MINNESOTA POWER

and

GREAT RIVER ENERGY

APPLICATION TO THE
MINNESOTA PUBLIC UTILITIES COMMISSION
FOR A
ROUTE PERMIT

ALTERNATIVE PERMITTING PROCESS

BADOURA

115 kV TRANSMISSION PROJECT

Docket ET2, E015/TL-07-76

March 2007

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LIST OF ACRONYMS

ACRONYMS	
AC	Alternating current
ACSR	Aluminum conductor steel reinforced
ACSS	Aluminum conductor steel supported
AM	Amplitude-modulated
BMPs	Best Management Practices
BPA	Bonneville Power Administration
BWSR	Minnesota Board of Water and Soil Resources
Commission	Minnesota Public Utilities Commission
CR	County Road
CWP	Crow Wing Power
dB(A)	Decibel
DC	Direct current
EMF	Electromagnetic fields
EPA	Environmental Protection Agency
EQB	Minnesota Environmental Quality Board
FM	Frequency-modulated
GAP	Gap Analysis Program
GRE	Great River Energy
HVTL	High voltage transmission line
ICD	Implantable cardioverter/defibrillator
Itasca-Mantrap	Itasca-Mantrap Cooperative Electrical Association
kV	Kilovolt
kV/m	Kilovolts per meter
LCP	Lake Country Power
ma	Milliamperes
MDNR	Minnesota Department of Natural Resources
MISO	Midwest Independent Transmission System Operator
mG	Milligauss
MHz	Megahertz
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MP	Minnesota Power
MVA	Megavolt ampere
MW	Megawatt
NAC	Noise area classifications
NEMA	National Electrical Manufacturers Association
NESC	National Electric Safety Code
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service

ACRONYMS	
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
ppm	Parts per million
PWI	Public Waters Inventory
RF	Radio frequency
RUS	Rural Utilities Service
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Areas
TH	Trunk Highway
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WMA	Wildlife Management Area

Application for a Route Permit for an Overhead High Voltage Transmission Line and Associated Substation Modifications to Support Increased Load Growth in North Central Minnesota

Pursuant to Minn. Stat. § 216E.01 to 216E.18 and Minn. Rules 4400.0400 et seq., Minnesota Power (MP) and Great River Energy (GRE) hereby apply to the Minnesota Public Utilities Commission (Commission) for a Route Permit for an overhead high voltage transmission line (HVTL) and associated substation modifications in Crow Wing, Cass and Hubbard counties, Minnesota (the Project). The Project has been certified to meet the electrical needs of MP customers and GRE cooperative's customers located in north central Minnesota. The application is submitted under the Alternative Permitting Process (Minn. Stat. § 216E.04 and Minn. Rules 4400.2000).

The Application is divided into 12 sections as follows:

1. **EXECUTIVE SUMMARY** – provides background information on MP, GRE, and GRE cooperatives and a brief description of the Project.

2. **INTRODUCTION** – provides a discussion of the need for the Project; eligibility for the Alternative Permitting process; summary of the Certification process and the notice to the Commission.

3. **PROJECT INFORMATION** – describes the proposed ownership of the line and associated facilities (Minn. Rules 4400.1150, subp. 2A, B), the permittees for the Project, and a cost analysis of the proposed Project, including costs of construction, operation, and maintenance (Minn. Rules 4400.1150, subp. 2K).

4. **ALTERNATIVES CONSIDERED AND REJECTED** – identifies alternatives considered by the Applicants and the reasons they were rejected (Minn. Rules 4400.2100).

5. **DESCRIPTION OF THE PROPOSED PROJECT** – provides a detailed description of the proposed Project (Minn. Rules 4400.1150, subp. 2D) including line specifications and design, and describes possible design options to accommodate expansion of the Project in the future (Minn. Rules 4400.1150, subp. 2L).

6. **ENVIRONMENTAL INFORMATION** – provides a description of the environmental setting, effects on environmental and human resources, and mitigative measures (Minn. Rules 4400.1150, subp. 2E and 2F, and subp. 3), including the identification of land uses and environmental conditions along the Proposed Route.

7. **ENGINEERING AND OPERATIONAL DESIGN OF PROPOSED HVTL AND SUBSTATIONS** – describes engineering and operational design concepts for the proposed Project, including electric and magnetic fields, air quality, and radio/TV interference (Minn. Rules 4400.1150, subp. 2J).

8. **PROPERTY/RIGHT-OF-WAY ACQUISITION AND RESTORATION** – identifies existing rights-of-way along the Proposed Route (Minn. Rules 4400.1150, subp. 2I). Describes right-of-way requirements, property/right-of-way acquisition procedures (Minn. Rules 4400.1150, subp. 2M), tree clearing, and right-of-way restoration procedures.

9. **CONSTRUCTION PRACTICES AND OPERATION AND MAINTENANCE OF THE HVTL AND ASSOCIATED SUBSTATIONS** – provides a narrative description of the procedures and practices for construction, operation, and maintenance of the proposed line and substations (Minn. Rules 4400.1150, subp. 2M).

10. **AGENCY INVOLVEMENT, PUBLIC PARTICIPATION, AND PERMITS/ APPROVALS NEEDED** - discusses agency contacts and public participation opportunities, provides a reference to the list the landowners within the Proposed Route, and provides a list and brief description of federal, state, and local permits that may be required for the Project (Minn. Rules 4400.1150, subp. 2N).

11. **SUMMARY OF FACTORS TO BE CONSIDERED IN EVALUATING THIS APPLICATION** – summarizes the key elements of the Route Permit Application and compares them to the established factors to be considered in evaluating this Application (Minn. Rules 4400.3150).

12. **REFERENCES** – lists documents referenced in the text of the Application and data sources used to generate maps.

1. EXECUTIVE SUMMARY

1.1 General

MP is an investor-owned utility headquartered in Duluth, Minnesota. MP supplies retail electric service to 135,000 retail customers and wholesale electric service to 16 municipalities in a 26,000-square-mile electric service territory located in northeastern Minnesota (Figure 1-1). MP generates and delivers electric energy through a network of transmission and distribution lines and substations throughout northeastern Minnesota. MP's transmission network is interconnected with the regional transmission grid to promote reliability. MP is a member of the Midwest Independent Transmission System Operator (MISO).

GRE is a not-for-profit generation and transmission cooperative based in Elk River, Minnesota. GRE provides electrical energy and related services to 28 member distribution cooperatives (Figure 1-2), including Crow Wing Power (CWP), Itasca-Mantrap Cooperative Electrical Association (Itasca-Mantrap), and Lake Country Power (LCP). These distribution cooperatives serve a portion of the area to be supplied by the proposed high voltage transmission line (HVTL). The GRE distribution cooperatives, in turn, supply electricity and related services to more than 614,000 members/consumers in Minnesota and Wisconsin. GRE is also a member of MISO.

GRE’s 2,679-megawatt (MW) generation system includes a mix of baseload and peaking plants (including coal-fired, refuse-derived fuel, and oil plants) and wind generators. GRE owns approximately 4,550 miles of transmission line in Minnesota, North Dakota, South Dakota and Wisconsin.

MP’s and GRE’s mission is to provide safe, reliable, competitively-priced energy to those it serves. The electrical load in north central Minnesota has grown beyond the capability of the existing electrical system.

Specifically, the MP and GRE 115 kilovolt (kV)/34 kV electric transmission/substation system from Pequot Lakes to Pine River to Badoura to Birch Lake and Long Lake is fast approaching its electrical capability. Loss of a line or transformer that may occur could result in potential long-term outages. The Project described in this route permit application would provide needed 115 kV sources into the area that would allow both utilities to maintain the necessary voltage and reliability requirements on their respective distribution systems.

Figure 1-1 MP Service Territory Map

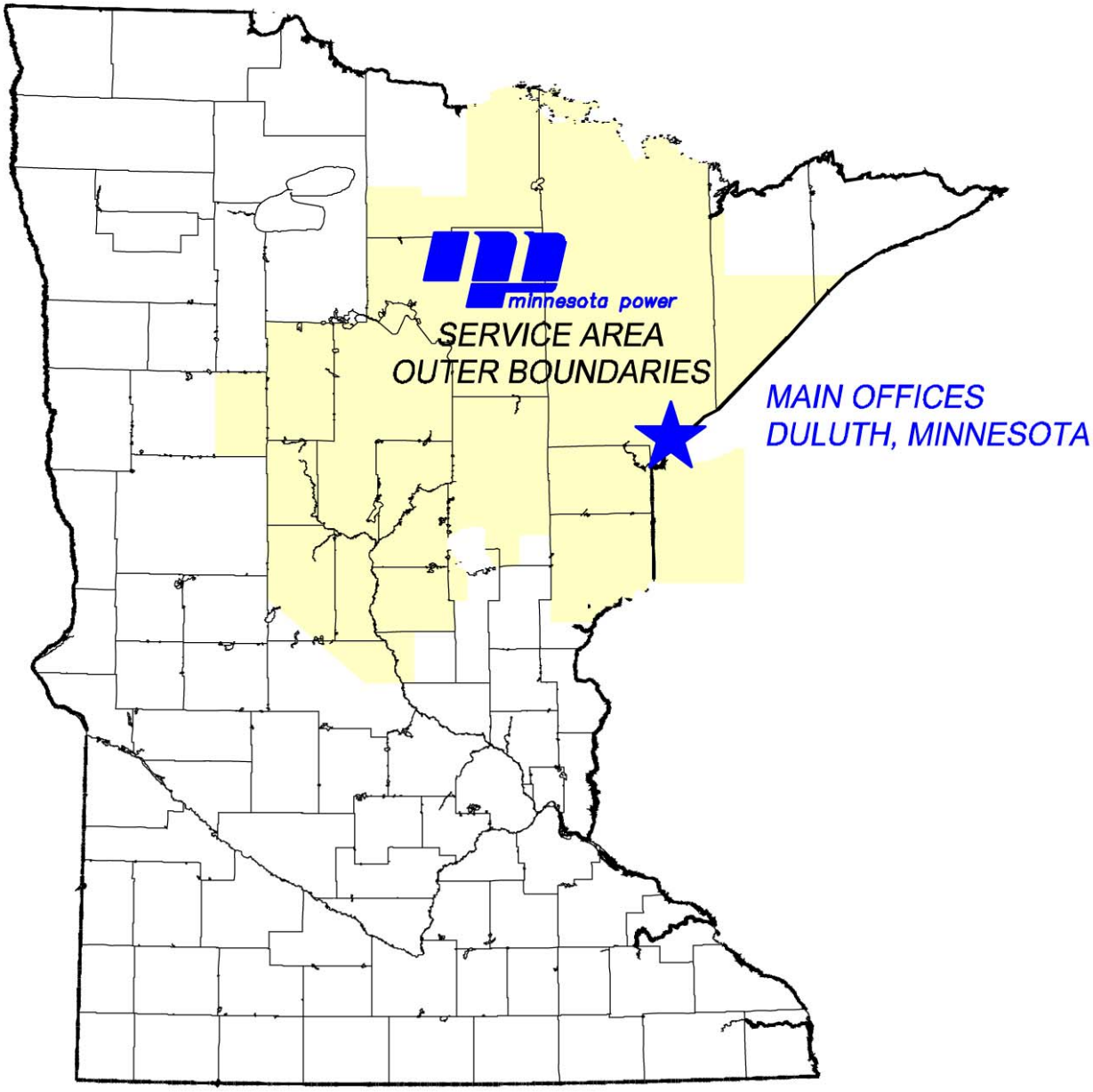
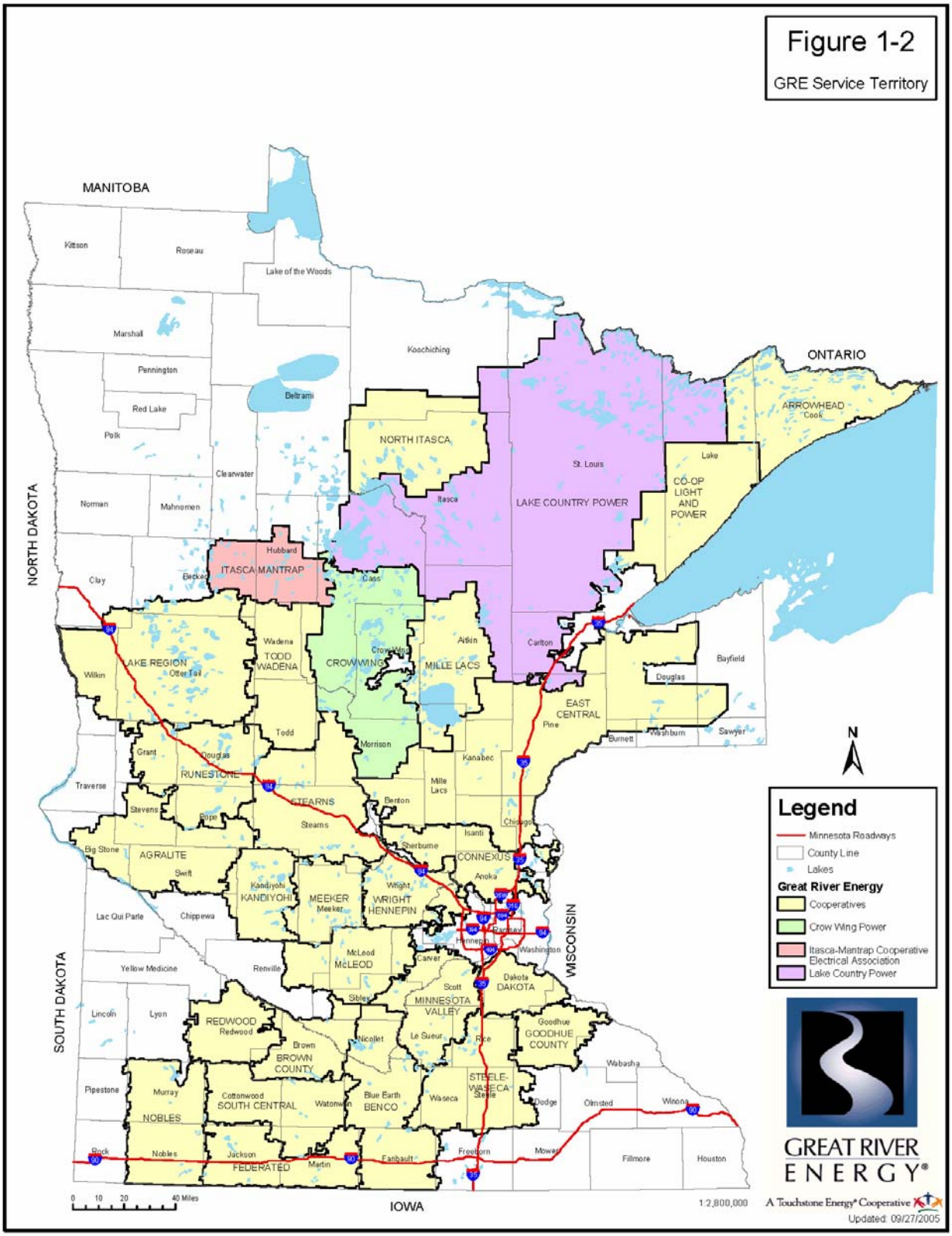


Figure 1- 2 GRE Service Territory Map



1.2 Description of the Proposed Project

MP and GRE propose to construct approximately 63 miles of overhead 115 kV transmission line and associated substation modifications to meet the growing electrical load of the Badoura project area. The Proposed Route is located between the endpoints of Pequot Lakes, Pine River, Badoura, Hackensack and Park Rapids and traverses through Cass, Crow Wing and Hubbard counties (Figure 1-3).

The Project would connect the Pequot Lakes Substation located northeast of Pequot Lakes, a new or expanded 115 kV Pine River Substation located southwest of Pine River, the Badoura Substation, the Birch Lake Substation located east of Hackensack, and the Long Lake Substation located east of Park Rapids. Substation improvements would include new transformer additions at the Long Lake and Birch Lake substations and conversion of the distribution service at the Tripp Lake Substation to 115 kV service. The existing Pine River Substation (owned by Crow Wing Power) and the Birch Lake Substation (owned by GRE) will be upgraded to 115 kV service.

Facilities proposed to maintain and improve the electric power service in the Pequot Lakes, Pine River, and Badoura area are:

- Build a Pequot Lakes to Pine River 115 kV line.
- Add 115 kV line exit and associated facilities at the Pequot Lakes Substation.
- Convert Pine River Distribution Substation to 115/34.5 and 115/12.5 kV service.
- Build a Pine River to Badoura 115 kV line.
- Add 115 kV line exits and associated facilities at the Badoura Substation.

Facilities proposed to maintain and improve the electric power service in the Birch Lake area are:

- Rebuild an existing 34.5 kV Badoura - Birch Lake Tap line to 115 kV.
- Build a Birch Lake Tap to Birch Lake Substation 115 kV line (with possible 34.5 kV distribution underbuild in some sections).
- Add 115 kV line exit and associated facilities at the Badoura Substation.
- Add 115/69 kV transformer and associated facilities at the Birch Lake Substation.
- Convert Tripp Lake Distribution Substation to 115 kV service.

Facilities proposed to maintain and improve the electric power service from the Badoura to Long Lake area are:

- Rebuild an existing Badoura (MP)-Long Lake (GRE) 34.5 kV line to 115 kV with some 34.5 kV underbuild in the Park Rapids area.
- Add 115 kV line exit and associated facilities at the Badoura Substation.
- Install a second 115 kV line exit and second 115/34.5 kV transformer and associated facilities at the Long Lake Substation.
- Move Itasca-Mantrap's Park Rapids Substation to the Long Lake Substation.

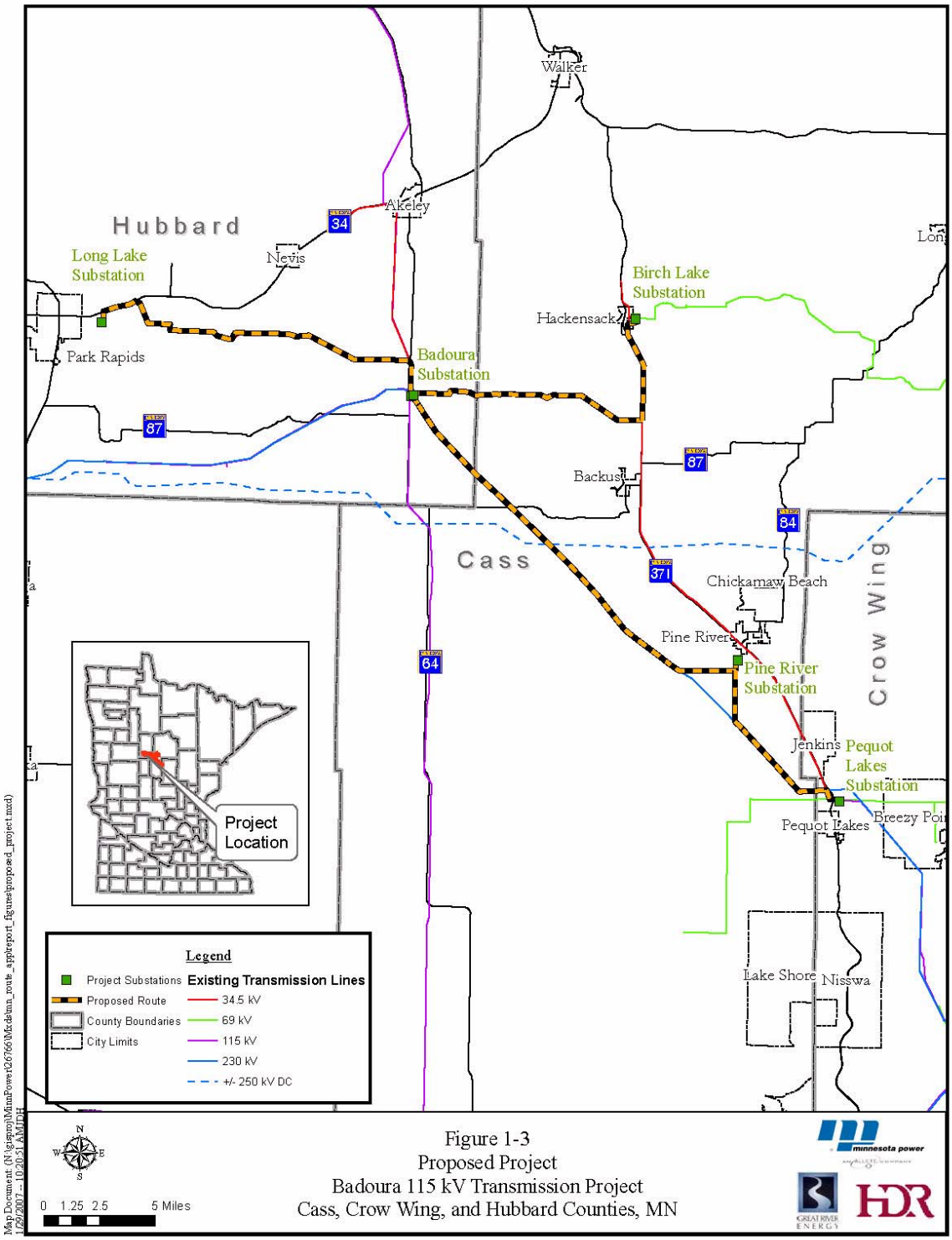



Figure 1-3 Proposed Project