9. CONSTRUCTION PRACTICES AND OPERATION AND MAINTENANCE OF THE HVTL AND ASSOCIATED SUBSTATIONS

9.1 Construction Practices

9.1.1 Transmission Line

The proposed 115 kV transmission line would be constructed at existing grade elevations. Therefore, no pole locations would require grading, unless it is necessary to provide a level area for construction access and activities.

GRE designs and constructs transmission lines using the most cost-effective methods based on past experiences and practices and in compliance with the latest industry standards. As a RUS borrower, GRE adheres to RUS standards regarding clearances to ground, clearance to crossing utilities, clearance to buildings, right of way widths, erecting power poles, and stringing of transmission line conductors. RUS requires borrowers to submit an environmental report prior to any construction activities.

GRE typically utilizes outside contractors for construction activities on large transmission line projects. The specifications used are developed by GRE's Engineering and Project Management Department, which utilize the RUS Contract documents and standards. A copy of GRE's easement restriction list and any required local permits are given to the awarded contractor prior to construction.

Typical tangent structures will be wood, laminated wood, or steel direct-embedded poles. The structures will require a hole dug 10 to 15 feet deep with 3 to 4 feet diameter for each pole. Any excess soil will be removed from the site unless requested by landowners or others. The poles may be backfilled with native soils, crushed rock or concrete depending on design conditions. In lowland areas, a galvanized steel culvert may be also inserted for pole stability due to poor soil capacity. Angle structures will typically be guyed. In some instances, an angle structure may consist of a self-supporting steel pole that will require a drilled pier foundation. The pier will typically have a diameter of 4 to 8 feet. The hole may require a typical depth of 15 to 30 feet deep depending on design requirements. The pier will be filled with concrete delivered to the site via concrete trucks from a local batch plant.

Poles may be delivered to the staked location or to a designated marshalling yard depending on delivery and contractor availability. If the poles are delivered to a staked site, they are placed on the right of way out of the clear zone of any adjacent highways or designed pathways. The poles are typically framed with insulators and hardware on the ground and then lifted and placed in the hole via a bucket truck or a crane, depending on the weight of the structure.

Once the structures have been erected, conductors are installed by establishing stringing setup areas within the right of way. These stringing setup areas are typically located every two miles along the project route. The conductors are pulled with a rope lead that connects to every structure through a dolly attached at the insulator location. Temporary guard or clearance poles are installed at crossings to provide adequate clearance over other utilities, streets, roads, highways, railroads, or other obstructions after any necessary notifications are made or permit requirements met to mitigate any concerns with traffic flow or operations of other utilities.

In lowland areas, construction activities may occur during the winter season to mitigate any damage to wetland areas or to comply with required crossing permits. A pre-construction conference will outline any special requirements for the contractor prior to the start of any construction activities.

During construction when temporary removal or relocation of fences may occur, installation of temporary or permanent gates may be required. GRE right of way agents will coordinate with the landowners on replacement of fences and gates. As part of GRE's easement restriction list, the contractor will work around cultivated areas until harvest has occurred.

9.1.2 Substations

The proposed project will affect two existing substations (Mud Lake and Wilson Lake). The MP Mud Lake Substation presently transforms the voltage from 230 kV down to 115 kV on the transmission side. The MLEC Wilson Lake Substation transforms the voltage from 69 kV on the transmission side down to 12.5 kV on the distribution side.

No upgrades are planned on the distribution portion of the MLEC Wilson Lake Substation. There will be modifications to the existing distribution substation to accommodate the addition of the 115/69 kV Wilson Lake transmission substation.

Mud Lake Substation

Construction at the Mud Lake Substation will include modifications to the 115 kV bus. This bus work, along with the installation of a new 115 kV breaker, is needed to accommodate the new 115 kV transmission coming from the Wilson Lake Substation. All construction will be completed in accordance with GRE construction standards as well as the NESC. These standards include clearances to ground, clearance to crossing utilities, clearance to buildings, right of way widths, erecting power poles, and stringing of transmission line conductors.

There is sufficient space at the Mud Lake Substation to accommodate the transmission upgrade and no new land will be required. No expansion of the existing fenced areas is anticipated. New fencing, if necessary, would match the existing fence and the existing grade would be maintained.

MP will be responsible for all design, engineering and construction activities.

Wilson Lake Substation

Construction of the new 115/69 kV substation at the Wilson Lake site will begin once permits are received and the final design is complete. A detailed construction schedule will be developed based upon availability of crews, outage restrictions for any transmission lines that may be affected, weather conditions, spring load restrictions on roads, and any restrictions placed on certain areas for minimizing impacts from construction.

Approximately one to two acres of land will be graded to construct the substation. The concrete foundation will be poured to support the substation equipment and control house. Once the site is graded, a perimeter fence will be installed to secure the site and substation erection will commence.

GRE will utilize erosion control methods to minimize runoff during substation construction. GRE construction crews or a GRE contractor will comply with local, state, NESC and GRE standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, right of way widths, erection of power poles, and stringing of transmission line conductors.

Upon completion of construction activities, GRE will restore the site. Post-construction reclamation activities include the removing and disposing of debris, dismantling all temporary facilities (including staging areas), employing appropriate erosion control measures, and reseeding areas disturbed by construction activities with vegetation similar to that which was removed. Where appropriate, GRE will incorporate methods to screen the final site.

GRE will perform periodic inspections, maintain equipment, and make repairs over the life of the substation. GRE will also conduct routine maintenance as required to remove undesired vegetation that may interfere with the safe and reliable operation of the substation.

9.2 Operation and Maintenance

GRE will periodically use its transmission line right of way to perform inspections, maintain equipment, and repair damage. Regular maintenance and inspections will be performed over the life of the facility to ensure a reliable system. Annual inspections will be done by foot, snowmobile, All-Terrain Vehicles, pickup truck, or by aerial means. These inspections will be limited to the acquired right of way

and areas where obstructions or terrain require access off the easement. An aerial inspection of each transmission line is conducted monthly to ensure reliable operation.

GRE's Transmission Construction & Maintenance Department will conduct vegetation surveys and remove undesired vegetation that will interfere with the operation of the transmission line. Frequency of vegetation maintenance is on a three to seven year cycle. Right of way clearing practices include a combination of mechanical and hand clearing, along with an application of herbicides where allowed.

9.3 Work Force Requirements

During construction, there will be minimal impacts to community services, hotels and restaurants to support the utility personnel and contractors. It is estimated that 15 to 20 workers will be employed during construction of the project.

It is not expected that additional permanent jobs would be created by this project. The construction activities would provide seasonal influx of additional revenue into the communities during the construction phase, and materials such as concrete may be purchased locally.

10. AGENCY INVOLVEMENT, PUBLIC PARTICIPATION, PERMITS/APPROVALS REQUIRED

10.1 Agency Contacts/Public Participation

GRE contacted the following agencies for input on the proposed project:

Minnesota Department of Transportation – Office of Aeronautics

Minnesota Department of Transportation – Transportation Department (Highway Issues)

Minnesota Historical Society

US Army Corps of Engineers

Minnesota Department of Natural Resources

United States Fish and Wildlife Service

USDA Natural Resources Conservation Service

Crow Wing County (phone conversations and e-mails)

Correspondence to and from these agencies is provided in Appendix A.

GRE attended township board meetings in the project area to describe the proposed project to township board members. All of the township boards understand the need for additional electrical capacity in the Wilson Lake area. GRE also held a public information meeting on June 7, 2006 to solicit public input on the project. Approximately 30 people attended that meeting.

Although the Mille Lacs Band of Ojibwe tribal lands are located several miles south of the proposed project, the tribe was noticed regarding the project and the public meeting held on June 7, 2006.

10.2 Identification of Landowners

The names of each owner whose property is within the proposed route (Minn. Rules pt. 4400.1150, subp. 2G) are provided in Appendix B.

10.3 Required Permits and Approvals

10.3.1 Local

- **City and County Road Crossing Permits** are required to cross or occupy city and county road right of way.

- **City or County Lands Permits** may be required to occupy city or county lands such as parklands, watershed districts, and other city/county-owned property.

10.3.2 State

- **A Certificate of Need** and a **Route Permit** from the Commission is required to construct a high voltage transmission line.
- **A License to Cross** protected waters and wetlands must be obtained from the DNR.
- **Road Crossing Permits** from the DOT are required to cross or occupy state trunk highway road right of way.
- **State Lands Permits** may be required to occupy state-owned property.
- **An NPDES (for stormwater discharges) permit** from the MPCA will be required for the Wilson Lake Substation rebuild/expansion.

10.3.3 Federal

- **RUS Approval** – Because GRE has requested financial assistance from the RUS, it must demonstrate environmental compliance and obtain environmental approval prior to construction of a transmission line.

11. SUMMARY OF FACTORS TO BE CONSIDERED IN EVALUATING THIS APPLICATION

GRE has applied for a Route Permit for a 115 kV HVTL that is needed to meet the energy needs of GRE cooperatives customers located in the Wilson Lake area. The HVTL's two endpoints will be the MP Mud Lake Substation on the west and the MLEC Wilson Lake Substation on the east.

The role of the Commission is to determine the best route to follow to accomplish those requirements, and to determine what mitigation efforts GRE should employ to reduce any environmental or human settlement consequences. Minn. Rules pt. 4400.3150 lists 14 factors to consider in determining whether to issue a permit for the proposed route. Those factors are discussed briefly below.

A. Effects on human settlement, including but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services.

Effects of the proposed project on human settlement are discussed in Section 6.2 of this Application. The proposed route and associated substation modifications result in no displacement of existing residences. The noise from the HVTL and substations will be minimal (Section 6.2.3). The proposed line parallels an existing 230 kV transmission line for approximately 1.5 miles to the intersection of STH 18, then runs east along STH 18 for approximately 10.5 miles to the MLEC Wilson Lake Substation. Most of the existing MLEC and CWP overhead distribution lines along STH 18 will be removed, upgraded, and attached to the new transmission line. The centerline will be just outside road right of way. The proposed HVTL and associated substation will have no impact on cultural values, recreation, or public services.

B. Effects on public health and safety.

The proposed project will be constructed to comply with RUS standards as well as the NESC. Questions often arise about electric and magnetic fields (EMF), which are invisible lines of force that surround any electrical device. The term EMF refers to electric and magnetic fields that are coupled together such as in high frequency radiating fields. Electric and magnetic fields are discussed in Section 7.3 of this Application. The HVTL meets the standard developed by the EQB (and used by the Commission in routing assessments) imposing a maximum electric field limit of 8 kV per meter at one meter above ground. That standard was implemented to mitigate serious hazard from shocks when touching large objects parked under transmission lines with voltage of 500 kV or greater. The proposed 115 kV line will have a maximum magnitude of electric field density of approximately 1.1 kV per meter underneath the conductors one meter above ground level. Research on the biological effects from electric fields on animals and humans has shown no significant association with disease in humans.

Magnetic fields result from the flow of electricity (current) in the transmission line. Recent studies of the health effects from power frequency fields conclude that the evidence of health risk related to magnetic fields is weak.

The values of the magnetic field for the GRE 115 kV transmission line are:

- In 2008, under normal maximum load conditions, the 115 kV transmission line would have a peak value of 17.6 mG directly underneath the transmission line and a value of approximately 7 mG at the edge of the right of way.

- In 2008, under contingency conditions, the 115 kV transmission line would have a peak value of 43.1 mG directly underneath the transmission line and a value of approximately 22 mG at the edge of the right of way.

C. Effects on land-based economies, including but not limited to, agricultural, forestry, tourism, and mining.

The proposed route for the HVTL does not significantly impact any prime agricultural, forestry or mining property, nor is the route located in an area where tourism would be affected (Section 6.3).

D. Effects on archaeological and historic resources.

A First Stage Cultural Resources Evaluation of the project area indicated that there are ten previously identified archaeological sites within two miles of the proposed transmission line route. However, these sites are not located within the proposed transmission route, and the line will be constructed parallel to a right of way that has already been disturbed by highway construction and distribution line construction (Section 6.4; Appendix A).

E. Effects on the natural environment, including effects on air and water quality resources and flora and fauna.

The HVTL and associated substation will not affect air or water quality (Sections 6.5 and 6.6; Appendix A). It will only affect flora within the easement area. There are limited fauna in this route, and they will not be affected by the HVTL or substation.

F. Effects on rare and unique natural resources.

The Minnesota Department of Natural Resources and the United States Fish and Wildlife Service determined that the proposed project will not affect any rare or unique natural resources (Section 6.5.4; Appendix A).

G. Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission capacity.

The proposed design is state-of-the-art for energy efficiency and minimizing environmental effects. There are no known, or likely plans to add additional transmission capacity along the proposed route. Therefore, the design is appropriate to this project and maximizes energy efficiency.

GRE will work with the affected landowners to use a design that mitigates the impact on the affected landowners and the right of way.

The Wilson Lake Substation will be laid out to accommodate additional equipment such as additional transmission line terminations, capacitor banks, transformers, and distribution related feeders should significant load growth occur in the area. Although no specific plans have been made, construction of the site to accommodate future growth will eliminate the need for a new substation site in the future.

H. Use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries.

The entire length of the proposed transmission line parallels existing transmission line right of way and roads. It parallels GRE's existing 230 kV transmission line for 1.5 miles, and parallels the STH 18 right of way and existing distribution lines for 10.5 miles.

I. Use of existing large electric power generating plant sites.

This criterion is not applicable.

J. Use of existing transportation, pipeline, and electrical transmission systems or rights-of-way.

See the comments under part H above.

K. Electrical system reliability.

MLEC, CWP and ECE serve the electric needs of the Lake Mille Lacs region. The existing 69 kV transmission system serving the area, built in phases mainly from 1957 to 1997, has reached its capacity limit based on 2005 summer loading (52 MW). The area's electric load has shown a growth on average more than four percent per year over the last six years with similar growth expected to continue. This growth would further reduce the existing system's reliability and could lead to potential brownouts, rotating blackouts, and safety concerns due to overloaded equipment. The purpose of the proposed project is to improve the capacity and reliability of the transmission grid in the Lake Mille Lacs region to meet new expected loads within the next several years.

Continuing economic growth has caused a considerable increase in electrical use in the region, especially on the northwest side of the lake. The proposed 115 kV line has superior reliability because it is located in the load center with breaker additions that limit potential faults. Long-term, it may add increased reliability to the regional transmission system by providing a potential source to other regions such as the Cromwell and Pierz areas when those areas require additional transmission facilities. Perhaps more important is that only a 115 kV transmission option can provide the level of voltage support required for reliable operation of the system at a reasonable cost. Historically, 115 kV transmission line is inherently more reliable than 69 kV line due to increased ground clearance and insulation levels.

L. Costs of constructing, operating, and maintaining the facility which are dependent on design and route.

The cost of constructing, operating, and maintaining the facility along the proposed route is no higher, and is likely to be lower than along alternative routes. The proposed route parallels existing rights of way to the extent technically and economically feasible. This reduces the cost of acquiring easements and right of way preparation.

M. Adverse human and natural environmental effects which cannot be avoided.

The only identified environmental effects that cannot be avoided are primarily short-term during the construction of the line and substation. If any archeological sites are identified during placement of the poles along the proposed route or construction of the substation, work will be stopped and the MHS will be consulted. Native vegetation will be maintained within the proposed route that is compatible with the operation and maintenance of the transmission line. If necessary, native species will be planted or seeded in areas that are devoid of native species. Soils will be revegetated as soon as possible to minimize erosion or some other method will be used during construction to prevent soil erosion. During construction temporary guard or clearance poles are installed at crossings to provide adequate clearance over other utilities, streets, roads, highways, railroads, or other obstructions after any necessary notifications are made or permit requirements met to mitigate any concerns with traffic flow or operations of other utilities.

N. Irreversible and irretrievable commitments of resources.

The proposed route does not require any irreversible or irretrievable commitment of resources. Should the line and/or substation be abandoned and removed at some time in the future, there is nothing related to their earlier placement that would prevent or require a different use of resources in the future.

12. REFERENCES

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