

## 2. INTRODUCTION

### 2.1 Need for the Project

The addition of new electrical services and increase in demand from existing services are causing electricity delivery concerns along the Trunk Highway (TH) 371 corridor from Pequot Lakes to Pine River and Hackensack. Continuing economic growth in the Park Rapids area has caused a considerable increase in electrical use in the region, and the addition of new electrical services and the increase in demand from existing services are also creating electricity delivery concerns in this area.

The existing electrical systems, consisting of transmission lines and substations, are approaching their electrical capability. Loss of a facility may result in potential long-term outages. This situation has become a concern for summer and winter peak electricity use periods. With continued growth, the number of critical hours during the year will continue to increase.

The North American Electric Reliability Council, which develops standards for implementing secure and safe electrical delivery, mandates that certain levels of service be maintained to ensure that the transmission grid operates efficiently and reliably. Electric utilities must maintain power quality at a level that prevents damage to all customers' electrical loads. Based on these mandates, transmission improvements are necessary for this region.

MP and GRE are responsible for meeting these mandates by constructing, operating and maintaining a reliable transmission system in north central Minnesota.

The proposed transmission system improvements will provide a much needed second 115 kV source to the Park Rapids and Pequot Lakes areas and provide continued service to all electrical customers if a 115 kV line or transformer is out of service.

#### 2.1.1 Existing Transmission System - Pequot Lakes to Pine River, Badoura and Hackensack

Electrical energy for MP customers and GRE cooperative customers in Backus, Pequot Lakes, Pine River and the surrounding rural areas is provided by a 34.5 kV line between MP's Pequot Lakes and Badoura substations. The Pine River and Pequot Lakes area electric loads are normally supplied from the Pequot Lakes Substation with the Badoura Substation serving as an alternate source. These electric loads have steadily grown and are expected to reach levels where the voltage will fall below acceptable levels during peak electric use periods (while being served from the Badoura Substation during planned or unplanned outage of the Pequot Lakes end of the line). In addition, the Pequot Lakes Substation is supplied by a single 115 kV line. Due to expected electric load growth, within a few years the 69 kV supply to the Pequot Lakes Substation will be unable to support satisfactory voltage to the area electrical customers during planned or unplanned outages of the single 115 kV line that supplies the substation.

The existing Birch Lake 69/34.5 kV Substation normally serves the MP and GRE loads in Hackensack, Ten Mile Lake, Longville, Pleasant Lake and Wabedo and surrounding rural areas. During planned or unplanned loss of the 34.5 kV or 69 kV circuits in this area, the Badoura Substation and the new MP Akeley 115/34.5 kV Substation serve as alternate sources to these loads. Presently, several switching events are required to maintain voltage and prevent line overloads when this area needs to be served by its alternate sources. As load continues to grow, the electrical system will no longer be capable of maintaining voltage at acceptable levels when these loads must be served from their alternate source during peak electric use periods.

### 2.1.2 Existing Transmission System – Badoura to Park Rapids

GRE recently constructed the Long Lake Substation that serves MP and Itasca-Mantrap loads in Park Rapids and the surrounding rural areas. Although this substation did not create additional firm transmission capacity to the Park Rapids area (it replaced an existing line), it is the beginning of what eventually will be a reliable 115 kV looped system to serve the Park Rapids area.

The peak electric load served by the new Long Lake Substation is over 40 MW. The Long Lake Substation is supplied with electric energy by a single 115 kV line. When this line is out of service, the area is supplied by 34.5 kV lines from the Badoura, Akeley and Hubbard substations. Multiple switching events are required to restore electric service to customers served by the Long Lake Substation to maintain acceptable voltage and ensure no circuit is overloaded. As electricity use continues to grow, it is expected that by 2009 some electric load would need to be shed to maintain voltage during unplanned outages of the single 115 kV line supplying the Long Lake Substation at peak load periods.

## 2.2 Eligibility for the Alternative Permitting Process

The Commission statutes and rules provide for an Alternative Permitting Process for certain facilities (Minn. Stat § 216E.04 and Minn. Rules 4400.2000, subp. 1). The proposed 115 kV transmission line qualifies for the Alternative Permitting Process because it meets Minn. Rules 4400.2000, subp. 1C (HVTLs between 100 and 200 kV). The Route Permit application submittal requirements are listed in Table 2-1 with cross references indicating where information can be found in this Application.

Table 2-1 Completeness Checklist

Authority	Required Information	Where
Minn. R. 4400.2000, Subp. 1(C)	Subpart 1. <b>Eligible Projects.</b> An applicant for a site permit or a route permit for one of the following projects may elect to follow the procedures of parts 4400.2000 to 4400.2950 instead of the full permitting procedures in parts 4400.1025 to 4400.1900: high voltage transmission lines of between 100 and 200 kilovolts	2.2
Minn. R. 4400.2000, Subp. 2.	Subpart 2. <b>Notice to PUC.</b> An applicant for a permit for one of the qualifying projects in subpart 1, who intends to follow the procedures of parts 4400.2000 to 4400.2750, shall notify the PUC of such intent, in writing, at least 10 days before submitting an application for the project	2.4, Appendix B
Minn. R. 4400.2100	<b>Contents of Application</b> (alternative permitting process) The applicant shall include in the application the same information required in part 4400.1150, except the applicant need not propose any alternative sites or routes to the preferred site or route. If the applicant has rejected alternative sites or routes, the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them	4.1 (See also 4400.1150, Subp.2 below) Figures 4-1 to 4-10
4400.1150, subp. 2 (applicable per Minn. R. 4400.2100)	<b>Route Permit for HVTL</b> (a) a statement of proposed ownership of the facility at the time of filing the application and after commercial operation	3.1
	(b) the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated	3.2
	c) at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference	Not applicable, per Minn. R. 4400.2100
	(d) a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line	1.2, Figure 1-3, Section 5 Figures 5-1 to 5-18 7.1, 7.2
	(e) the environmental information required under 4400.1150, Subp. 3	See Minn. R. 4400.1150, subp. 3 (A)-(H) below
	(f) identification of land uses and environmental conditions along the proposed routes	6.1 - 6.10
	(g) the names of each owner whose property is within any of the proposed routes for the high voltage transmission line	10.3, Appendix E
	(h) United States Geological Survey topographical maps or other maps acceptable to the chair showing the entire length of the high voltage transmission line on all proposed routes	Figure 6-1
	(i) identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share right-of-way with the proposed line	8.1.1, 8.1.2

Authority	Required Information	Where
	(j) the engineering and operational design concepts for the proposed high voltage transmission line, including information on the electric and magnetic fields of the transmission line	7.1-7.5 Figures 7-1 to 7-5 Appendix D
	(k) cost analysis of each route, including the costs of constructing, operating, and maintaining the high voltage transmission line that are dependent on design and route	3.5
	(l) a description of possible design options to accommodate expansion of the high voltage transmission line in the future	5.4
	(m) the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction, and maintenance of the high voltage transmission line	8.2 - 8.5
	(n) a listing and brief description of federal, state, and local permits that may be required for the proposed high voltage transmission line	10.4, Table 10-1
	(o) a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required	2.3 Appendix A
Minn. R.4400.1150, subp. 3	<b>Environmental Information</b> (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, 6.6, 6.7
	(F) a description of the effects of the facility on rare and unique natural resources	6.8
	(g) identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route	See all of the effects described in Section 6
	(h) a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures	See all of the mitigative measures identified in Section 6
Minn. R. 4400.1350, subp. 2 (applicable per Minn. R. 4400.2300)	<b>Notice of Project</b> Notification to persons on PUC's general list, to local officials, and to property owners	Will be mailed within 15 days of application submission

Authority	Required Information	Where
Minn. R. 4400.1350, subp 4	Publication of notice in a legal newspaper of general circulation in each county in which the route is proposed to be located.	Will be published within 15 days of application submission
Minn. R. 4400.1350, subp. 5	Confirmation of notice by affidavits of mailing and publication with copies of the notices	Will be submitted within 30 days of notice being mailed and published
Minn. R. 4400.3150	<b>Factors to be Considered in Permitting a HVTL</b> (a) effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services	Section 11
	(b) effects on public health and safety	Section 11
	(c) effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	Section 11
	(d) effects on archaeological and historic resources	Section 11
	(e) effects on the natural environment, including effects on air and water quality resources and flora and fauna	Section 11
	(f) effects on rare and unique natural resources	Section 11
	(g) application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity	Section 11
	(h) use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries	Section 11
	(i) use of existing large electric power generating plant sites	Section 11
	(j) use of existing transportation, pipeline, and electrical transmission systems or rights-of-way	Section 11
	(k) electrical system reliability	Section 11
	(l) costs of constructing, operating, and maintaining the facility which are dependent on design and route	Section 11
	(m) adverse human and natural environmental effects which cannot be avoided	Section 11
	(n) irreversible and irretrievable commitments of resources	Section 11
Minn. R. 4400.3350, subps. 1 and 2	Prohibited Routes <b>Wilderness areas.</b> No high voltage transmission line may be routed through state or national wilderness areas <b>Parks and natural areas.</b> No high voltage transmission line may be routed through state or national parks or state scientific and natural areas unless the transmission line would not materially damage or impair the purpose for which the area was designated and no feasible and prudent alternative exists. Economic considerations alone do not justify use of these areas for a high voltage transmission line	Not Applicable

Authority	Required Information	Where
Minn. Stat. §216E.03, subd. 4 (applicable per Minn. Stat. §216E.04, subd. 8)	<b>Considerations in designating sites and routes</b> (1) Evaluation of research and investigations relating to the effects on land, water and air resources of large electric power generating plants and high voltage transmission lines and the effects of water and air discharges and electric and magnetic fields resulting from such facilities on public health and welfare, vegetation, animals, materials and aesthetic values, including base line studies, predictive modeling, and evaluation of new or improved methods for minimizing adverse impacts of water and air discharges and other matters pertaining to the effects of power plants on the water and air environment	6.2.1, 6.2.4, 6.2.5 6.5 to 6.8, 7.3
	(2) Environmental evaluation of sites and routes proposed for future development and expansion and their relationship to the land, water, air and human resources of the state	5.4, Section 11 (G)
	(3) Evaluation of the effects of new electric power generation and transmission technologies and systems related to power plants designed to minimize adverse environmental effects	Not applicable
	(4) Evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants	Not applicable
	(5) Analysis of the direct and indirect economic impact of proposed sites and routes including, but not limited to, productive agricultural land lost or impaired	6.3.1, 6.9.3 to 6.9.6
	(6) Evaluation of adverse direct and indirect environmental effects that cannot be avoided should the proposed site and route be accepted	See all of the effects identified in Section 6; Section 11
	(7) Evaluation of alternatives to the applicant's proposed site or route proposed pursuant to subdivisions 1 and 2	Not applicable to alternative process
	(8) Evaluation of potential routes that would use or parallel existing railroad and highway rights-of way	8.1, Section 11 (H)
	(9) Evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations	6.3.1, Section 11(H)
	(10) Evaluation of the future needs for additional high voltage transmission lines in the same general area as any proposed route, and the advisability of ordering the construction of structures capable of expansion in transmission capacity through multiple circuiting or design modifications	5.4, Section 11 (G)
	(11) Evaluation of irreversible and irretrievable commitments of resources should the proposed site or route be approved	Section 11 (N)
	(12) When appropriate, consideration of problems raised by other state and federal agencies and local entities	Section 6; 10.1

### 2.3 Certificate of Need Process Summary

Minn. Stat. § 216B.243, subd. 2, states that no large energy facility shall be sited or constructed in Minnesota without the issuance of a certificate of need by the Public Utilities Commission. Minn. Stat. § 216B.2421, subd. 2(3) defines a “large energy facility” as any high voltage transmission line with a capacity of 100 kilovolts or more than ten miles of its length in Minnesota or that crosses a state line. Because the proposed 115 kV transmission line that is the subject of this application is greater than 10 miles in length, a certificate of need is required.

A chronology of the Certification Process is provided below.

- Need for the Project identified in the 2003 Minnesota Biennial Transmission Projects Report.
- Notice plan submitted to the Commission on May 27, 2005. The plan was revised, approved by the Commission on August 25, 2005 and implemented by MP/GRE during September 2005.
- Application for “Certification of a High Voltage Transmission Line” submitted to the Commission on October 31, 2005 under Minn. Stat. § 216B.2425, as part of the 2005 Minnesota Biennial Transmission Projects Report.
- Environmental Report Scoping meeting held by the Department of Commerce at the Backus City Hall on December 7, 2005.
- Environmental Report developed by the Department of Commerce and released on March 1, 2006.
- Public hearing held at the Backus City Hall on March 28, 2006.
- “Request by Great River Energy and Minnesota Power for Certification of the Badoura Transmission Line as a Priority Project” approved by the Commission at the May 11, 2006 Commission meeting.
- Order issued by the Commission (Appendix A) on May 25, 2006 certifying that, “the Badoura Project is needed and is a priority electric transmission project.”

### 2.4 Notice to the Commission

MP and GRE notified the Commission by letter dated January 12, 2007 that the Applicants intended to utilize the Alternative Permitting Process for the proposed Project. This notice complies with the requirement of Minn. Rule 4400.2000, subp. 2 to notify the Commission at least 10 days prior to submitting an application. A copy of the notice letter is provided in Appendix B.



### 3. PROJECT INFORMATION

#### 3.1 Proposed Ownership

MP and GRE will each own specific segments of this Project. The segments are shown on Figure 3-1 and are described below.

##### 3.1.1 Segments 1 and 2 – Pequot Lakes Substation to Pine River Substation and Badoura Substation (Minnesota Power)

###### Transmission Line

**Segment 1 - Pequot Lakes Substation to Pine River Substation** - The line will exit the Pequot Lakes Substation to the north and then will turn west and parallel existing MP 34.5 kV and GRE 69 kV lines for approximately 2300 feet. It will then turn northerly paralleling the MP 34.5 kV line for approximately 2200 feet to the intersection with an existing 230 kV line (identified as the 91 Line and owned by MP). It will then share right-of-way with the 91 Line to near the intersection with Cass County State Aid Highway (CSAH) 1. At this point the line will proceed due north on the east side of CSAH 1 to the Pine River Substation.

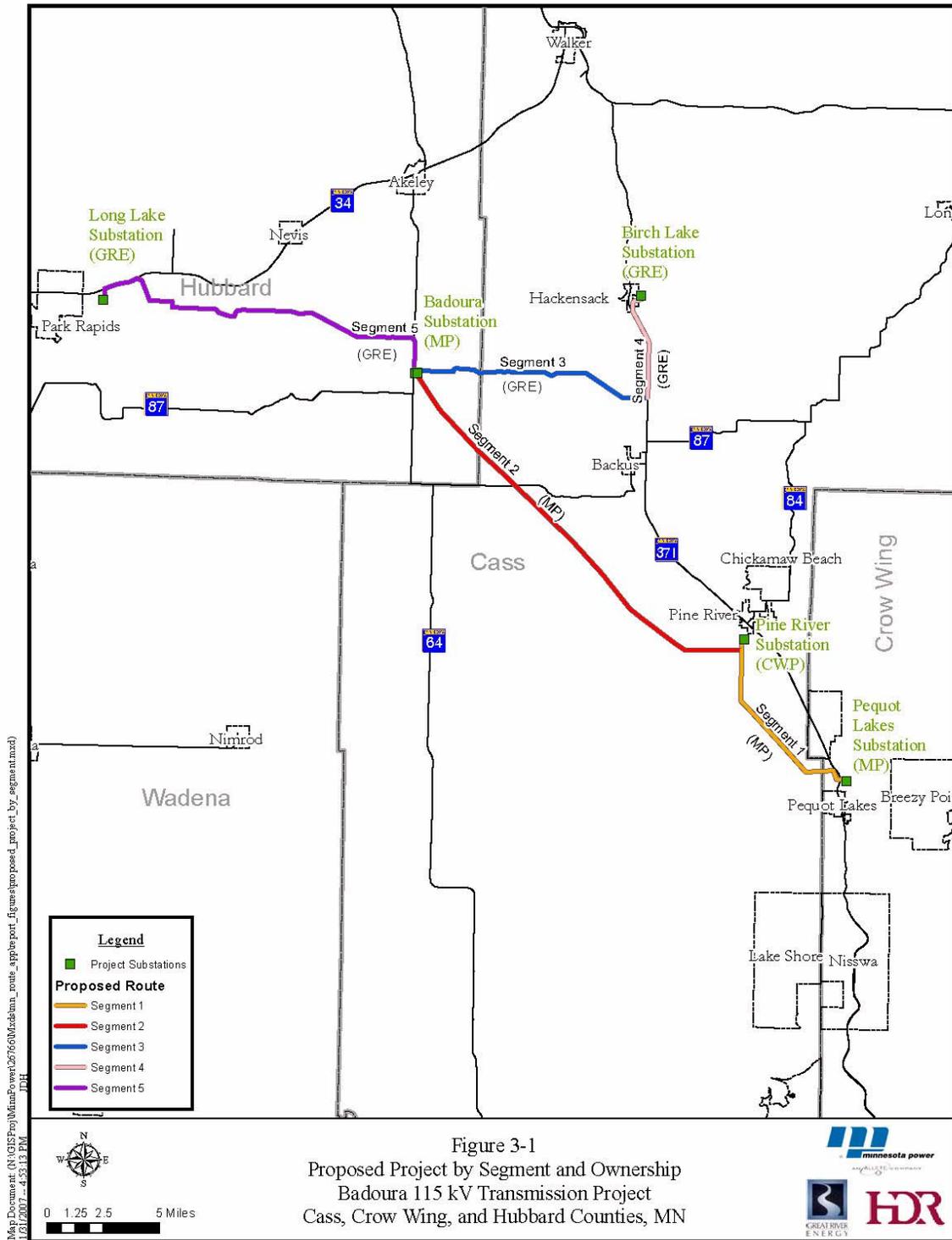
**Segment 2 - Pine River Substation to Badoura Substation** - The new line will exit the Pine River Substation and travel south along the east side of CSAH 1 (115 kV double circuit with Pequot to Pine River 115 kV Line) for approximately 0.5 mile. It will then turn west to the south side of County Road (CR) 171 to its intersection with the 91 Line. It then proceeds northwesterly and again shares right-of-way with the 91 Line to its termination at the Badoura 115 kV Substation.

###### Substations

MP owns the Pequot Lakes and Badoura substations and will own all the equipment additions. CWP owns the existing Pine River 34.5/12.5 kV Distribution Substation and 12.5 kV distribution and will own the 115/12.5 kV transformer addition. MP will own the 115 kV bus, 115/34.5 kV transformer addition, and 34.5 kV feeders and associated equipment additions. CWP will continue to own the Pine River 12.5 kV Distribution Substation and MP will either own the land its facilities are located on or have a permanent easement for its facilities to be located within the substation with CWP.

Within the new substation, MP will own and operate all the high voltage (115 kV) facilities. MP and CWP will separately own and operate their respective low voltage distribution facilities.

Figure 3-1 Proposed Project by Segment and Ownership



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### 3.1.2 Segments 3 and 4 – Badoura Substation to Birch Lake Substation (Great River Energy)

#### Transmission Line

**Segment 3 - Badoura Substation to TH 371** - GRE will own this segment of the 115 kV transmission line east out of the Badoura Substation. It will follow and replace an existing MP 34.5 kV line to a point (referred to as the 507/516 tie switch) east of TH 371.

**Segment 4 - TH 371 to Birch Lake Substation** – This segment proceeds northerly paralleling TH 371 to its termination at the Birch Lake Substation in Hackensack.

#### Substation

The Birch Lake Substation and the common facilities (land, fence, etc.) are owned by GRE. GRE will own all of the 115 kV equipment and MP will operate all the 115 kV facilities in the Birch Lake Substation. GRE will operate the 69 kV facilities and MP will operate the 34.5 kV facilities in this substation.

### 3.1.3 Segment 5 – Badoura Substation to Long Lake Substation (Great River Energy)

#### Transmission Line

GRE will own this segment of the 115 kV transmission line north and west out of the Badoura Substation. It will follow and replace an existing MP 34.5 kV line to its termination at the Long Lake Substation near Park Rapids. In the immediate vicinity of Park Rapids, there will be approximately two miles of 115 kV transmission line with 34.5 kV distribution underbuild.

#### Substation

The Long Lake Substation and the common facilities (land, fence, etc.) are owned by GRE. MP will operate all of the high side equipment within this substation.

## 3.2 Permittees

Minnesota Power and Great River Energy will be named as co-permittees for this Project. Transfer of the permit to any other person or organization is not anticipated.

Contact information for MP and GRE are provided below.

**Co-Permittee:** Minnesota Power  
30 West Superior Street  
Duluth, MN 55802

**Contact:** Robert E. Lindholm  
**Phone:** (218) 722-5642 Ext. 3342  
**Fax:** (218) 723-3916  
**Email:** [rlindholm@allete.com](mailto:rlindholm@allete.com)

**Co-Permittee:** Great River Energy  
 17845 East Highway 10  
 PO Box 800  
 Elk River, Minnesota 55330

**Contact:** Carole L. Schmidt  
**Phone:** (763) 241-2272  
**Fax:** (763) 241-6072  
**Email:** [cschmidt@grenergy.com](mailto:cschmidt@grenergy.com)

### 3.3 Project Location

The proposed Project is located in Crow Wing, Cass and Hubbard counties. The project area encompasses the communities of Pequot Lakes, Pine River, Backus, Hackensack and Park Rapids, Minnesota and traverses many townships within the three counties. Table 3-1 identifies the various political entities located within the Badoura project area.

**Table 3-1 Political Entities in the Badoura Project Area**

County	Municipality	Township
Crow Wing	Pequot Lakes Jenkins	Jenkins Sibley [dissolved & became part of Pequot Lakes]
Cass	Pine River Backus Hackensack Mildred [unincorporated] Oshawa [unincorporated]	Birch Lake Hiram Wilson Loon Lake Walden McKinley Bull Moose Pine River Barclay Powers Deerfield Bungo
Hubbard	Park Rapids Chamberlain [unincorporated] Badoura [unincorporated] Hubbard [unincorporated] Nevis Dorset [unincorporated]	Todd Henrietta Nevis Akeley White Oak Hubbard Crow Wing Lake Badoura Straight River

### 3.4 Project Schedule

Construction of transmission line in Segments 1 and 2 and the Pine River Substation is expected to begin in 2008 and be completed in 2009. These line segments will be MP's responsibility.

Construction of transmission line in Segments 3, 4 and 5 is expected to begin in 2008 and be completed in 2009. These line segments will be GRE's responsibility.

### 3.5 Project Cost Analysis

#### 3.5.1 Project Costs

Estimates for the proposed transmission line are divided into preconstruction and construction costs. Preconstruction costs include expenditures for permitting and right-of-way acquisition. Construction costs include expenditures for right-of-way clearing, transmission line construction, and right-of-way restoration.

#### Preconstruction Costs

Preconstruction costs include labor and expenses for preparation and approval of Certificate of Need and Route Permit applications, public information meetings and public hearings, and acquiring easements for approximately 63 miles of right-of-way. MP and GRE estimate these costs to be approximately \$3,100,000.

#### Transmission Construction Costs

Transmission line costs for the various segments and three proposed design types vary due to the number of structures per mile (i.e. span length), the height and diameter of the wood poles, labor, and hardware costs.

The H-Frame and the single pole (without underbuild) design costs would range from \$350,000 to \$450,000 per mile, inclusive of right-of-way clearing.

The single pole (with underbuild) design cost would range from \$400,000 to \$500,000 per mile. This design is more expensive due to the additional cost for removal of the existing lower voltage circuit, and because there would be more structures per mile due to shorter average span lengths.

For cost estimating purposes, the Applicants are assuming there will be about 53 miles of H-Frame and single pole (without underbuild) construction (approximately \$18.5 to \$23.5 million); and about 10 miles of single pole with underbuild construction (\$4 million to \$5 million). Therefore the estimated cost for construction of the approximate 63 miles of transmission line would range from \$22.5 to \$28.5 million.

Substation Upgrade Costs

Additions and upgrades at four existing substations and the expanded or relocated Pine River Substation are estimated to be:

Pequot Lakes Substation	\$ 1,300,000
Pine River Substation	\$ 3,500,000
Birch Lake Substation	\$ 2,100,000
Badoura Substation	\$ 2,100,000
<u>Long Lake Substation</u>	<u>\$ 1,700,000</u>
Total	\$10,700,000

Estimated costs for the proposed Project are summarized in Table 3-2.

**Table 3-2 Estimated Badoura Project Costs**

Permitting, Easement and Land Acquisition	H-Frame or Single Pole (w/o underbuild) 115 kV Line (~53 miles)	Single Pole (with underbuild) 115 kV Line (~10 miles)	Substation Costs	Total Estimated Project Costs
\$3,100,000	\$18,500,000 to \$23,500,000	\$4,000,000 to \$5,000,000	\$10,700,000	<b>\$36,300,000</b> to <b>\$42,300,000</b>

### 3.5.2 Operation and Maintenance Costs

The annual cost of right-of-way maintenance is currently estimated at \$350 per mile.

In addition to these right-of-way maintenance costs, annual operating and maintenance costs associated with 115 kV transmission voltages in Minnesota currently average about \$600 per mile. Storm restoration, annual inspections, and ordinary replacement costs are included in the operating and maintenance costs.