 feet. H-Frame structures will utilize two braced wood poles. These structures will range in height from 60 to 70 feet above ground, and the spans adjacent to these structures will range from 500 to 1,000 feet.

The general Project location is shown below on **Figure 1**.

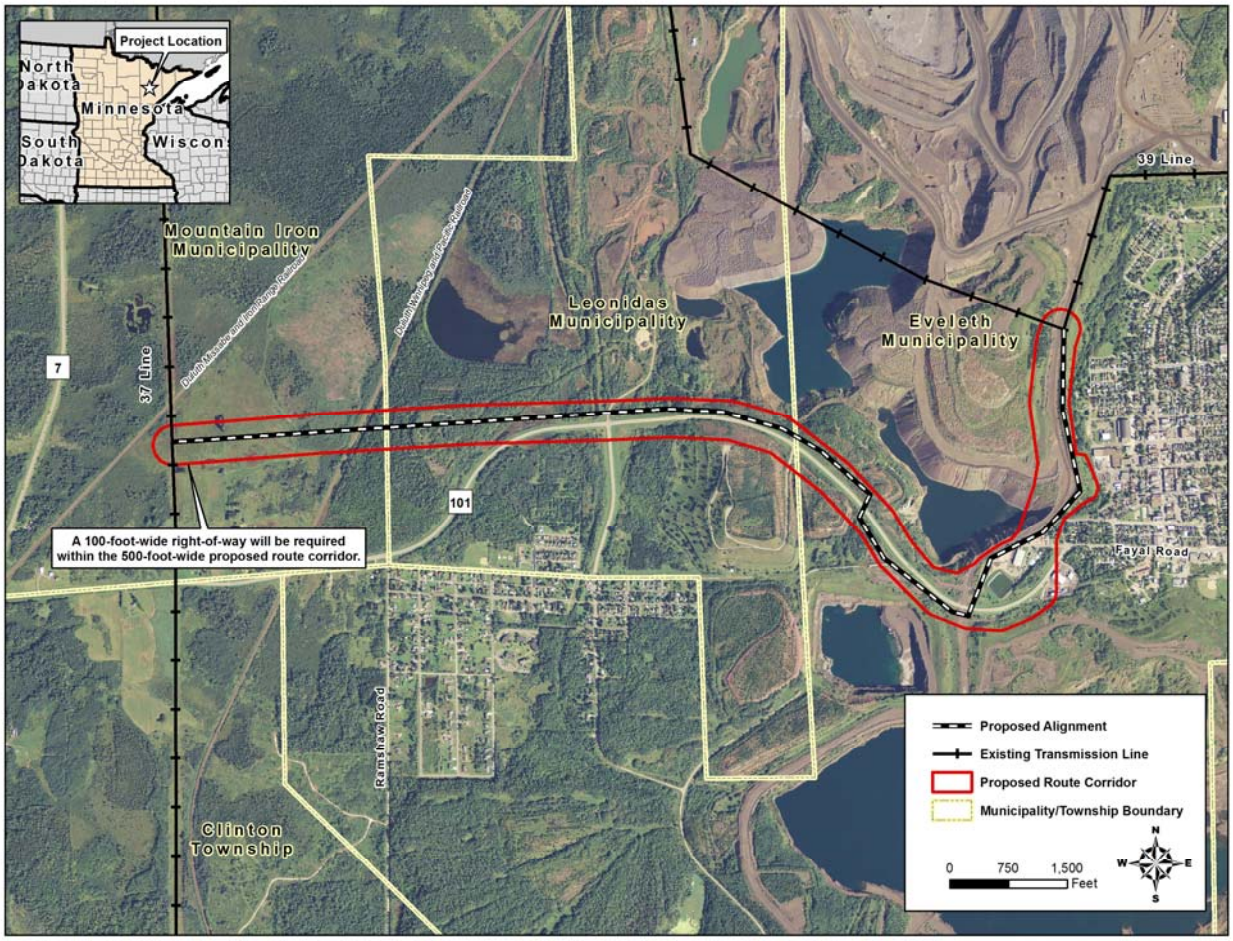
Figure 1 – Project Location



Pole height and span length for both structure types vary depending on topography and environmental constraints within the proposed right-of-way. All structures will meet or exceed clearance and strength requirements given in the 2012 edition of the National Electrical Safety Code.

In this application, Minnesota Power has analyzed and presented data for a 500-foot-wide route corridor, which is requested for flexibility to adjust the route based on site-specific engineering and design. Minnesota Power requests that the Commission approve the 500-foot-wide route corridor as shown on **Figure 2**.

Figure 2 – Proposed Route



1.2 Project Need

United Taconite has requested that Minnesota Power remove an existing 115 kV HVTL to accommodate United Taconite's plans to expand its mining operation located west of the City of Eveleth. The Project (i.e., installation of 3.0 miles of new HVTL) is needed to allow this existing line to be removed without degrading the area high voltage transmission system.

1.3 Routing Considerations

Much of the Project will be located on land owned by United Taconite, who has assisted with the development of the route corridor.

1.4 Permitting Process

The Project consists of 115 kV facilities that do not cross state lines and, therefore, qualifies for the Alternative Permitting Process under Minnesota Statutes Section 216E.04, subdivision 2(3), and Minnesota Rules Chapter 7850.2800 to 7850.3900 (see Minn. R. 7850.2800, Subp. 1(C)).

1.5 Completeness Checklist

The content requirements for an application with the Commission under the Alternative Permitting Process are identified under Minnesota Statutes Section 216E.04, subdivision 2(3) and Minnesota Rules 7850.2900 and 7850.1700. Table 1 lists the rule requirements and the section where the information can be found in this application.

Table 1 – Completeness Checklist

Authority	Required Information	Section
Minn. R. 7850.2800 Subp. 1(C) – 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 7850.2800 to 7850.3900 instead of the full permitting procedures in part 7850.1700 to 7850.2700 for high voltage transmission lines of between 100 and 200 kilovolts.	2.5
Minn. R. 7850.2800, Subp. 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 7850.2800 to 7850.3700, shall notify the MPUC of such intent, in writing, at least 10 days before submitting an application for the project.	2.6; Appendix A
Minn. R. 7850.3100 Contents of Application (alternative permitting process)		
	The applicant shall include in the application the same information required in part 7850.1900, 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.	2.5
Minn. R. 7850.1900, Subp. 2 (applicable per Minn. R. 7850.3100) – Route Permit for a High Voltage Transmission Line ("HVTL")		
A.	A statement of proposed ownership of the facility at the time of filing the Application and after commercial operation.	2.1
B.	The precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the Route Permit may be transferred if transfer of the Route Permit is contemplated.	2.3
C.	At least two proposed routes for the proposed HVTL and identification of the preferred route and the reasons for the preference.	N/A per Minn. R. 7850.3100
D.	A description of the proposed HVTL and all associated facilities, including the size and type of the HVTL.	3.2, 4.1, 5.1.1
E.	The environmental information required under Minn. R. 7850.1900, Subp. 3.	6.0
F.	Identification of land uses and environmental conditions along the proposed routes.	6.0
G.	The names of each owner whose property is within any of the proposed routes for the HVTL.	5.1.3 Figure B-11 Appendix D

Authority	Required Information	Section
H.	U.S. Geological Survey ("USGS") topographical maps or other maps acceptable to the Commission showing the entire length of the HVTL 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 HVTL.	5.1.2, 5.1.3
J.	The engineering and operational design concepts for the proposed HVTL, including information on the electric and magnetic fields of the HVTL.	5.1, 5.2
K.	Cost analysis of each route, including the costs of constructing, operating and maintaining the HVTL that are dependent on design and route.	3.5
L.	A description of possible design options to accommodate expansion of the HVTL in the future.	4.4
M.	The procedures and practices proposed for the acquisition and restoration of the right-of-way and for construction and maintenance of the HVTL.	5.1.3; 5.1.4
N.	A listing and brief description of federal, state and local permits that may be required for the proposed HVTL.	7.6
O.	A copy of the Certificate of Need or the certified HVTL list containing the proposed HVTL or documentation that an application for a Certificate of Need has been submitted or is not required.	2.4
Minn. R. 7850.1900, 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.	6.0
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 mitigation measures.	6.0

2.0 Statement of Ownership and Regulatory Requirements

2.1 Statement of Ownership

Minnesota Power will own, construct, and operate the proposed HVTL line. Minnesota Power is an investor-owned utility with headquarters in Duluth, Minnesota. Minnesota Power supplies retail electric service to 140,000 retail customers and wholesale electric service to 16 municipalities in a 26,000-square-mile electric service territory located in northeastern Minnesota. Minnesota Power generates and delivers electric energy through a network of transmission and distribution lines and substations throughout northeastern Minnesota. Minnesota Power's transmission network is interconnected with the regional transmission grid to promote reliability and Minnesota Power is a member of the Midwest Reliability Organization and the Midwest Independent Transmission System Operator.

2.2 Requested Action and Alternative

This application for a Route Permit by Minnesota Power is submitted under the Alternative Permitting Process under Minnesota Statutes Section 216E.04, subdivision 2(3) and Minnesota Rules 7850.2800 to 7850.3900 (see Minn. R. 7850.2800, Subp. 1(C)). The rules do not require consideration of alternative routes in the application (see Minn. R. 7850.3100), however, Minnesota Power has identified in this application other routes that were rejected. For the reasons discussed within this application, Minnesota Power prefers the Proposed Route for the new HVTL and respectfully requests that the Commission approve the Proposed Route with a 500-foot-wide width.

This Application demonstrates that construction of the Project along the Proposed Route will comply with the applicable standards and criteria set out in Minnesota Statutes Section 216E.03, subdivision 7, and Minnesota Rule 7850.4100. The Project will support the State of Minnesota's goals to conserve resources, minimize environmental and human settlement impacts and land use conflicts, and ensure the State of Minnesota's electric energy security through the construction of efficient, cost-effective transmission infrastructure.

2.3 Permittee

Minnesota Power
Daniel McCourtney
Environmental Compliance Specialist
30 West Superior St.
Duluth, MN 55802

Phone: (218)-355-3515
Email: dmccourtney@allete.com

2.4 Certificate of Need

A Certificate of Need is not required for the Project because it is not classified as a large energy facility under Minnesota Statutes Sections 216B.243 and 216B.2421, subdivision 2(3). While the Project is a HVTL with a capacity of 100 kV or more, it is not more than 10 miles long in Minnesota and it does not cross a state line. Therefore, the Project is exempt from the Certificate of Need requirements.

2.5 Route Permit, Alternative Permitting Process

The Minnesota Power Plant Siting Act (PPSA), Minnesota Statutes Section 216E.03, subd. 2 provides that no person may construct an HVTL as defined in the act without a Route Permit from the Commission. Under the PPSA, Minnesota Statutes Section 216E.01, subd. 4, an HVTL includes a transmission line that is 100 kV or more and is greater than 1,500 feet in length. The proposed 115 kV transmission line is an HVTL greater than 1,500 feet in length; therefore, a Route Permit is required from the Commission prior to construction. The Project qualifies for review under the Alternative Permitting Process authorized by Minnesota Statutes Section 216E.04, subdivision 2(3), and Minnesota Rule 7850.2800, Subpart 1(C) (establishing alternative process for HVTLs between 100 and 200 kilovolts). Accordingly, Minnesota Power is following the provisions of the Alternative Permitting Process outlined in Minnesota Rules 7850.2800 to 7850.3900 for this Project.

2.6 Notice to Commission

On October 10, 2012, Minnesota Power notified the Commission by letter (mailed and eFiled) that it intended to use the Alternative Permitting Process for the Project. This letter complies with the requirement of Minnesota Rule 7850.2800, Subp. 2, to notify the Commission of this election at least 10 days prior to submitting an application for a Route Permit. A copy of the letter is attached in Appendix A.

3.0 Project Information

3.1 Project Location

Figure B-1 shows an overview of the Project location and route. Table 2 identifies the location of the Project.

Table 2 – Project Location

Township	Range	Sections	County
T58N	R17W	31	St. Louis
T57N	R17W	6	St. Louis
T58N	R18W	35, 36	St. Louis

3.2 Project Proposal

Minnesota Power proposes to construct an approximate 3.0-mile-long, 115 kV HVTL in St. Louis County near the City of Eveleth, Minnesota. Minnesota Power would also, at the request of United Taconite, remove approximately 1.9 miles of existing 39 Line that runs through United Taconite's north pit.

There are two different structures proposed for the new 115 kV line, wooden monopoles and wooden H-frame. Monopole structures are proposed for the portion of the line located within the active United Taconite mining operation and along Highway 101. The monopole structures within the active mining operation will be approximately 100 feet tall. The monopole structures that parallel Highway 101 will range between 60 and 70 feet tall. The average span length between all monopole structures will be between 250 and 350 feet.

H-frame structures will range between 60 and 70 feet tall with an average span length of 500 and 1,000 feet. The conductor for the proposed line will include three phases of Aluminum Core Steel Reinforces (ACSR) cable accompanied by shield wire(s) for lightning protection.

3.3 Need for Project

United Taconite has requested that Minnesota Power remove an existing 115 kV HVTL to accommodate United Taconite's plans to extend its mining operation located west of the City of Eveleth. The Project (i.e., installation of 3.0 miles of HVTL) is needed to allow this existing line to be removed without degrading the area's high voltage transmission system.

3.4 Project Schedule

Minnesota Power anticipates beginning construction of the Project in the summer of 2013 following its attainment of the required regulatory permits and approvals. Table 3 provides an estimated permitting and construction schedule summary.

Table 3 – Estimated Project Schedule

Project Task	Date
File Route Permit Application with the Commission	Fall 2012
Route Permit Issuance	Spring/Summer 2013
Begin HVTL Construction	Summer 2013
In-Service Date	Winter 2013

The Project schedule is based on information known as of the date of this filing and upon planning assumptions that balance the timing of implementation with the availability of crews and materials and with other practical considerations. This schedule may be subject to revision as further information is developed.

3.5 Project Cost

Minnesota Power estimates that the Project, which includes the installation of the new 115 kV HVTL and removal of the existing transmission line, will cost approximately $2 million, depending on final route selection and any mitigation requirements.

Operation and maintenance costs for the HVTL will be nominal for several years, since the line will be new and minimal vegetation maintenance will be required. Typical annual vegetation, operating, and maintenance costs for 115 kV transmission voltages, on wooden structures, across Minnesota Power's system area are typically $585 per mile. The principal operating and maintenance cost includes inspections, which are usually done by fixed-wing aircraft and by helicopter on a regular basis.

4.0 Facility Description and Route Selection Rationale

4.1 Transmission Line Description

The Project involves installing a new 115 kV HVTL using both monopole and H-frame structures and removing the existing transmission line that is currently located within United Taconite's north pit west of the City of Eveleth. About 35 percent of privately owned land will be crossed by the HVTL, followed by about 22 percent of land owned by Oliver Iron Mining Company, about 21 percent owned by USX Corporation, 17 percent owned by the Minnesota DNR, and about 5 percent owned by United Taconite Company. The proposed route for the new 115 kV HVTL is 3.0 miles long between the existing Line 39 connection west of the City of Eveleth to the connection with the existing 37 Line connection northwest of the City of Leonidas. The length of existing transmission line that will be removed is approximately 1.9 miles long. **Figure B-2** provides an overview of the Proposed Route and **Figures B-3 to B-7** provides more detail on the Proposed Route (see Appendix B).

Additional characteristics of the Proposed Route, which are discussed further in Section 6.0, include the following:

- The Proposed Route is within or adjacent to County Road 101 and an existing haul road right-of-way for approximately 52 percent of the length of the route.
- More than 28 percent of the Proposed Route crosses barren or commercial/industrial land.
- Approximately 25 percent of the Proposed Route crosses wetland, spanning approximately 0.7 mile of wetland.
- The Proposed Route crosses land zoned primarily for mining and rural residential purposes.
- There are 23 residences located within 300 feet of the Proposed Route centerline.
- Twenty-nine inventoried historic architectural properties and no archaeological sites located within 1 mile of the Project area.
- Two federally listed species are known to occur in St. Louis County and no state-listed species are known to exist within 1 mile of the Project area.

4.2 Route Width and Alignment Selection Process

4.2.1 Route Width

Minnesota Statutes Section 216E.02, subd. 1 directs the Commission to locate transmission lines in a manner that "minimize[s] adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and ensuring their electric needs are met and fulfilled in an orderly and timely fashion." The PPSA also authorizes the Commission to meet its routing responsibility by designating a "route" for a new transmission line when it issues a Route Permit. Minnesota Statutes Section 216E.01, subd. 8 notes that the route may be up to 1.25 miles in width, within which the right-of-way for the facilities can be located.

The right-of-way for the HVTL line is proposed to be 100 feet. Minnesota Power requests that the Commission authorize a total route width of 500 feet. Detailed maps showing the currently planned route width is provided as Figures B-3 to B-7 in Appendix B.

In order to accommodate the future mining expansion of United Taconite's North Pit, Minnesota Power will remove the portion of existing transmission line located in Sections 25 and 36 of Township 58 North-Range 18 West and Section 31 of Township 58 North-Range 17 West. The area to be temporarily disturbed will be limited to within the existing right-of-way that Minnesota Power owns. After that portion of the line is removed, the area will be mined.

4.2.2 Route Selection Process

In developing the Proposed Route, Minnesota Power analyzed the statutory and rule criteria set forth in the PPSA and Minnesota Rule 7850.4100; gave consideration to the State of Minnesota's policy of non-proliferation of new infrastructure corridors; met with interested stakeholders and landowners, including local, state, and federal agencies; and consulted with United Taconite, the primary landowner in the area.

The general vicinity of the Project was initially studied during the planning process by a team of siting, right-of-way, planning, environmental, ecological, and engineering personnel. Minnesota Power also reviewed the general area surrounding the Project to help identify anticipated and significant routing issues that might arise.

As demonstrated in this application, Minnesota Power has also performed an analysis of environmental resources in the vicinity of the Project by using computer mapping of data, including aerial photographs and topographic maps. The Proposed Route is designed to best minimize overall impacts of the Project while still fulfilling the request of United Taconite.

The Proposed Route was developed with the following primary objectives:

- minimize land use impacts by routing along existing road corridors;
- minimize land use impacts by routing on mining interest fee land and proposed reclamation site boundaries;
- minimize use of new rights-of-way; and
- minimize impacts on environmental and sensitive resources.

4.3 Alternative Routes Considered and Rejected

Minnesota Power had originally proposed to permit a route to accommodate the Project's need through the "local review" process under the state rules concerning the construction of new HVTL facilities (Minnesota Rules 7850.5300, subp. 2). The originally proposed route is shown on **Figure B-9**. Private landowners along that proposed route were not in favor of the project as proposed and had significant opposition. As a result, Minnesota Power along with United Taconite developed the Project's proposed route (shown on **Figure B-2**), which follows a more agreeable ownership pattern. A public meeting, held by Minnesota Power on October 11, 2012, had three attendees at the meeting; two represented the City of Leonidas and one represented the City of Eveleth (see Section 2.6) in order to address questions and/or concerns with the proposed route.

4.4 Design Options to Accommodate Future Expansion

The proposed 115 kV transmission line is designed to meet current and projected needs.

5.0 Engineering and Operational Design

5.1 Structures, Right-of-Way, Construction and Maintenance

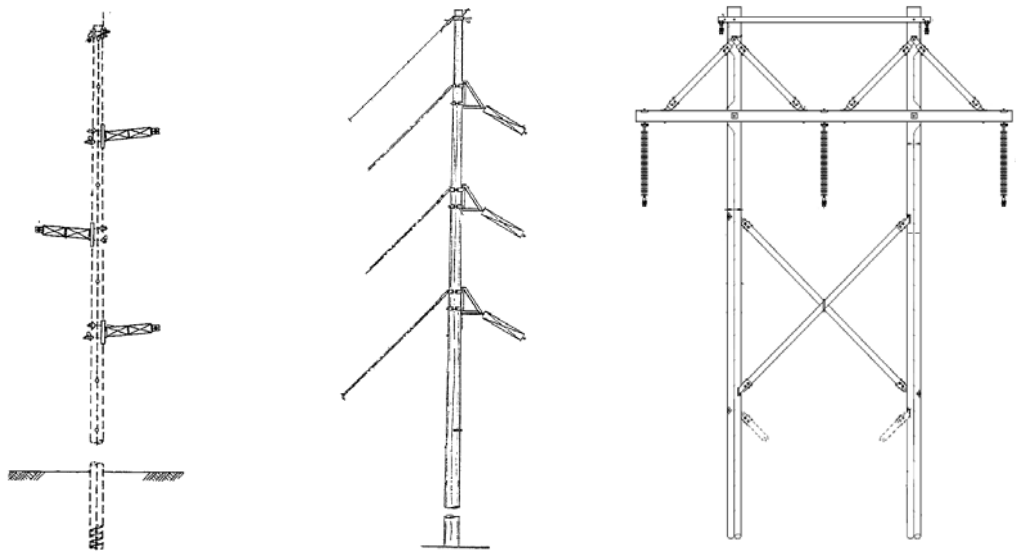
5.1.1 Transmission Structures

Minnesota Power's proposed 3.0 miles of 115 kV HVTL will be constructed with both monopole and H-Frame direct embedded wood structures. Monopole tangent structures will use wood or laminated wood poles with horizontal post or braced post insulators. Monopole angle structures will also be used that will utilize suspension insulators and may require guying. The structures will range in height from 60 to 105 feet above ground, and the spans adjacent to these structures will range from 250 to 350 feet.

H-Frame structures will utilize two braced wood poles and suspension insulators. These structures will range in height from 60 to 70 feet above ground, and the spans adjacent to these structures will range from 500 to 1,000 feet. Pole height and span length for both structure types vary depending on topography and environmental constraints within the proposed right-of-way. All structures will meet or exceed clearance and strength requirements given in the 2012 edition of the National Electrical Safety Code (NESC).

Typical structure types for this project are shown on **Figure 3**.

Figure 3 - Typical 115 kV Structures



Typical Monopole Tangent	Typical Monopole Angle	Typical H-Frame Structure

5.1.2 Right-of-Way Width

Minnesota Power will require a typical right-of-way of 100 feet wide for the new 115 kV HVTL construction. In locations with existing rights-of-way or other considerations, the Project may be designed to fit within existing right-of-way (centered on the centerline of the structure).

When the HVTL parallels other existing infrastructure right-of-way (e.g., roads, railroads, other utilities), an easement of lesser width may be required as part of the right-of-way of the existing infrastructure, which can often be combined with the right-of-way needed for the HVTL. With this pole placement, the HVTL shares the existing right-of-way, thereby reducing the size of the easement required from the private landowner.

When the HVTL is parallel to a roadway, poles will generally be placed 5 feet within the private right-of-way adjacent to the roadway. Therefore, a little less than half of the line right-of-way will share the existing road right-of-way, resulting in an easement of lesser width being required from the landowner. In general, the structures will be placed as close to the property line as practical. Minnesota Power will work with industry standard practices and the Minnesota Department of Transportation's (DOT) accommodation policy to position and manage the right-of-way.

5.1.3 Right-of-Way Evaluation and Acquisition

This project will require approximately 3.0 miles of new right-of-way. For HVTLs, utilities acquire easement rights across certain parcels to accommodate the facilities. The evaluation and acquisition process includes title examination, initial owner contacts, survey work, document preparation, and purchase. Each of these activities, particularly as it applies to easements for HVTL facilities, is described in more detail below.

The first step in the right-of-way process is to identify all persons and entities that may have a legal interest in the real estate upon which the facilities will be built. To compile this list, a right-of-way agent or other persons engaged by the utility will complete a public records search of all land involved in the Project to determine the legal description of the property and the owner(s) of record, and to gather information regarding easements, liens, restriction, encumbrances, and other conditions of record as needed.

After owners are identified, a right-of-way representative will contact each property owner or the property owner's representative. The right-of-way agent will describe the need for the transmission facilities and how the Project may affect each parcel. The right-of-way agent will also inquire from the landowner information about any specific construction concerns.

The next step in the acquisition process is evaluation of the specific parcel. For this work, the right-of-way agent may request permission from the owner for survey crews to enter the property to conduct preliminary survey work. Permission may also be requested to take soil borings to assess the soil conditions and determine appropriate foundation design. Surveys are conducted to locate the right-of-way corridors, natural features, man-made features, and associated elevations for use during the detailed engineering of the line. The soil analysis is performed by an experienced geotechnical testing laboratory.

During the evaluation process, the location of the proposed HVTL may be staked with permission of the property owner. This means that the survey crew will locate each structure or pole on the ground and place a surveyor's stake to mark the structures'

anticipated location. By doing this, the right-of-way agent can show the landowner where the structure(s) will be located on the property. The right-of-way agent may also delineate the boundaries of the easement area required for safe operation of the line.

Prior to the acquisition of easements of property, land value data will be collected. Based on the impact of the easement or purchase to the market value of each parcel, a fair market value offer will be developed. The right-of-way agent will contact the property owner to present the offer for the easement and discuss the amount of just compensation for the rights to build, operate, and maintain the transmission facilities within the easement area and reasonable access to the easement area. The agent will also provide maps of the line route or site and maps showing the landowner's parcel. The landowner is allowed a reasonable amount of time to consider the offer and to present any material that the owner believes is relevant to determining the property's value.

In nearly all cases, utility companies are able to work with the landowners to address their concerns and an agreement is reached for the utility's purchase of land rights. The right-of-way agent will prepare the easements required to complete each transaction. In rare instances where a negotiated settlement cannot be reached, the landowner may choose to have an independent third party determine the value of the rights taken. Such valuation is made through the utility's exercise of the right of eminent domain pursuant to Minnesota Statutes, Chapter 117. The process of exercising the right of eminent domain is called condemnation.

Before commencing a condemnation proceeding, the right-of-way agent must obtain at least one appraisal for the property proposed to be acquired and a copy of that appraisal must be provided to the property owner per Minnesota Statute § 117.036, subd. 2(a). The property owner may also obtain another property appraisal and the company must reimburse the property owner for the cost of the appraisal according to the limits set forth in Minnesota Stat. § 117.036, subd. 2(b). The property owner may be reimbursed for reasonable appraisal costs up to $1,500 for single-family and two-family residential properties, $1,500 for property with a value of $10,000 or less, and $5,000 for other types of properties.

To start the formal condemnation process, a utility will file a petition in the district court where the property is located and serves that Petition on all owners of the property. If the court grants the petition, the court will appoint a three-person condemnation commission that will determine the compensation for the easement. The three people must be knowledgeable of applicable real estate issues. Once appointed, the commissioners will schedule a viewing of the property over and across which the HVTL easement is to be located. Next, the commission will schedule a valuation hearing where the utility and landowners can testify as to the fair market value of the easement or fee. The commission will then make an award as to the value of the property acquired and file it with the court. Each party has 40 days from the filing of the award to appeal to the district court for a jury trial. In the event of an appeal, the jury will hear land value evidence and render a verdict. At any point in this process, the case can be dismissed if the parties reach a settlement.

As part of the right-of-way acquisition process, the right-of-way agent will discuss the construction schedule and construction requirements with the owner of each parcel. To ensure safe construction of the line, special consideration may be needed for fences, crops, or livestock. For instance, fences may need to be moved, temporary or permanent gates may need to be installed; crops may need to be harvested early; and livestock may need to be moved. In each case the right-of-way agent and construction personnel coordinate these processes with the landowner.

5.1.4 Transmission Construction Procedures

Minnesota Power will begin construction after appropriate federal, state, and local approvals are obtained, property and rights-of-way are acquired, soil conditions are established, and a final design is completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues, and available workforce.

Minnesota Power's construction process will follow standard construction and mitigation practices, including best management practices (BMPs) that were developed from experience with past projects. These practices address staging, erecting HVTL structures, and stringing HVTLs. Construction and mitigation practices to minimize impacts will be developed by Minnesota Power based on the proposed schedule for activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain, and other factors. In some cases, activities or schedules may be modified to minimize impacts on sensitive environmental features.

HVTL structures are generally designed for installation at existing grades. However, some sloped work areas may need to be graded or filled in order to establish a more level work surface for structure installation. If the landowner permits, it is preferred to leave the leveled areas and working pads in place for use in future maintenance activities, if any. If permission is not obtained, the site is graded back to its original condition to the extent possible and imported fill is removed.

Typical construction equipment that will be used on a Project may consist of tree removal equipment, line construction equipment, stringing equipment, and general construction equipment on rubber tires or tracks, as appropriate. Staging areas are often established for the Project, which are required for accommodating the equipment and materials necessary to construct the new HVTL facilities. The materials are stored at staging areas until they are needed for the Project.

Minnesota Power may also require staging areas for additional space for storage during construction. These areas will typically be selected for their location, access, security, and ability to efficiently and safely warehouse supplies. The temporary staging areas outside of the HVTL right-of-way will be obtained by Minnesota Power through rental agreements.

Minnesota Power will access the HVTL right-of-way corridor from existing roads or trails that run parallel or perpendicular to the HVTL right-of-way. In some situations, private field roads or trails may be used. Where necessary to accommodate the heavy equipment used in construction, including cranes, cement trucks and hole drilling equipment, existing access roads may be upgraded or new roads may be constructed. New access roads may also be constructed when no current access is available or the existing access is inadequate to cross roadway ditches. To the extent possible, Minnesota Power will coordinate these activities with the affected property owner(s) and/or state and local highway departments as appropriate.

Pole structure installation first begins by moving them from the staging areas and delivering them to a staked location. The poles are typically staged within the right-of-way until the pole is set. Depending on site conditions, structures may be framed in the ground and lifted into place, or the poles may be set first and then bracing and hardware attached.

Most structures will be direct embedded. The area around the pole is then backfilled with crushed rock and/or soil. In lowland areas with poor soil capacity, Minnesota Power will use galvanized steel culverts to increase pole stability.

Angle structures as well as some tangent structures will typically be guyed. Guy wires will be anchored using screw anchors, cross plate anchors, or rock anchors depending on the soil conditions encountered.

After the structures have been assembled, set, and secured, conductors will be installed by establishing stringing setup areas along the route. The conductors will then be pulled with a rope lead that connects to each structure through dollies attached at the insulator locations.

Environmentally sensitive areas (e.g., wetlands) may require special construction techniques, which may vary according to conditions at the time of construction. During construction, impacts on wetland areas will be minimized by Minnesota Power to the extent possible. Additionally, Minnesota Power will use construction practices that help prevent soil erosion and will take measures to ensure that equipment fueling and lubricating will occur at a distance from waterways. Additional mitigative measures relating to wetlands are contained in Section 6.5.2.2.

5.1.5 Transmission Removal Procedures

Once construction of the proposed HVTL section is complete, Minnesota Power will begin removal of the existing transmission line section. The conductor will be removed first by hanging dollies at the insulator locations and using rope leads to pull the conductor from the structures. The conductor will be wound on reels and salvaged. The line hardware will then be removed from the structures. Wood poles will be removed by pulling the poles out of the ground or by cutting them at their base. Steel poles will be unbolted from their foundations and removed, and reinforced concrete foundations will be left in place.

5.1.6 Restoration Procedures

Minnesota Power will attempt to limit ground disturbance during construction wherever possible. However, disturbance will occur during the normal course of work, which can take several weeks in any one location. As construction is completed (weather permitting), Minnesota Power will restore disturbed areas to their original condition to the maximum extent practicable. Right-of-way agents will attempt to contact each property owner after construction is completed to assess if any remaining damage has occurred as a result of the Project. If damage has occurred to crops, fences or the property, Minnesota Power will fairly reimburse the landowner for the damages sustained that are not repaired or restored by Minnesota Power or its representatives. In some cases, Minnesota Power may engage an outside contractor to restore the damaged property as nearly as possible to its original condition. Portions of vegetation that are disturbed or removed during construction of HVTLs will naturally reestablish to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish with few problems after disturbance. Areas with significant soil compaction and disturbance from construction activities along the proposed HVTL corridor may require assistance in reestablishing the vegetation stratum and controlling soil erosion. Commonly used methods to control soil erosion and assist in reestablishing vegetation include re-seeding and mulching, erosion control blankets, silt fence installation, and minimizing soil disturbance during construction. To avoid adversely impacting reptile and bird species, Minnesota Power will not use plastic mesh erosion control materials.

These erosion control and vegetation establishment practices are regularly used in construction projects and are referenced in the construction permit plans. These construction techniques typically minimize long-term impacts that may result from the Project. The Minnesota Noxious Weed Law (Minnesota Statutes Section 18.75-18.91) defines a noxious weed as an annual, biennial, or perennial plant that the Commissioner of Agriculture designates to be injurious to the public health, the environment, public roads, crops, livestock, or other property. The Minnesota Department of Agriculture's Noxious & Invasive Weed Program assists local governments and landowners with resources for managing noxious and invasive weeds throughout Minnesota. Minnesota Power will attempt to limit the spread of noxious and invasive weeds by cleaning construction equipment before it enters the construction work area and using only invasive-free mulches, topsoil, and seed mixes. Permanent vegetation will be established in areas disturbed within the construction work area except in actively cultivated areas and standing water wetlands. Seed used will be purchased on a "Pure Live Seed" basis for seeding revegetation areas. The seed tags on the seed sacks will also certify that the seed is "Noxious Weed Free."

Minnesota Power may use both herbicides and/or mechanical methods to control the spread of noxious weeds. All herbicides used by Minnesota Power are approved by the U.S. Environmental Protection Agency and the State of Minnesota Department of Agriculture. These herbicides are applied by commercial pesticide applicators that are Licensed by the Minnesota Department of Agriculture. If during post-construction monitoring of the restored right-of-way a higher density and cover of noxious weeds on the right-of-way is noted when compared to adjacent off right-of-way areas, Minnesota Power will obtain landowner permission and work to mitigate noxious weed concerns.

5.1.7 Maintenance Procedures

Minnesota Power designs its HVTLs to operate for decades and they typically require only moderate maintenance, particularly in the first few years of operation. The estimated service life of a HVTL built today is approximately 40 years. However, HVTLs are seldom completely retired. Transmission infrastructure has very few mechanical elements and is built to withstand weather extremes that are normally encountered. With the exception of severe weather such as tornadoes and heavy ice storms, HVTLs rarely fail. HVTLs are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure exceeds 90 percent.

The principal operating and maintenance costs for transmission facilities are the costs of inspections and vegetation management. Inspection costs include 1 to 2 annual helicopter inspections, annual fixed wing patrol inspection, ground line inspections every 8 years, and pole climbing inspections as necessary. For wood structure HVTLs with voltages ranging from 115 kV through 230 kV, experience shows that the scheduled maintenance cost is approximately $105 per mile per year; pole climbing inspections are budgeted and scheduled as necessary. Vegetation management is performed on a 7-year cycle at an approximate average annual cost of $480 per mile. Annual operating and maintenance costs for HVTLs in Minnesota and the surrounding states vary. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

5.2 Electric and Magnetic Fields

The term electromagnetic fields (EMF) refer to electric and magnetic fields that are coupled together, such as in high frequency radiating fields. For the lower frequencies associated with power lines (referred to as "extremely low frequencies" (ELF)), EMF should be separated into electric fields (EFs) and magnetic fields (MFs), measured in kilovolts per meter (kV/m) and milliGauss (mG), respectively. These fields are dependent on the voltage of a transmission line (EFs) and current carried by a transmission line (MFs). The intensity of the electric field is proportional to the voltage of the line, and the intensity of the magnetic field is proportional to the current flow through the conductors. Transmission lines operate at a power frequency of 60 hertz (cycles per second).

5.2.1 Health and Environmental Effects

Considerable research has been conducted in recent decades to determine whether exposure to power-frequency (60 Hz) electric and magnetic fields can cause biological responses and adverse health effects. The multitude of epidemiological and toxicological studies has shown at most a weak association (i.e., no statistically significant association) between EMF exposure and health risks.

In 1999, the National Institute of Environmental Health Sciences (NIEHS) issued its final report on "Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields" in response to the Energy Policy Act of 1992. In the report, the NIEHS concluded that the scientific evidence linking EMF exposures with health risks is weak and that this finding does not warrant aggressive regulatory concern. However, in light of the weak scientific evidence supporting some association between EMF and health effects and the fact that exposure to electricity is common in the United States, the NIEHS stated that passive regulatory action, such as providing public education on reducing exposures, is warranted.[1]

The U.S. Environmental Protection Agency (USEPA) seems to have come to a similar conclusion about the link between adverse health effects, specifically childhood leukemia, and power-frequency EMF exposure. On its website, the USEPA states:

> Many people are concerned about potential adverse health effects. Much of the research about power lines and potential health effects is inconclusive. Despite more than two decades of research to determine whether elevated EMF exposure, principally to magnetic fields, is related to an increased risk of childhood leukemia, there is still no definitive answer. The general scientific consensus is that, thus far, the evidence available is weak and is not sufficient to establish a *definitive* cause-effect relationship.[2]

Minnesota, California, and Wisconsin have each conducted their own literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group to evaluate the research and develop policy recommendations to protect the public health from any potential problems arising from EMF effects associated with HVTLs. The Minnesota Department of Health published the Working Group's findings in *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options*. The Working Group summarized its findings as follows:

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[1] Report is available at http://www.niehs.nih.gov/health/topics/agents/emf/

[2] See http://www.epa.gov/radtown/power-lines.html

> Research on the health effects of EMF has been carried out since the 1970's. Epidemiological studies have mixed results – some have shown no statistically significant association between exposure to EMF and health effects, 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. A number of scientific panels convened by national and international health agencies and the United States Congress have reviewed the research carried out to date. Most researchers concluded that there is insufficient evidence to prove an association between EMF and health effects; however many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe.[3]

Based on findings like those of the Working Group and NIEHS, the Minnesota Public Utilities Commission has consistently found that "there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects."[4] This conclusion was further justified in the recent Route Permit proceedings for the Brookings County – Hampton 345 kV Project (Brookings Project). In the Brookings Project Route Permit proceedings, the Applicants (Great River Energy and Xcel Energy) and one of the intervening parties both provided expert evidence on the potential impacts of electric and magnetic fields on human health. The administrative law judge (ALJ) in that proceeding evaluated written submissions and a day-and-a-half of testimony from the two expert witnesses. The ALJ concluded: "there is no demonstrated impact on human health and safety that is not adequately addressed by the existing State standards for [EMF] exposure."[5] The Commission adopted this finding on July 15, 2010.[6]

5.2.2 Electric Fields

While there is no official state or federal standard for transmission line electric fields, the Environmental Quality Board (EQB) has developed a standard of a maximum electric field limit of 8 kV per meter measured at 1 meter above the ground. The standard was designed to prevent serious hazards from shocks when touching large objects parked under AC transmission lines of 500 kV or greater. The maximum electric field, measured at 1 meter above ground associated with the Project is calculated to be 1.3 to 1.4 kV per meter, as listed in Table 4.

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[3] Minnesota Department of Health. 2002. *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options*

[4] See, for example, *In the Matter of the Application for a HVTL Route Permit for the Tower Transmission Line Project*, Docket No. ET-2, E015/TL-06-1624, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Minnesota Power and Great River Energy for the Tower Transmission Line Project and Associated Facilities (August 1, 2007)

[5] *In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, ALJ Findings of Fact, Conclusions and Recommendation at Finding 216 (April 22, 2010 and amended April 30, 2010).

[6] *In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, Order Granting Route Permit (September 14, 2010).

Table 4 – Calculated Electric Fields (kV/m) for Proposed 115 kV Transmission Line Designs (One meter (3.28 feet) above ground)

Structure Type [a]	Maximum Operating Voltage (kV)	Distance to Proposed Centerline (feet)										
		-300	-200	-100	-50	-25	Max	25	50	100	200	300
115 kV Monopole	121	0.01	0.02	0.07	0.18	0.38	1.32	0.54	0.18	0.08	0.02	0.01
115 kV H-Frame	121	0.00	0.01	0.06	0.37	1.16	1.37	1.16	0.37	0.06	0.01	0.00

[a] See Figure 3 for images of the structure types associated with the Project.

5.2.3 Magnetic Fields

There are no federal or Minnesota regulations pertaining to MF exposure. The EQB and the Commission have recognized that Florida (a 150 mG limit) and New York (a 200 mG limit) are the only two state standards in the country. Recent studies of the health effects from power frequency fields conclude that the evidence of health risk is weak.[7] The general standard is one of prudent avoidance.

The magnetic field profiles around the proposed HVTL for each structure and conductor configuration being considered for the Project is shown in Table 4. Magnetic fields were calculated at the conductor's thermal limit based on the design of the HVTL. The peak magnetic field values are calculated at a point directly under the HVTL and where the conductor is closest to the ground. The same method is used to calculate the magnetic field at the edge of the right-of-way. The magnetic field profile data show that magnetic field levels decrease rapidly as the distance from the centerline increases.

Because the actual power flow on a transmission line could potentially vary widely throughout the day depending on electric demand, the actual magnetic field level could also vary widely from hour to hour. In any case, the typical loading of the transmission line will be far below the thermal limit of the line, resulting in typical magnetic fields well below those indicated in the Table 5 below.

Table 5 – Calculated Magnetic Fields (mG) for Proposed 115 kV Transmission Line Designs (One meter (3.28 feet) above ground)

Structure Type	Line Current (Amps)	Distance to Proposed Centerline (feet)										
		-300	-200	-100	-50	-25	Max	25	50	100	200	300
115 kV Monopole	614	0.60	1.31	4.77	14.90	34.88	77.13	45.40	18.85	5.53	1.42	0.63
115 kV H-Frame	614	0.85	1.90	7.45	27.13	74.73	139.45	74.73	27.13	7.45	1.90	0.85

[a] See Figure 3 for images of the structure types associated with the Project.

[7] Minnesota Department of Health. *EMF White Paper on Electric and Magnetic Field* (EMF) Policy and Mitigation Options. 2002; National Research Council. *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields*. 1997; www.niehs.nih.gov/health/topics/agents/emf/.

5.2.4 Stray Voltage

Stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings, such as barns and milking parlors, and can occur on the electric service entrances to structures from distribution lines, not HVTLs. HVTLs do not, by themselves, create stray voltage because they do not connect to businesses or residences. HVTLs, however, can induce stray voltage on a distribution circuit that is parallel to and immediately under the HVTL. Appropriate measures would be taken to prevent stray voltage problems when the proposed HVTL parallels or crosses distribution lines.

5.3 Farming Operations, Vehicle Use, and Metal Buildings Near Power Lines

Insulated electric fences used in livestock operations can pick up an induced charge from HVTLs. Usually, the induced charge will drain off when the charger unit is connected to the fence. When the charger is disconnected either for maintenance or when the fence is being built, shocks may result. Potential shocks can be prevented by using a couple of methods including:

1. one or more of the fence insulators can be shorted out to ground with a wire when the charger is disconnected; or

2. an electric filter can be instilled that grounds out charges induced from a power line while still allowing the charger to be effective.

Farm equipment, passenger vehicles, and trucks may be safely used under and near power lines. The power lines will be designed to meet or exceed minimum clearance requirements over roads, driveways, cultivated fields, and grazing lands specified by the NESC. Recommended clearances within the NESC are designed to accommodate a relative vehicle height of 14 feet.

There is a potential for vehicles under HVTLs to build up an electric charge. If this occurs, the vehicle can be grounded by attaching a grounding strap to the vehicle long enough to touch the earth. Such buildup is a rare event because generally vehicles are effectively grounded through tires. Modern tires provide an electrical path to ground because carbon black, a good conductor of electricity, is added when they are produced. Metal parts of farming equipment are frequently in contact with the ground when plowing or engaging in various other activities. Therefore, vehicles will not normally build up a charge unless they have unusually old tires or are parked on dry rock, plastic or other surfaces that insulate them from the ground.

Buildings are permitted near HVTLs but are generally prohibited within the right-of-way itself because a structure under a line may interfere with safe operation of the transmission facilities. For example, a fire in a building on the right-of-way could damage a HVTL. As a result, NESC guidelines establish clear zones for transmission facilities. Metal buildings may have unique issues. For example, metal buildings near power lines of 200 kV or greater must be properly grounded.

6.0 Land Use, Recreation, and Historic and Natural Resources

6.1 Description of Environmental Setting

6.1.1 Topography

The Project is located in St. Louis County, Minnesota, the largest county east of the Mississippi River. The county has over 1,000 lakes and is populated by small mining towns, farm communities, and cities, with the population centers being concentrated along the Mesabi and Vermilion Iron Ranges and in the Duluth area along Lake Superior. Based on U.S. Geological Survey topographic maps, the Project will be located in an area whose topography has been significantly altered by mining activities west of the City of Eveleth and north of the City of Leonidas. For the most part, the Project will be located within a relatively level area with the exception of a moderate elevation change of about 100 feet south and west of the existing United Taconite mining pit.

6.1.2 Geology and Soils

The geology of the Project area is composed of early Proterozoic rocks common in east-central and northern Minnesota. These rocks form part of the Penokean orogen, which is a 1.85-billion-year old mountain building event that was part of a larger feature that extended from central South Dakota to Lake Huron. The Project area is underlain by one of the two belts of the Penokean orogen, the Animikie basin. The Animikie basin is primarily underlain by slate/shale, siltstone, and graywacke of the Rove, Virginia, and Thompson Formations. Also bordering the Project area to the north are the Gunflint, Biwabik, and Emily Iron Formations, and iron formations and underlying quartzite are also present in the area (Geology of Minnesota, 1995).

During the first part of the Precambrian era, thick sediments were laid down in a shallow sea trough that covered the Lake Superior region. Thick sand, fine muds, or pure lime were deposited at various locations during this time, which accumulated in the slowly deepening sea. Over the sand, masses of iron minerals accumulated and eventually formed the world's largest iron deposit in what would become Minnesota, Wisconsin, and Michigan. As a result of its geologic history, the area is rich in iron ore and taconite, and large mines on the Mesabi Iron Range in the area of Hibbing, Virginia, and Hoyt Lakes are a major source of iron ore. Minnesota leads the nation in the production of iron ore/taconite. In 2011, mines in Michigan and Minnesota shipped 99 percent of the usable ore produced in the United States (U.S. Geological Survey, 2012).

Subsequent glacial movements that occurred throughout the State of Minnesota during the Pleistocene time (starting about 5 million years ago) further defined the geology of the Project area. Also, around 10,000 years ago during the Holocene, large peat bogs developed in the northern part of the state within the lake plain associated with Glacial Lake Agassiz, which was west of the Project area. Peat deposits also occur on lake plains associated with Glacial Lake Upham in St. Louis County and Glacial Lake Aitkin in Aitkin County (Geology of Minnesota, 1995).

The underlying geology and topography near the Cities of Eveleth and Leonidas have been altered over time as a result of mining operations. Further, the surface topography and natural drainage ways have been impacted by the man-made development of public infrastructure (e.g., buildings, roads).

Soils throughout the area are typically poorly to very poorly drained and consist primarily of clay or clay loam (National Cooperative Soil Survey, 2012). Based on the soil data for St. Louis County (U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, 2012), the most predominant soils within the vicinity of the Project include the following soil units:

- B27A – McQuade-Buhl complex, 0 to 3 percent slopes: consists of somewhat poorly to poorly drained soils associated with flats on till plains.
- B33A – McQuade-Fayal, depressional complex, 0 to 2 percent slopes: consists of somewhat poorly to very poorly drained soils associated with swales on till plains; loamy material over dense fine till; frequent frequency for flooding.
- B67A – Rifle soils, Hibbing catena, 0 to 1 percent slopes: very poorly drained soils associated with swamps on moraines and swamps on till plains; organic material; frequent frequency for flooding with very high water capacity.
- 1003B – Udorthents, Loamy: well drained soils with slopes of 0 to 6 percent; no to low frequency for flooding or ponding.
- 1048 – Dumps, Iron Mine: Variable soil material associated with moraines.
- 1049 – Pits, Iron Mine: Variable soil material associated with moraines.
- 1050 – Tailings basin: metal ore extraction mine spoil associated with moraines.

6.2 Human Settlement

6.2.1 Public Health and Safety

Minnesota Power will implement proper safeguards during construction and operation to avoid potential impacts public health and safety. The Project will be designed in compliance with local, state, NESC, and Minnesota Power standards for clearance to ground, crossing utilities and buildings, strength of materials, and right-of-way widths. Minnesota Power will ensure that construction and contract crews comply with local, state, NESC, and company standards for installation of facilities and standard construction practices. Minnesota Power-established and industry safety procedures will also be followed after the transmission line is installed. This will include clear signage during all construction activities.

The proposed HVTL will be equipped with protective devices (circuit breakers and relays located in the substation where the transmission lines terminate) to safeguard the public if an accident occurs, such as a structure or conductor falling to the ground. The protective equipment will de-energize the transmission line should such an event occur. Minnesota Power will post signage to warn the public about the risk of coming into contact with the energized equipment.

With implementation of safeguards and protective measures, the Project is not anticipated to result in adverse or significant impacts on public health and safety.

6.2.2 Zoning and Displacement

The Proposed Route will cross areas classified by the Cities of Eveleth and Mountain Iron as zoned for mining and rural residential purposes (see **Figures B-2 and B-10**). Based on

recent discussions with the city, zoning information for the City of Leonidas is not currently available.

NESC and Minnesota Power standards require certain clearances between transmission line facilities and buildings for safe operation of the transmission line. Minnesota Power's acquired right-of-way is intended to be sufficient to maintain these clearances. Displacement can occur when an existing structure is located within the right-of-way for a new transmission facility. The HVTL will be designed so that all existing residences are located outside of the right-of-way.

Based on a review of recent aerial photography, there are 23 residences within 300 feet of the proposed centerline, of which one is within 100 feet of the centerline. Also, there are 13 commercial buildings within 300 feet of the proposed centerline, of which 2 are within 100 feet of the centerline.

Table 6 – Distance to Structures

Structure	Distance [a]					
	0 to 50 feet	51 to 100 feet	101 to 150 feet	151 to 200 feet	201 to 250 feet	251 to 300 feet
Residences	0	1	2	6	12	23
Commercial	0	2	2	4	10	13

[a] Distance is from proposed centerline within the proposed 500-foot-wide corridor.

The proposed Project will not require displacement of occupied residences or commercial businesses. Minnesota Power will seek to construct the HVTL consistent with any applicable zoning ordinances. However, no zoning, building, or land use approvals will be required from surrounding municipalities if a Route Permit is issued for the Project because once the Commission issues a Route Permit, zoning, building, and land use regulations and rules are preempted per Minnesota Statutes § 216E.10, subd. 1. No adverse or significant impacts on residential or commercial structures as a result of the Project are anticipated.

6.2.3 Noise

Transmission conductors produce noise under certain conditions. The level of noise depends on conductor conditions, voltage level and weather conditions. Generally, activity-related noise levels during the operation and maintenance of transmission lines are minimal.

Noise emissions from a transmission line occur during certain weather conditions. In foggy, damp, or rainy weather, power lines can create a crackling sound when a small amount of electricity ionizes the moist air near the wires. During heavy rain, the background noise level of the rain is usually greater than the noise from the transmission line. As a result, people do not normally hear noise from a transmission line during heavy rain. During light rain, dense fog, snow, and other times when there is moisture in the air, transmission lines can produce noise. Noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. At substations, the source of noise is primarily the transformers, which can create a humming noise.

Since human hearing is not equally sensitive to all frequencies of sound, the most noticeable frequencies of sound are given more "weight" in most measurement schemes. The A-weighted scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in decibels (dBA). A noise level change of

3 dBA is barely perceptible to human hearing. A 5 dBA change in noise level, however, is clearly noticeable. A 10 dBA change in noise level is perceived as a doubling of noise loudness, while a 20 dBA change is considered a dramatic change in loudness. Table 7 shows noise levels associated with common, everyday activities.

Table 7 – Common Noise Sources and Levels

Noise Source [a]	Sound Pressure Level (dBA)
Jet Engine (at 25 meters)	140
Jet Aircraft (at 100 meters)	130
Rock Concert	120
Pneumatic Chipper	110
Jackhammer (at 1 meter)	100
Chainsaw, Lawn Mower (at 1 meter)	90
Heavy Truck Traffic	80
Business Office, Vacuum Cleaner	70
Conversational Speech, Typical TV Volume	60
Library	50
Bedroom	40
Secluded Woods	30
Whisper	10

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

In Minnesota, statistical sound levels ("L" or Level Descriptors) are used to evaluate noise levels and identify noise impacts. 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} may be exceeded 10 percent of the time within an hour.

Land areas, such as picnic areas, churches, or commercial spaces, are assigned to an activity category based on the type of activities or use occurring in the area. Activity categories are then categorized based on their sensitivity to traffic noise. The Noise Area Classification (NAC) is listed in the Minnesota Pollution Control Agency (MPCA) noise regulations to distinguish the categories. Residential areas, churches, and similar type land use activities are included in NAC 1; commercial-type land use activities are included in NAC 2; and industrial-type land use activities are included in NAC 3.

Table 8 identifies the established daytime and nighttime noise standards by NAC.

Table 8 – Noise Standards by Noise Area Classification

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

The audible noise associated with the proposed transmission line was modeled using the Corona and Field Effects (CFE) spreadsheets developed by the Bonneville Power Administration. The results are given in the table below.

Table 9 – Calculated Audible Noise (dBA) for Proposed Single/Double Transmission Line Designs (3.28 feet above ground)

Structure Type	Noise L_5 Edge of ROW (dBA)	Noise L_{50} Edge of ROW (dBA)
115 kV Monopole	25.92	22.42
115 kV H-Frame	26.10	22.60

The noise generated from the proposed HVTL is not expected to exceed background noise levels and will, therefore, not be audible at any receptor location. The HVTL will be designed and constructed to comply with state noise standards established by the MPCA. Any audible noise will be below the MPCA noise standards established for Noise Area Classification 1. Additionally, it is not anticipated that the Project will increase noise from transmission line conductors or any associated facilities above the levels already experienced in the area.

With implementation of state design and construction standards, the Project is not anticipated to result in adverse or significant impacts on the public as a result of noise.

6.2.4 Aesthetics

Construction of the proposed HVTL will occur adjacent to existing road rights-of-way for the majority of its length, as well as within an area already populated by transmission lines, structures, and mining activities. Therefore, the Project will have nominal effects on the visual and aesthetic character of the area. The proposed structures for the 115 kV HVTL will be similar to the other 115 kV transmission lines used by Minnesota Power in the area. As described in Section 5.1.1, the structures will be constructed with both monopole and H-Frame direct embedded wood structures. Monopole tangent structures will use wood or laminated wood poles with horizontal post or braced post insulators, will range in height from 60 to 105 feet above ground, and the spans adjacent to these structures will range from 250 to 350 feet. H-Frame structures will utilize two braced wood poles and suspension insulators, will range in height from 60 to 70 feet above ground, and the spans adjacent to these structures will range from 500 to 1,000 feet.

Like the existing transmission lines in the area, the new HVTL will be visible to residents along the western edge of the City of Eveleth and users along an existing mining road and County Road 101. The majority of the landscape in the eastern Project area is commercial/industrial and in the western Project area is open and scrub-shrub wetland. The visual effect will depend largely on the perceptions of the observers. The visual contrast added by the transmission structures and lines may be perceived as a visual disruption or as points of visual interest. The transmission lines that already exist in the Project area will limit the extent to which the new lines are viewed as a disruption to the area's scenic integrity. Minnesota Power is also planning to remove the existing transmission line that currently transects United Taconite's north pit northwest of the City of Eveleth. A comment was made during the Minnesota Power public meeting expressing concern regarding the potential visual impact the new structures could have from the City of Leonidas Scenic Overlook. Minnesota Power will continue to work with affected parties to identify additional methods, if necessary, to further mitigate aesthetical impacts related to the proposed Project.

Construction and operation of the proposed Project is not expected to result in adverse or significant impacts on the area's aesthetics.

6.2.5 Socioeconomic Impacts

According to U.S. Census Bureau data, minority groups in the area constitute a very small percentage of the total population, averaging 7 percent in St. Louis County and between 2 and 5.5 percent in cities near the Project area. Median household incomes within the county and nearest cities to the Project area are lower than the State of Minnesota median household income. The percentage of persons living below the poverty level in the area is approximately 50 percent more than the state average. Population and economic data is provided in Table 10.

Table 10 – Population and Economic Characteristics of the Project Location

Location	Population	Minority Population (percent)	Caucasian Population (percent)	Median Household Income (U.S. dollars)	Percentage of Population Below Poverty Level (families)
State of Minnesota [a]	5,344,861	13.1	86.9	57,243	10.6
St. Louis County [a]	200,255	7.0	93.0	44,941	15.1
City of Eveleth [b]	3,718	5.5	94.5	38,239	18.2
City of Leonidas [c, d]	55 [c]	2.0	98.0	19,167	14.3

[a] U.S. Census Bureau, 2012.
[b] City Data, 2012.
[c] IDcide, 2012.
[d] Wikipedia, 2012.

Approximately 24 to 30 workers will be needed over five months to construct the proposed HVTL. During construction, construction crews will spend money locally, thereby providing a small economic benefit to the community.

There will be short-term impacts on community services as a result of construction activity and an influx of contractor employees during construction of the Project. Both utility personnel and contractors will be used for construction activities. The communities near the Project should experience short-term positive economic impacts through the use of the hotels, restaurants, and other services by the various workers. The construction activities will provide a seasonal influx of additional dollars into the communities during the construction phase, and materials such as concrete may be purchased from local vendors.

It is not expected that additional permanent jobs will be created the Project. Once the Project is operational, its socioeconomic effects are generally positive because it will provide a more stable and reliable supply of electricity, encourage economic development, provide for future growth, and increase the local tax base resulting from the incremental increase in revenues from utility property taxes.

Socioeconomic impacts resulting from the Project will be primarily positive with an influx of wages and expenditures made at local businesses during the Project, increased tax revenue, and increased opportunities for business development.

The Project will result in a slight influx of wages and expenditures made at local businesses during construction. Once the Project is operational, its socioeconomic effects are generally positive because it will provide a more stable and reliable supply of electricity, encourage

business development, provide for future growth, and increase the local tax base resulting from the incremental increase in revenues from utility property taxes. Therefore, Minnesota Power does not anticipate any adverse socioeconomic impacts from the Project.

6.2.6 Cultural Values

Cultural values are the history and beliefs of the area that provide a framework for community unity. Local community ties relate to work, worship, celebration, and recreation. The region surrounding the Project area has cultural values tied to German, Norwegian, Swedish, Italian, English, and Irish heritages (City Data, 2012). The major industries in St. Louis County are mining, wood and paper products, aviation, higher education, shipping and transportation, health care, and tourism (St. Louis County, 2012). The most common industries in Eveleth include retail trade, public administration, accommodation and food services, mining, quarrying, and oil and gas extraction, construction, transportation and warehousing, and manufacturing (City Data, 2012).

The Project area is bounded by the Mesabi Iron Range, a vast deposit of iron ore and the largest of three major iron ranges in Minnesota. Discovered in 1866, it is the chief deposit of iron ore in the United States, and was extensively worked in the earlier part of the 20th century. Mining operations waned during the 1970s but, as a result of China's demand for iron and the falling value of the U.S. dollar, taconite production began to rebound in 2005 (Minnesota Mines, 2012).

Examples of cultural events near the Project include the Land of the Loon Festival in Virginia (about 2 miles from Project), Festival of Trees in Mountain Iron (about 3 miles from Project), and Independence Day events throughout the region. Construction of the proposed Project is not expected to conflict with the cultural values along the route because it will be short term and temporary, and operation of the new HVTL will not conflict with or prevent the practice of cultural values in the area.

6.2.7 Recreation and Public Services and Infrastructure

No known federal, state, or county parks, forests, recreational areas, wildlife refuges, wildlife protection areas, trails, or natural areas will be affected by the Project. While the City of Eveleth offers several recreational opportunities and public infrastructure, the Project is located to the west of the city and would not affect these facilities (see **Figure B-12**). The general area supports recreational activities such as hiking, snowmobiling, biking, hunting, and fishing.

Public services in the Project area include fully staffed police department, a volunteer fire department, four medical clinics, and a paid-on-call ambulance service in the City of Eveleth, and a volunteer fire department in the City of Leonidas. The area is served by State Highway 53 and County Road 101, and the nearest airport is approximately 2.7 miles from the Project area in the City of Virginia (see **Figures B-13 and B-14**).

Direct impacts on existing recreational opportunities and public services within the Project location will be avoided because the proposed route will not cross these areas and it is collocated with existing road rights-of-way for the majority of the route. Other than in the case of an emergency, the Project will not affect area fire, medical, or police services, and should not conflict with commuters of local highways, roads, and airports. Users of nearby recreational opportunities may experience indirect and temporary impacts such as visual and noise impacts during the time of construction, which is expected to only extend for

approximately 5 months. The Project is not anticipated to result in adverse or significant impacts on recreation or public services.

6.3 Land-Based Economics

6.3.1 Agriculture

The Project area is not located in an agricultural area (see **Figure B-15**). Based on recent aerial photographs, the nearest significant tracts of land with evidence of agriculture are located approximately 0.5 mile west of the western-most portion of the Project.

6.3.2 Forestry

Based on property parcel data, no economically significant forestry resources are located within the Project area.

6.3.3 Tourism

The primary tourism activities in the county include camping, recreational use of lakes for fishing and boating, snowmobiling, bicycling, hiking, bird or wildlife viewing, or cross country skiing. The Cities of Eveleth and Leonidas are home to the "Big Stick," the largest hockey stick in the United States; the U.S. Hockey Hall of Fame; a golf course; and the Leonidas Overlook, which offers a viewpoint for iron ore and taconite mine sites and 15 miles of scenery (City of Eveleth, 2012). Also, the City of Eveleth recently opened the Mesabi Trail, a 132-mile-long bike trail through the region, headquarters building (Iron Range Resources and Rehabilitation Board, 2012).

Direct impacts on existing tourist attractions within the Project location will be avoided because the proposed route will not cross these areas and it is collocated with existing road rights-of-way for the majority of the route. However, indirect and temporary impacts such as visual and noise impacts will occur during the time of construction, which is expected to only extend for approximately 5 months. The Project is not anticipated to result in adverse or significant impacts on the area's tourism.

6.3.4 Mining

As discussed in Section 6.2.6, the Project area is bounded by the Mesabi Iron Range, a vast deposit of iron ore and the largest of three major iron ranges in Minnesota. Mining activities play a significant role in the area's economy, accounting for 10 percent of the area's industry (compared to less than 1 percent statewide). As previously stated, the Project will remove the existing transmission line that crosses an active taconite mine, thereby providing United Taconite with additional space to conduct mining operations and be consistent with future plans for the mining property. The new HVTL will be located south and west of the mine and the proposed corridor has been selected in consultation with United Taconite.

Since the Project is intended to facilitate requests from the local mining companies, the Project is expected to result in an overall benefit to local mining operations.

6.4 Archaeological and Historic Resources

On behalf of Minnesota Power, Merjent, Inc. conducted a Phase Ia cultural resources assessment for the Project in September of 2012 at the Minnesota State Historic Preservation Office (SHPO) (see Appendix E). The cultural resources assessment revealed that no archaeological site or inventoried standing structure is recorded within the immediate Project location; however, the review did identify 29 inventoried historic architectural properties and no archaeological sites located within 1 mile of the Project area (see **Table 11** and **Figure B-16**). Five of the historic architectural properties are listed on the National Register of Historic Places (NRHP). The listed properties include a single family house and four public buildings. The period of significance for these properties dates from 1900 to 1924. Each property has direct ties to the mining industry including the residence of W. Bailey, manager of the mining-rights fee office, a church, vocational school and gym built for workers in the iron mining industry, and one of the region's leading hotels built on a major stop on Mesaba Railway's interurban trolley line. The historic character of these five properties will not be affected by the proposed Project.

Table 11 – Previously Identified Historic Properties Near The Project

Inventory Number	Property Name	City / Township	NRHP Status
SL-EVC-001	Eveleth High School	Eveleth	Not assessed
SL-EVC-002	houses	Eveleth	Not assessed
SL-EVC-003	houses	Eveleth	Not assessed
SL-EVC-004	houses	Eveleth	Not assessed
SL-EVC-005	commercial building	Eveleth	Not assessed
SL-EVC-006	commercial building	Eveleth	Not assessed
SL-EVC-007	commercial buildings	Eveleth	Not assessed
SL-EVC-008	Eveleth City Hall	Eveleth	Considered eligible
SL-EVC-009	commercial buildings	Eveleth	Not assessed
SL-EVC-010	commercial buildings	Eveleth	Not assessed
SL-EVC-011	Miners National Bank	Eveleth	Not assessed
SL-EVC-012	commercial buildings	Eveleth	Not assessed
SL-EVC-013	Eveleth Public Library	Eveleth	Considered eligible
SL-EVC-014	Eveleth Post Office	Eveleth	Not assessed
SL-EVC-015	auditorium	Eveleth	Not assessed
SL-EVC-016	fire station	Eveleth	Not assessed
SL-EVC-017	Italian American Social Club	Eveleth	Considered eligible
SL-EVC-018	W. Bailey House (Redstone)	Eveleth	Listed
SL-EVC-019	Church of the Holy Family (Catholic)	Eveleth	Listed
SL-EVC-020	Eveleth Manual Training School	Eveleth	Listed
SL-EVC-021	Eveleth Recreation Building	Eveleth	Listed
SL-EVC-022	Hotel Glode	Eveleth	Listed
SL-EVC-023	John T. Bernard House	Eveleth	Not assessed
SL-EVC-024	Slovenian Meeting Hall	Eveleth	Not eligible
SL-EVC-025	Uranian Hall	Eveleth	Not eligible
SL-EVC-026	Eveleth Hippodrome	Eveleth	Not assessed
SL-EVC-027	Bridge No. L8537	Eveleth	Not eligible
SL-FAY-003	Bridge No. 5697	Fayal Twp.	Not assessed
SL-MIC-010	Bridge No. 7759	Mountain Iron	Not eligible

While none of the remaining 24 recorded historic structures are within the Project area, three are considered eligible to the NRHP and represent the Eveleth City Hall, Public Library, and the Italian American Social Club. Another two buildings and two bridges have been

determined not eligible for the NRHP. The remaining 17 structures have not been assessed for their eligibility for listing on the NRHP.

While none of these recorded properties are located within the Project area, the closest building is the Eveleth Hippodrome (SL-EVC-26). Located within 600 feet of the area of potential effect, it is unlikely that its historic character or its landscape and surroundings will be affected by construction of the transmission line, especially since the view shed is partially obstructed by a separate building and the Project area has been heavily modified by mining operations.

The potential to impact any undiscovered archaeological site is low to very low because the Project is proposed to be located along existing transportation corridors, in areas already disturbed by mining operations, or in wetlands and drained agricultural fields. Also there are no lakes, or perennial rivers or streams in the proposed Project location, all high potential locations for discovery of prehistoric archaeological sites. Similarly, the potential for unknown historic architectural resources to be affected by the proposed construction of the transmission line is low to very low because the historic landscape and surroundings have been compromised due to the dynamic changes to the mine pit and its supporting infrastructure.

A Phase Ia cultural resources assessment and recommendations report, which presented the findings summarized here, was submitted to Minnesota SHPO on October 10, 2012. A letter was received from the Minnesota SHPO on October 16, 2012, concluding there are no properties listed in the National or State Registers of Historic Places, and no known or suspected archaeological properties in the area will be affected by the Project. See Appendix C for the agency correspondence.

If there is an unanticipated discovery of cultural resources during Project construction, Minnesota Power will stop construction activities in the area of the discovery and consult with a professional archaeologist and Minnesota SHPO to determine the proper course of action. If a cultural item or feature is determined to be potentially eligible for listing on the NRHP, it will be avoided or mitigated before construction resumes.

6.5 Natural Environment

6.5.1 Air Quality

Potential air quality effects related to transmission facilities include fugitive dust emissions during construction, exhaust emissions from construction equipment, and ozone generation during transmission line operation (Jackson et al., 1994). All of these potential effects are considered to be relatively minor, and all but the ozone effects are short-term.

State and federal governments currently regulate permissible concentrations of ozone and nitrogen oxides. Ozone forms in the atmosphere when nitrogen oxides and volatile organic compounds react in the presence of heat and sunlight. Air pollution from cars, trucks, power plants, and solvents contribute to the concentration of ground-level ozone through these reactions. Currently, both state and federal governments regulate permissible concentrations of ozone and nitrogen oxides. The national standard is 0.075 parts per million (ppm) during an 8-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest 8-hour daily maximum average in 1 year.

The only potential air emissions from a transmission line result from corona, and such emissions are limited. Corona consists of the breakdown or ionization of air within a few

centimeters immediately surrounding conductors and can produce ozone and oxides of nitrogen in the air surrounding the conductor. This process is limited because the conductor electrical gradient of a 115 kV transmission line is usually less than that necessary for the air to break down. 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 reactive form of oxygen and combines readily with other elements and compounds in the atmosphere. Because of its reactivity, it is relatively short-lived. There are currently no non-attainment areas listed for St. Louis County (U.S. Environmental Protection Agency, 2012).

During construction of the proposed HVTL, minor emissions from vehicles and other construction equipment and fugitive dust from right-of-way clearing will occur, but will be limited. Air-quality impacts during the construction phase will also be temporary.

The magnitude of construction emissions is heavily influenced by weather conditions and the specific construction activity. Exhaust emissions, primarily from diesel equipment, will vary according to the phase of construction, but will be minimal and temporary. Adverse impacts on the surrounding environment will be minimal because of the short and intermittent nature of the emission and dust-producing construction phases.

Minnesota Power will use BMPs such as wetting surfaces to minimize the amount of fugitive dust created by the construction process. The Project is not anticipated to result in adverse or significant effects on air quality.

6.5.2 Water Quality and Wetlands

6.5.2.1 Waterbodies

The Project area is located within the Great Lakes Basin and the St. Louis River and Vermillion River watersheds (Minnesota DNR, 2012a). A watershed is defined as the entire physical area or basin drained by a distinct stream or riverine system, physically separated from other watersheds by ridgetop boundaries (Minnesota DNR, 2012b).

In 1985, the State of Minnesota adopted the Comprehensive Local Water Management Act under State Statutes 103B.301 – 103B.335. The act encourages counties outside of the metropolitan area to develop and implement comprehensive water management plans. As a result, St. Louis County and the St. Louis Soil and Water Conservation Districts developed a Comprehensive Water Management Plan (draft) to provide strategies to address the water related issues in county. The purpose of water planning is to protect water resources through the adoption and implementation of local water management plans that are based on local priorities. Aspects of the plan include considerations for construction stormwater management, avoidance or minimizing impacts on wetlands, and invasive species management (St. Louis County, Minnesota and St. Louis Soil and Water Conservation Districts, 2010).

While the Project is located outside of a designated floodplain, the Minnesota DNR has the overall responsibility for implementation of the State Flood Plain Management Act. The

Minnesota DNR has established minimum standards for floodplain management entitled "Statewide Standards and Criteria for Management of Flood Plain Areas of Minnesota" (Minn. R. 6120.5000 to 6120.6200). These standards have two direct applications: 1) all local floodplain regulations adopted after June 30, 1970 must be compliant with these standards; and 2) all state agencies and local units of government must comply with Minnesota Regulations in the construction of structures, roads, bridges or other facilities located within floodplain areas delineated by local ordinance. Local floodplain regulatory programs, administered by county government, predominately for the unincorporated areas of a county, and by municipal government for the incorporated areas of a county, must be compliant with federal and state floodplain management standards. Both federal and state standards identify the 100-year floodplain as the minimum area necessary for regulation at the local level. These regulations are intended to protect new development and modifications to existing development from flood damages when locating in a flood prone area cannot be avoided (Minnesota DNR, 2011d). Although the Project is not anticipated to result in an adverse impact on flood levels, Minnesota Power will work with the Minnesota DNR and/or St. Louis County to address question or concerns regarding floodplains, if requested.

There are two waterbodies within the proposed 500-foot-wide route corridor, a drainage ditch and Elbow Creek (Canal Ditch) (see **Figure B-17**). The drainage ditch, which is a perennial waterbody, is also classified as Public Waters Inventory (PWI) waterbody. The Minnesota DNR PWI identifies lakes, wetlands, and watercourses over which the Minnesota DNR has regulatory jurisdiction. Minnesota law (Minnesota Statutes Section 84.415 administered through Minnesota Rules Chapter 6135) requires that a license be obtained from the Minnesota DNR Division of Lands & Minerals for the passage of any utility over, under, or across any state land or public waters. Minnesota Power will work with the Minnesota DNR to obtain the necessary licenses if the proposed HVTL crosses PWI waters.

Minnesota Power will use erosion control measures identified in the MPCA Storm Water Best Management Practices Manual, such as using silt fence, during construction and operations to minimize impacts on adjacent water resources and prevent material discharge to surface waters. Because of the danger it can cause to bird or reptile species, Minnesota Power will not use plastic mesh erosion control materials. Minnesota Power will consider the use of biodegradable materials, smaller-sized mesh erosion controls, and/or limit their use where bird or reptile species are known to habitat (e.g., near wetlands, waterbodies). Disturbed surface soils will be stabilized at the completion of construction to minimize the potential for subsequent effects on surface water quality. With implementation of BMPs, the Project is not anticipated to result in adverse or significant effects on waterbodies in the area.

6.5.2.2 Wetlands

Wetland areas were initially identified using National Wetlands Inventory (NWI) data to assess wetlands that may be present within the Project area. Subsequently, Minnesota Power sponsored wetland surveys of the Project area, which were conducted in early September 2012. Based on the wetland surveys, the proposed HVTL route will cross a total of 0.7 mile of wetland (see **Figure B-17**). Most of the Project area is dominated by Palustrine Scrub Shrub (PSS), Palustrine Emergent (PEM), and Palustrine Forested (PFO) classified wetlands.

The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses, or lichens (U.S. Fish and Wildlife Service (FWS), 1979). PSS wetlands are most commonly dominated by woody vegetation less than 20 feet tall such as true shrubs, young trees, and trees or shrubs that are small or stunted because of

environmental conditions (FWS, 1979). PFO wetlands are characterized by woody vegetation that is approximately 19 feet tall or taller and normally possess an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer (FWS, 1979). Table 12 summarizes the wetlands located within a 100-foot-wide easement and 500-foot-wide corridor associated with the proposed route corridor.

Table 12 – Wetlands Within the Proposed Route Corridor

Wetland Type [a]	500-ft-wide Route Width [b]	100-ft-wide Easement Width [b]
PSS	30.0	5.7
PFO	5.7	1.1
PEM	7.7	1.8
PUB	1.6	0.0
Total	**45.0**	**8.6**

[a] Based on the FWS' Cowardin Classification System for wetlands. Wetland types include: PSS – Palustrine Shrub-Scrub, PFO - Palustrine Forested, PEM – Palustrine Emergent, and PUB – Palustrine Unconsolidated Bottom.
[b] Wetland acreages based on wetland surveys conducted in the summer of 2012.

The wetlands crossed by the Proposed Route are subject to jurisdiction of the COE under Section 404 of the Clean Water Act and current guidance regarding the jurisdictional status of isolated wetlands. Once the route is finalized and permitting requirements determined, Minnesota Power will submit the Minnesota Local/State/Federal Application Form (the "Joint Application Form") for Water/Wetland Projects to the COE's Two Harbors District, Minnesota DNR, and St. Louis County. Application materials will include information necessary for the COE to make its jurisdictional determination for impacted wetlands. Minnesota Power anticipates the Project will be authorized under the COE's RGP-003-MN or LOP-05-MN permitting program.

According to the Clean Water Act, Section 401 water quality certification is required for activities that may result in a discharge to waters of the United States. On non-tribal lands in Minnesota, the MPCA administers Section 401 water quality certification. If the COE authorizes the Project under its GP/LOP permitting program as expected, the MPCA waives its Section 401 Water Quality Certification authority.

As previously stated, the proposed spans of the HVTL structures will be between 300 and 900 feet and, therefore, Minnesota Power will span wetlands to the extent possible, and will avoid crossing wetlands with construction equipment. Where wetlands must be crossed, Minnesota Power will use stabilization mats to traverse wetlands if soil conditions are saturated and susceptible to rutting. Further, Minnesota Power will use standard erosion control measures identified in the MPCA Stormwater Best Management Practice Manual, such as using silt fence, to minimize impacts on adjacent water resources construction practices within or near wetland to prevent soil erosion and sedimentation, and will ensure equipment fueling and lubricating will occur a sufficient distance away from wetlands. Additional construction practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil. Minnesota Power will work with regulatory agencies to establish any additional mitigative measures, if necessary. As previously stated, Minnesota Power will also obtain necessary permits and approvals prior to commencing construction.

6.5.3 Flora

The Project is located within the Laurentian Mixed Forest Province, which, in Minnesota, is characterized by broad areas of conifer forest, mixed hardwood and conifer forests, and conifer bogs and swamps (Minnesota DNR, 2012c).

St. Louis County is comprised primarily (over 50 percent) of forest land; the remaining land uses include approximately 23 percent bog/marsh/fen, 9 percent surface water, 0.7 percent urban/industrial, and less than 0.1 percent cultivated (Comprehensive Water Management Plan). Based on U.S. Geological Survey Land Use, Land Class data (2012) specific to the Project, the proposed corridor will cross primarily deciduous forest, barren, and shrub/scrub and woody wetland land. Common tree and plant species in central St. Louis County include, but is not limited to, various species of firs, pines, maples, birch, willow, basswood, ash, juneberry, sedge, honeysuckle, pondweed, goldenrod, aster, and rush (Minnesota DNR, 2012d).

Minnesota Power will consult with the appropriate agencies to confirm that no known areas within the Project location are currently within the Conservation Reserve Program (CRP). The CRP program provides an opportunity to convert highly erodible cropland or environmentally sensitive area to permanent vegetative cover, such as grasses or trees. For a discussion on agriculture impacts, see Section 6.3.1.

6.5.4 Fauna

The forest and open areas and wetlands in the Project area provide habitat for a variety of wildlife. The largest mammals typically found in the area are the black bear, wolves, moose, and white-tailed deer. Other animal species include coyotes, fox, raccoons, beaver, opossum, woodchucks, squirrels, muskrats, nesting boreal and great gray owls, spruce grouse, and many warblers of coniferous habitats like the black-throated blue, Tennessee, and bay-breasted. Other nongame species include the gray jay, boreal chickadee, osprey, red-shouldered hawk, bald eagle, common loon, Blanding's turtle, and wood turtle (Minnesota DNR, 2012e).

Because much of the Project is located within and adjacent to a developed and commercial/industrial area, the fauna generally present within the area are adapted to high levels of anthropogenic disturbance. Therefore, it is unlikely that the construction, operation, and maintenance of the Project would have a permanent effect on fauna present in the area. Wildlife that inhabits trees that may be removed for the HVTL will likely be temporarily displaced. Comparable habitat is near the route, and it is likely that these organisms would only be displaced a short distance. The majority of construction will be limited to upland areas and, therefore, it is anticipated that impacts on fish and mollusks that inhabit the local waterbodies will be limited to the removal phase of construction where there would be short term disturbance.

The HVTL may affect raptors, waterfowl, and other bird species. Birds have the potential to collide with all elevated structures, including power lines. Avian collisions with transmission lines can occur in proximity to agricultural fields that serve as feeding areas, wetlands and water features, and along riparian corridors that may be used during migration.

The electrocution of large birds, such as raptors, is more commonly associated with small distribution lines than large transmission lines. Electrocution occurs when birds with large wingspans come in contact with two conductors or a conductor and a grounding device. Minnesota Power transmission line design standards provide adequate spacing to eliminate

the risk of raptor electrocution and will minimize potential avian impacts of the proposed Project.

Based on a review of the Minnesota Power-sponsored wetland surveys (see section 6.5.2.2), Minnesota Power does not believe that the Project area contains open waters sizeable enough to attract the presence of water birds. The open water wetlands that are present around the project area are industrial in nature and do not provide habitat required by waterfowl. Further, the Project area (3 miles long) is relatively small in comparison to the surrounding area available for avian migration. Therefore, Minnesota Power is not proposing to install swan diverters along the transmission line.

It is anticipated that most wildlife displacement and habitat impacts will be temporary and that no significant or adverse impacts on wildlife will occur as a result of the Project.

6.6 Rare and Unique Natural Resources

6.6.1 U.S. Fish and Wildlife Service

The FWS website was reviewed for a list of species covered under the Endangered Species Act (ESA) that may be present within St. Louis County (FWS, 2012a). According to the website, the following two federally listed species are known to occur within the county: piping plover (*Charadrius melodus*) and Canada lynx (*Lynx canadensis*).

The Great Lakes population of piping plover is federally listed as endangered and Critical Habitat is designated in St. Louis County. Great Lakes piping plovers use open, sandy beaches, barrier islands, and sand spits formed along the Great Lakes' perimeters (FWS, 2012b). They do not inhabit lakeshore areas where high bluffs formed by severe erosion have replaced beach habitat. They prefer sparsely vegetated open sand, gravel, or cobble for nesting sites and forage along the rack line where invertebrates are most readily available (FWS, 2012c). The Project is not located within designated Critical Habitat nor does appropriate habitat occur within the Project area; therefore, Minnesota Power has determined that the Project will have no effect on the piping plover or its habitat.

The Canada lynx is federally listed as threatened and Critical Habitat is designated in St. Louis County. Lynx live in dense forests with boreal features across northern Minnesota in areas that receive deep snow and have high-density populations of snowshoe hares, the principal prey of lynx (FWS, 2012d). Although the Project is not located within designated Critical Habitat, the general Project area could be populated with Canada lynx at the time of construction based on distribution in the state; however, project impacts would be minor and temporary. Noise and/or physical disturbance would prompt the lynx to temporarily vacate the area for a short period of time and the lynx could return to the area shortly after cessation of activities. Lynx movement may be temporarily impeded and individuals may be displaced, but the impacts on the Canada lynx population would likely be minimal if not negligible. Therefore, Minnesota Power determined that project activities are not likely to adversely affect this species or its habitat.

Minnesota Power submitted a letter to the FWS on October 5, 2012 describing the above determinations. To date no response letter has been received.

6.6.2 Minnesota Department of Natural Resources

The Minnesota DNR NHIS database was queried to obtain the locations of rare and unique natural resources within the Project area. The results of this search are shown on **Figure**

B-18. Queries of the NHIS database often display species that either do not have a status or are of special concern. Species or communities that do not have a status, or are classified as special concern, have no legal protection in Minnesota. Only potential impacts on species with legal protection (threatened and endangered) will be discussed in this application.

The review of the NHIS database did not identify any state-listed species within the Project area or within a 1-mile buffer around the Project area. Minnesota Power submitted a letter the Minnesota DNR on October 5, 2012 describing its NHIS database search and to request any additional information or concerns. The Minnesota DNR responded via email on November 5, 2012 concurring with Minnesota Power's assessment that there are no known occurrences of rare features within one-mile of the Project area (see Appendix C.2).

7.0 Agency Involvement, Public Participation, and Required Permits and Approvals

7.1 Project Notices to Agencies, LGUs, and Interested Parties

On September 13, 2012, Minnesota Power submitted pre-filing notice letters describing the Project to pertinent federal and state agencies, and local government units, including the Cities of Eveleth, Leonidas, and Mountain Iron, and St. Louis County (see Appendix C). Two comment letters were received in response to the notices; one from the U.S. Army Corps of Engineers (COE), and one from Minnesota DOT (see Appendix C). Minnesota Power will continue to work with these and other agencies as necessary.

In addition, Minnesota Power hosted a public meeting on October 11, 2012 in the City of Leonidas, Minnesota. There were three attendees at the meeting; two represented the City of Leonidas and one represented the City of Eveleth. Minnesota Power received a comment expressing concern over the potential visual impact the structures could have from the City of Leonidas Scenic Overlook. Other comments received included potential vertical clearance issues near the City of Eveleth Public Works Facility as well as to note that there are buried water main and sewer lines along County Road 101 near this facility that will need to be located prior to construction. Minnesota Power work closely with both cities to help resolve these issues.

7.2 U.S. Fish and Wildlife Service

Minnesota Power submitted a review request letter to the FWS on October 5, 2012 and requested review and concurrence with its review and determinations on the two federally listed species known to occur within the county: piping plover (*Charadrius melodus*) and Canada lynx (*Lynx canadensis*) (see Section 6.6.1). To date a response has not been received.

7.3 Minnesota Department of Natural Resources

Minnesota Power submitted a review request letter to the Minnesota DNR. The letter was sent on October 5, 2012 and requested review and concurrence with its review and determination for rare plants, animals, and natural communities or other significant natural features known to occur within the Project area (see Section 6.6.2). The Minnesota DNR responded via email on November 5, 2012 concurring with Minnesota Power's assessment that there are no known occurrences of rare features within one-mile of the Project area (see Appendix C).

7.4 Minnesota State Historic Preservation Office

A Phase Ia cultural resources assessment and recommendations report, which presented the findings summarized in Section 6.4, was submitted to Minnesota SHPO on October 10, 2012. A letter was received from the Minnesota SHPO on October 16, 2012, concluding there are no properties listed in the National or State Registers of Historic Places, and no known or suspected archaeological properties in the area will be affected by the Project. See Appendix C for the agency correspondence.

7.5 Identification of Landowners

There are 19 adjacent and affected property owners to the Proposed Route as listed in Appendix D. Minnesota Power sent a project notification letter to these landowners on September 13, 2012 and is currently coordinating with all landowners.

7.6 Required Permits and Approvals

The following Table 13 identifies federal, state, and local permits and approvals that could potentially be required for the Project.

Table 13 - Potential Required Permits

Jurisdiction and Permit	Requirement
Federal	
COE, Clean Water Act, Section 404 Permit	Required if dredging and filling activities will occur within jurisdictional wetlands. If the proposed activities are not eligible for coverage under the General Permit or Letter of Permission, an Individual Permit will be obtained from the COE.
State	
MPUC, Route Permit	Required for any high voltage transmission line.
Minnesota DNR, License to Cross Public Waters	Required if any work is necessary in public waters.
Minnesota DOT, Utility Permit	Required if placing utilities on or across a Minnesota trunk highway right-of-way.
MPCA, NPDES/SDS General Stormwater Permit for Construction Activity	Required under the NPDES/SDS General Stormwater Permit for Construction Activity where construction activities will cause more than one acre of ground disturbance.
MPCA, Section 401 Water Quality Certification	If the COE authorizes the Project under its GP/LOP permitting program as expected, the MPCA waives its Section 401 Water Quality Certification authority.
Local	
Moving Permit (Hauling)	Required whenever legal dimensions and/or axle weights are exceeded per county regulations.
Oversize/Overweight Vehicle Permit	Required on all county highways. May be required to move over-width loads on county, township, or city roads.
Railroad Crossing Permit	Required if crossing a railroad.

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9.0 Definitions

Following are a list of definitions for technical terms used in this Application:

Avian	Of or relating to birds.
Breaker	Device for opening a circuit.
Bus	An electrical conductor that serves as a common connection for two or more electrical circuits; may be in the form of rigid bars or stranded conductors or cables.
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.
Double circuit	The construction of two separate circuits at the same or different voltage on the same structures to increase capacity of the line.
Electric Field ("EF")	The field of force that is produced as a result of a voltage charge on a conductor or antenna.
Electromagnetic	The term describing the relationship between electricity and magnetism; a quality that combines both magnetic and electric properties.
Electromagnetic Field ("EMF")	The combination of an electric (E) field and a magnetic (H) field, 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. The intensity of the magnetic field is related to the current flow through the conductors.
Electromotive Force	The force (voltage) that produces an electric current in a circuit.
Excavation	A cavity formed by cutting, digging, or scooping.
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.
Grading	To level off to a smooth horizontal or sloping surface.
Grounding	To connect electrically with a ground; to connect some point of an electrical circuit or some item of electrical equipment to earth or to the conducting medium used in lieu thereof.

Habitat	The place or environment where a plant or animal naturally or normally lives and grows.
High Voltage Transmission Lines ("HVTL")	Overhead and underground conducting lines of either copper or aluminum used to transmit electric power over relatively long distances, usually from a central generating station to main substations. They are also used for electric power transmission from one central station to another for load sharing. In Minnesota, a HVTL is a conductor of electric energy and associated facilities designed for and capable of operating at a nominal voltage of 100 kilovolts or more either immediately or without significant modification (associated facilities include, but not be limited to, insulators, towers, substations, and terminals). See Minn. R. 7850.1000, Subp. 9.
Ionization	Removal of an electron from an atom or molecule. The process of producing ions. The electrically charged particles produced by high-energy radiation, such as light or ultraviolet rays, or by the collision of particles during thermal agitation.
Magnetic Field ("MF")	The region in which the magnetic forces created by a permanent magnet or by a current-carrying conductor or coil can be detected. The field that is produced when current flows through a conductor or antenna.
Mitigate	To lessen the severity of or alleviate the effects of.
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.
Sediment	Material deposited by water, wind, or glaciers.
Stray Voltage	A condition that can occur on the electric service entrances to structures from distribution lines, not transmission lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings such as barns. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences. Transmission lines, however, can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line.

Substation	A substation is a high voltage electric system facility. It is used to switch generators, equipment, and circuits or lines in and out of a system. It also is used to change AC voltages from one level to another. Some substations are small with little more than a transformer and associated switches. Others are very large with several transformers and dozens of switches and other equipment.
Ultraviolet Radiation	A portion of the electromagnetic spectrum with wavelengths shorter than visible light.
Voltage	Electric potential or potential difference expressed in volts. A unit of electrical pressure, electric potential or potential difference expressed in volts. The term used to signify electrical pressure. Voltage is a force that causes current to flow through an electrical conductor. The voltage of a circuit is the greatest effective difference of potential between any two conductors of the circuit.
Voltage Drop	The difference in voltage between two points; it is the result of the loss of electrical pressure as a current flows through a resistance.
Waterfowl	A bird that frequents water; especially a swimming game bird (as a duck or goose) as distinguished from an upland game bird or shorebird.
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.

10.0 Acronyms

AADT	Annual Average Daily Traffic
ACSR	Aluminum Core Steel Reinforces
BMPs	Best Management Practices
COE	U.S. Army Corps of Engineers
Company	Minnesota Power
dBA	Decibels
DNR	Department of Natural Resources
DOT	Department of Transportation
EF	electric fields
ELF	extremely low frequency
EMF	electromagnetic fields
FWS	U.S. Fish and Wildlife Service
HVTL	high voltage transmission line
kV	Kilovolt
kV/m	kilovolts per meter
LGU	local government units
LOP	Letter of Permission
MF	magnetic field
mG	milliGauss
MPCA	Minnesota Pollution Control Agency
MPUC or Commission	Minnesota Public Utilities Commission
NAC	Noise Area Classification
NESC	National Electric Safety Code
NHIS	Nature Heritage Information System
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
PEM	Palustrine Emergent wetland
PFO	Palustrine Forested wetland
ppm	parts per million
PPSA	Power Plant Siting Act
Project	39 Line Project

PSS	Palustrine Shrub-Scrub wetland
PWI	public waters inventory
SHPO	State Historic Preservation Office
SWCD	Soil and Water Conservation District
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WCA	Minnesota Wetland Conservation Act