GREAT RIVER
ENERGY℠

APPLICATION TO THE MINNESOTA PUBLIC UTILITIES COMMISSION

FOR A

GENERATING PLANT SITE PERMIT

ELK RIVER PEAKING STATION

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PREPARED BY BARR ENGINEERING COMPANY

Application for a Generating Plant Site Permit
Elk River Peaking Station Project

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Appendix A – Agency coordination letters
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Application Content Requirements Cross Reference

Project Permit Application Requirements (Minn. Rules 4400.1150, Subp. 1)	**Application Section**
A. a statement of proposed ownership of the facility as of the day of filing and after commercial operation;	1.2
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;	1.2
C. at least two proposed sites for the proposed large electric power generating plant and identification of the applicant's preferred site and the reasons for preferring the site;	Not required under alternative process
D. a description of the proposed large electric power generating plant and all associated facilities, including the size and type of the facility;	2.1
E. the environmental information required under subpart 3;	See Environmental Information below
F. the names of the owners of the property for each proposed site;	2.2
G. the engineering and operational design for the large electric power generating plant at each of the proposed sites;	3.1
H. a cost analysis of the large electric power generating plant at each proposed site, including the costs of constructing and operating the facility that are dependent on design and site;	2.4
I. an engineering analysis of each of the proposed sites, including how each site could accommodate expansion of generating capacity in the future;	Section 2.5, 3.1
J. identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility;	Section 3
K. a listing and brief description of federal, state, and local permits that may be required for the project at each proposed site; and	1.4.2
L. a copy of the Certificate of Need for the project from the Public Utilities Commission or documentation that an application for a Certificate of Need has been submitted or is not required.	1.4.1
Environmental Information Requirements (Minn. Rules 4400.1150, Subp. 3)	**Application Section**
A. a description of the environmental setting for each site or route;	Section 4
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;	4.1, 4.2
C. a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;	4.1.4, 4.1.5
D. a description of the effects of the facility on archaeological and historic resources;	4.1.5
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;	4.1.1, 4.1.2, 4.1.6

Environmental Information Requirements (Minn. Rules 4400.1150, Subp. 3)	Application Section
F. a description of the effects of the facility on rare and unique natural resources;	4.1.6
G. identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route; and	4.1, 4.2
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.	Section 4, 3.1

1 Introduction

Great River Energy, hereby applies to the Minnesota Public Utilities Commission (PUC) for a Site Permit pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes 116C.51 through 116C.69) and Minnesota Rules Chapter 4400.

GRE proposes to construct a simple cycle combustion turbine adjacent to the existing Elk River Station in Elk River, Sherburne County, Minnesota. The nominal 175-MW (summer capacity) plant is to be placed in service in the spring of 2009. The proposed power plant and associated facilities (collectively the Project) are described in more detail throughout this Application.

The addition of this generating unit at the Elk River site falls within the definition of a Large Electric Power Generating Plant (LEPGP) in the Power Plant Siting Act and, thus, requires a Site Permit from the PUC prior to construction. The Chapter 4400 rules provide for three different procedures for obtaining a site permit: full review, alternative review, and local review. GRE is applying for a site permit following the full review process. The Project is not eligible for the alternative process because the proposed unit will be fueled by both natural gas and fuel oil.

In the full review process, the applicant must identify in the application the preferred site for the power plant and one alternative site. The preferred site location and vicinity map are shown in Figures 1-1 and 1-2, respectively. An alternative site location and vicinity map are shown in Figures 1-1 and 1-3, respectively.

GRE filed an application for a Certificate of Need (CON) with the Minnesota PUC for the Project on May 18, 2007 in accordance with Minnesota Rules Chapter 7829 and 7849. Minnesota Rules 4410.7060 provide for the consolidation of environmental review procedures and Minnesota Statutes § 216B.243, Subd. 4 provides for joint hearing procedures for the Certificate of Need, Site Permits and Route Permits when feasible. GRE respectfully requests the PUC to consider consolidating CON and Site Permit hearings in this case.

1.1 Purpose

This Project is necessary to ensure that GRE has adequate generating capacity in 2009 and beyond to reliably meet its forecasted customer demand for electricity. The need for the addition of a peaking unit at the Elk River Station is described in more detail in GRE's application for a CON before the PUC. The CON application has been posted on the GRE corporate Web site at: http://www.greatriverenergy.com/projects/plants/erpp_con_application.html.

1.2 Applicant Information

GRE is undertaking the Project, owns the Project as of the filing of this application, and intends to own the Project for commercial operation.

GRE is a generation and transmission cooperative based in Elk River, Minnesota. GRE provides electrical energy and related services to 28 member distribution cooperatives. The distribution cooperatives, in turn, supply electricity and related services to more than 620,000 customers in Minnesota and a small portion of Wisconsin (or a population of approximately 1.5 million people). In 2006, GRE served its approximately 2,563-MW system needs through a mix of owned generation and purchases. Owned generation includes base load and peaking power plants, which are fueled by coal, refuse-derived fuel (RDF), natural gas, and fuel oil.

The permittee for the site permit will be:

Great River Energy
17845 East Highway 10
P.O. Box 800
Elk River, MN 55330-0800

The contact person at GRE regarding this Project is:

Mark Strohfus, Environmental Project Leader
17845 East Highway 10
P.O. Box 800
Elk River, MN 55330-0800

1.3 Project Schedule

In order to meet the anticipated need for additional peaking duty generating capacity in the summer of 2009, construction of the Project must begin in the early spring 2008.

1.4 Required Project Permits

This subsection identifies other major approvals and permits that are required for project construction and operation.

1.4.1 Certificate of Need

GRE has filed an application for a Certificate of Need from the Minnesota Public Utilities Commission for the Project in accordance with Minnesota Rules Chapter 7849.

1.4.2 Air Quality Permit

GRE will submit an application to amend the Elk River Station's air emission permit, Permit No. 1410003-003. The amendment will incorporate the Project into the existing facility air operating permit.

1.4.3 Water Supply and Discharge Agreements

GRE will obtain the water necessary for operation of the Project from the Elk River municipal water supply system. Process wastewater will be discharged to the Elk River sanitary sewer system and ultimately to the Elk River publicly owned treatment works (POTW). GRE will execute necessary agreements with the city to provide for the Project's water supply and wastewater discharge.

1.4.4 NPDES General Stormwater Permit for Construction Activity

The Project will disturb more than one acre of land and therefore triggers the requirement to apply for coverage under the Minnesota Pollution Control Agency's (MPCA) National Pollutant Discharge Elimination System (NPDES) Stormwater Permit Program for Construction Activities. GRE will ensure that the permit is applied for and complied with during the construction period.

1.4.5 NPDES General Stormwater Permit for Industrial Discharges

The Project will cause changes to the existing site that will require updates to the existing Stormwater Pollution Prevention Plan (SWPPP). No new permit or amendment of the existing general permit is required. The updates will be made once the construction phase has been completed.

1.4.6 Transmission Line Permits

An existing 69-kilovolt (kV) transmission line segment extending 5.6 miles in length from the Elk River site will be upgraded with new conductors and new poles. No change in voltage of the existing lines is necessary; therefore, no PUC High Voltage Transmission Line Route Permit is required. No other lines will require upgrades due to the Project. An MDNR License to Cross Public Waters will be obtained for public waters and wetlands crossed by the transmission lines, as required. GRE will also obtain local building permits that may be required for the transmission line work.

1.4.7 Gas Pipeline Permits

GRE will obtain natural gas for the Project from Northern Natural Gas Company already serving the site. Northern Natural Gas will construct and own a new one-half-mile, 12-inch lateral natural gas pipeline off of its existing 16-inch pipeline located northeast of the Project site. The gas pipeline route is discussed in detail in Section 3.1.3. A new town border station will be constructed on the Project site. Because the gas supply is being provided through an extension to an existing interstate pipeline, a gas pipeline routing permit in accordance with the requirements of Minnesota Statutes 116I.015 and Minnesota Rules 4415 is not required. Northern Natural Gas will apply for permits under the federal pipeline permitting processes as required.

1.4.8 Spill Prevention Control and Countermeasure (SPCC) Plan

GRE will update the existing station's SPCC Plan within six months of any site changes that may trigger revision of the plan.

1.4.9 Other Permits

The Project may require permits, approvals or notifications under the following programs:

- Exemption to allow burning of natural gas for power production (DOE, 10 CFR 503).
- Miscellaneous State Building and Construction Permits and Inspections.
- Miscellaneous Local Building and Construction Permits and Inspections.

Table 1-1 summarizes the major permits and approvals that are expected to be required to construct and operate the project.

Table 1-1 Potential Approvals Required for Construction and Operation

Approval Type	Authority	Comments
Certificate of Need	Minnesota Public Utilities Commission	Required for construction of the power plant.
Major amendment to the existing Part 70 Operating Permit to add a PSD emission source	Minnesota Pollution Control Agency	The permit must be issued before starting construction.
Water Supply and Wastewater Discharge Permit	Elk River Municipal Utilities	This permit would secure water supply and authorize the discharge of the evaporative cooling water to the city's wastewater treatment plant.
NPDES General Stormwater Construction Permit	Minnesota Pollution Control Agency	A general permit is available for this project.
NPDES General Stormwater Industrial Discharge Permit	Minnesota Pollution Control Agency	Amendment to existing SWPPP only.
License to Cross Public Waters	Minnesota Department of Natural Resources	As required for transmission line upgrades to cross public waters and wetlands.
Gas Pipeline Permits	Federal Energy Regulatory Commission	Northern Natural Gas Company will apply for federal permits as required.
Spill Prevention Control and Countermeasure (SPCC) Plan	Minnesota Pollution Control Agency	GRE must update the existing SPCC Plan within six months of bringing additional oil storage capacity on site.
Permanent Exemption for New Facilities	Department of Energy	Allows the use of natural gas for power production.
Electrical Inspection	Board of Electricity	Permit and inspection of building electrical systems.

2 Project Description

2.1 Project General Arrangement

The proposed Project consists of a single natural gas-fired simple-cycle combustion turbine generator (CT) with a nominal summer generating capacity of 175 MW and other associated facilities. Figure 2-1 is a general arrangement drawing illustrating the proposed plant's major features. The design of the Project is described in detail in Section 3.

2.2 Preferred Site

The preferred Project site is on GRE's campus in Elk River, Sherburne County, Minnesota. The Elk River campus currently includes Elk River Station – an Refuse-Derived-Fuel (RDF) combustor that co-produces electricity – and GRE's corporate offices. The preferred site is an area of approximately 11-acres in the northeast portion of the campus. Figure 2-2 shows the GRE Elk River campus property with the Project general arrangement superimposed.

Water and wastewater connections will be made to existing infrastructure owned and operated by the City of Elk River.

The Project at the preferred site will include upgrades to the existing site substation and one of the 69-kV transmission lines originating from the substation. No change in the operating voltage and no significant realignment of this line are required for the Project (see Section 3.1.2).

A new lateral high pressure gas pipeline will be extended approximately ½-mile to provide a natural gas fuel supply for the Project (see Section 1.4.6).

2.3 Alternative Site

The alternative Project site is located on GRE's property in the City of Rosemount in Dakota County, Minnesota. The site is bordered on the south by County Highway 42, on the east by Emery Avenue, on the north by Ehler's Path and 140th Street. Figure 2-3 shows the boundaries of the alternative site property and the proposed interconnection corridors. The property is currently leased to a farmer for crop production.

The natural gas and electric transmission line interconnects and wastewater discharge lines at the alternative site would require short corridors for completion. The proposed transmission line, natural gas and wastewater corridors are shown in Figures 3-3, 3-5 and 3-6, respectively. The natural gas corridor would extend from the Project property south along Emery Avenue for approximately 1000 feet to the existing 42-inch, high pressure pipeline owned by Northern Natural Gas. As with the preferred site, Northern Natural Gas would permit, own and operate the new lateral pipeline. The plant would be interconnected to an existing transmission line that crosses the site. Water supply would likely be obtained from the existing or new onsite well. Wastewater would be discharged to an MCES interceptor at the Rosemount WWTP through a new sewer line constructed along 140th street.

2.4 Cost Analysis

Total construction costs for the addition of the Project at the preferred site are estimated to be about $100 million. Total construction costs at the alternative site are estimated to be of similar magnitude to the preferred site costs.

2.5 Future Expansion

Minnesota Rules 4400.1150, Subp. 1, I. and 4400.1150, Subp. 2, L. ask an applicant to describe the extent to which a proposed generating plant site can accommodate future expansion.

The preferred Project site could possibly accommodate an additional CT. The Project is being designed to maximize future options for additional generating capacity on the site; however, GRE currently has no plans for expanding generation capacity at the proposed site.

The alternative site is owned by GRE and GRE will continue to consider the site for future generation development. The alternative site could accommodate several generating facility development options.

3 Engineering and Operational Design

3.1 Design

3.1.1 Combustion Turbines and Balance of Plant Equipment

A simple cycle combustion turbine has three major components: (1) a compressor, (2) a combustion chamber, (3) and a turbine. Air is drawn into the compressor, compressed, and discharged to the combustion chamber, mixed with fuel and ignited. The resulting expanding hot gases are sent through the turbine blades, causing them to rotate. The rotating turbine blades turn a shaft connected to a generator that produces electricity. Exhaust gases are emitted to the atmosphere through a stack that is expected to be about 90 feet tall. This process is shown schematically in Figure 3-1.

The combustion turbine generator for the Project will be "F" class technology, such as a Siemens Model 5000F. The Project will be one of the most efficient simple-cycle generation resources in the region due to this technology. The Project will have a peak output of approximately 175 MW during Midwest Area Power Pool (MAPP) summer peaking conditions. When operating on distillate fuel oil during typical winter conditions, the unit has a nominal capacity of approximately 211 MW. The unit has a maximum capability of 224 MW. However, the Midwest Independent Transmission System Operator (MISO) transmission service request is limited to 200 MW.

The CT's primary fuel will be natural gas, chosen for its low air emissions and ready availability from a nearby pipeline. Dry low nitrogen oxides (NOx) combustion technology will be employed to minimize emissions when utilizing natural gas for fuel. Ultra-low sulfur diesel fuel will be used as a back-up fuel when natural gas is unavailable. Demineralized water injection will be employed to minimize NOx emissions when utilizing diesel fuel.

In addition to the CT, new plant equipment will include:

- A generator step-up transformer.
- Less than 500 feet of transmission line from the transformers to the existing substation at the preferred site or less than 1,000 feet of transmission line from a new switchyard to the existing transmission line at the alternative site (see Section 3.1.2).

- A new lateral natural gas pipeline, town-border-station, and meter.
- An evaporative cooler.
- An exhaust stack with silencer.

These items comprise the largest components of the CT plant. The major systems that support the operation of the CT are discussed below. The general arrangement of the generating plant layout is shown in Figure 2-1.

3.1.2 Electrical Interconnection

At the preferred site, the existing 69-kV and 230-kV substations will be modified to accommodate the electrical output from the Project. The Elk River site has two existing 230-kV outlets, seven existing 69-kV lines and an existing 33-MW RDF-fired generation plant.

Preliminary results from the MISO studies indicate that sections of 69-kV lines will need to be upgraded to accommodate the interconnection of the Project at the preferred site. The locations of the transmission line segments that will require upgrades are shown on Figure 3-2. The Project will include upgrading approximately 5.41 miles of 69-kV transmission line in Sherburne and Anoka Counties as part of the Elk River Peaking Station transmission system. The Project transmission line rebuilds may involve changing to taller poles (from approximately 40-55 feet to 60-65 feet above ground) and upgrading wire size. The upgrade of transmission capability will also entail improvements to a 0.19-mile section of 69-kV transmission line at the existing substation at County Road 78 (Hanson Blvd.) and Bunker Lake Blvd. Details of the interconnection will be finalized once the interconnection studies have been completed and a final interconnection recommendation is provided by the MISO (expected by mid-December 2007).

At the alternative site, a switchyard will be constructed next to the plant to convert the electricity voltage to 345 kV so that it can be sent to the grid through the existing 345-kV transmission line that crosses the site (see Figure 3-3). An evaluation of the transmission system was conducted in 2003 as part of an earlier project, based on that evaluation, it is believed that no additional transmission system modifications would be necessary to interconnect the Project at the alternative site.

3.1.3 Fuel Supply

The Project will use natural gas as its primary fuel and ultra-low sulfur distillate fuel oil as its back up fuel. Natural gas would be transported to the Project at either the preferred or alternative site by the Northern Natural Gas pipeline system. Fuel oil would be delivered by truck most likely from the oil terminal in Roseville, Minnesota. Great River Energy has existing gas-fired CTs on the Northern Natural Gas system.

At either the preferred or alternative site, Northern Natural Gas would construct and own the lateral pipeline from the interconnection at the existing high pressure pipeline to the new town-border station. Great River Energy will own a short segment of the interconnection that will extend from the town border station to the combustion turbine—the specific length and route is undetermined at this time. Northern Natural Gas would obtain any permits or approvals required for the Northern Natural Gas segment of the proposed gas interconnection.

At the preferred site, the Northern Natural Gas pipeline system can supply the proposed project during the period from April to November. Northern Natural Gas has indicated that winter natural gas deliverability will be curtailed from November to April due to high local home and commercial heating load. Figure 3-4 depicts the existing pipelines and the preliminary route for the new lateral pipeline.

At the alternative site, Northern Natural Gas has indicated that natural gas should be available year round. Figure 3-5 depicts the existing pipelines and the preliminary route for the new lateral pipeline.

Fuel oil will be offloaded from tanker trucks into an onsite above ground storage tank. At the preferred site, an existing 846,000-gallon tank would be used. Great River Energy would limit the amount of fuel stored in the tank to approximately 600,000 gallons to ensure that the volume of oil and oil products stored at the Elk River campus would be less than one million gallons. At the alternative site, a new tank with a capacity of approximately 900,000 gallons would be constructed. Great River Energy would not limit the amount of fuel stored to less than the tank's design capacity. At either site, the tanks would be equipped with secondary containment structures in accordance with state and federal regulations. The Elk River campus's Spill Prevention Control

and Countermeasure (SPCC) Plan would be amended to address the new fuel storage. A new SPCC Plan would be prepared for the alternative site.

3.1.4 Water Supply

Water will be supplied by the Elk River Municipal Utilities (ERMU) at the preferred site. An existing well or a newly constructed well would be used to furnish water at the alternative site. Water needs are summarized in Table 3-1.

Table 3-1 – Water Use Estimate

Water Use	Estimated Need Natural Gas (gpm)	Estimated Need Fuel Oil (gpm)
Supply to Demineralized Water Skid	0 – 600	
NOx Control	0 – 120	
Evaporative Cooler		0 – 85
Sanitary and miscellaneous cleaning	0 – 50	0 – 50
Fire Suppression	0 – 1,500	0 – 1,500

The largest source of operational water demand is for control of NO_x emissions when the CT is operating on fuel oil. The water used for NO_x control will require treatment with a de-mineralizer water treatment system. Source water will be treated in a rented trailer-mounted de-mineralizer system and pumped to an onsite storage tank. De-mineralized water demand by the CT when operating on fuel oil is approximately 100 to 120 gallons per minute (gpm) depending on the CT's operating load. Approximately 460,000 gallons of water would be used for NOx control if fuel oil were used for 76 hours in a year.

The second largest source of operational water demand is the CT evaporative cooler. The evaporative cooler is used on hot days to cool and increase the density of air being used by the CT, which increases the CT's power output and efficiency. When the evaporative cooler is in operation, approximately 60 to 85 gpm of water is required, depending on the ambient air temperature, the relative humidity, and the facility operating power level. Approximately 1,000,000 gallons of water would be used if the evaporative coolers were operated for 300 hours in a year.

Untreated source water will also be used to supply fire suppression water. The maximum instantaneous use rate for fire suppression water is expected to be 1,500 gpm. A raw water holding tank may be necessary at the alternative site to provide sufficient instantaneous demand required for fire suppression.

Peak demand for drinking water, sanitary water, and other ancillary plant water uses is expected to be approximately 50 gpm.

3.1.5 Wastewater Management

The sources and types of water discharges include the evaporative cooler blow down, compressor section wash water, de-mineralizer concentrate, sanitary waste, and stormwater runoff from the site. Several means would be used to treat and discharge these wastewater streams including discharging to the ERMU Waste Water Treatment Plant (preferred site) or a Metropolitan Council of Environmental Services (MCES) sewer (alternative site), shipping off site for disposal, and settling and infiltrating.

Sources of and estimated volumes of wastewater are identified in Table 3-2.

Table 3-2 – Wastewater Generation

Source	Wastewater Generation (gpm)
Evaporative Cooler Blow Down	0 – 60 gpm
Turbine Water Wash	2,000 – 4,000 gallons per event
Spill Containment Drains	0 – 80 gpm
Sanitary Waste	0 – 30 gpm
Annual Total (MG)	**0.78 (Max rate 100 gpm)**

The main source of operations wastewater would be the evaporative cooler. The evaporative cooler is used on hot days to cool and increase the density of air being used by the CT, which increases the CT's power output and efficiency. When the evaporative cooler is in operation, approximately 30 to 60 gpm of blow down wastewater would be generated, depending on the ambient air temperature, the relative humidity, and the facility operating power level. At the preferred site, this wastewater stream would be piped to an onsite lift station that will discharge to

the ERMU sewer system along U.S. Highway 169. At the alternative site this waste stream would be discharged to a MCES sanitary sewer line that runs northwest of the site (see Figure 3-6).

Compressor section wash water will be generated periodically during cleaning of the turbine compressor. This cleaning is necessary to promote efficient, reliable operation of the CT. Compressor wash water will be discharged to an onsite storage tank. The wash water will be analyzed and proper disposal options will be determined based on the analytical results.

Some stormwater will also be discharged to the ERMU WWTP or the MCES system. Spill containment is provided around oil-containing equipment. During rain events, rainwater can collect in the spill containment areas. The containment basins are visually inspected during routing site checks. If there is water within the containment and there is no visible oil sheen, the water is discharged to the ground surface where it will infiltrate into the ground and possibly flow to the onsite stormwater pond. If there is a visible sheen, the water is pumped to the plant's oil/water separators for treatment. The oil/water separator will discharge to the pumping station along with any evaporative cooler blow down and ultimately piped to the ERMU WWTP or the MWCC system. The oil recovered in the separator is reclaimed and processed offsite.

Some wastewater is also generated from sanitary waste. This wastewater will be discharged to the sanitary sewer system.

3.1.6 Air Pollution Control

The Project will employ simple cycle combustion turbine technology using both natural gas and fuel oil as the fuel source. The CT will be equipped with Best Available Control Technology (BACT) for NOx emissions. BACT will ultimately be defined by the air emissions permitting process for the preferred site, which is administered by the Minnesota Pollution Control Agency (MPCA). The anticipated permitting approach will be to limit annual operation such that annual emissions of all Prevention of Significant Deterioration (PSD) pollutants except NOx will be less than the PSD significance threshold. Thus, NOx will be the only pollutant to require a BACT analysis. Siting the project at the preferred site will require a major amendment to the existing air permit to incorporate the PSD permit conditions.

If the Project were constructed at the alternative site, the CT would be the first emission unit for a new facility and would it be allowed a higher threshold before triggering the PSD permitting process. The permitting approach for the alternative site would be to accept a synthetic minor emissions limit with respect to the PSD review process, which would limit emissions to less than 250 tons per year for any PSD pollutant and a formal BACT review would not be required.

The CT air pollution controls are inherent to its design and so emission performance would not be different if the Project were constructed at the preferred or the alternative site. Great River Energy will propose BACT as dry low-NOx combustors when firing natural gas and water injection for NOx control when firing fuel oil.

3.2 Construction

Mobilization at the site will be the first construction activity, with Great River Energy setting up field offices and the Contractor following with mobilization and setup of construction offices, security fencing, and entrances.

Upon issuance of the necessary permits, construction will begin. The area where the new turbine will be located will be excavated approximately 2-4 feet to prepare the area for pouring of concrete footings and foundations. For the preferred and the alternative sites, it is expected that pilings will not be required and that the surficial groundwater table is at a great enough depth that dewatering will not be necessary for construction of foundations. Underground services will be installed. At the same time, the foundations for the generator step-up transformer and miscellaneous equipment will be formed. Extensive concrete work for all foundations will follow. Rough-ins for cable and pipe will be installed in the various foundations.

Within two to three months of initial mobilization, deliveries will begin arriving at the site. These shipments will continue over a four to five month period. Shipments of the transformer, turbine and generator will likely be via rail, with other equipment likely being shipped by truck. The timing of these shipments will coincide with the completion and readiness of their respective foundations. Rail shipments will be coordinated by the heavy haul subcontractor. This equipment will be lifted from the rail cars and loaded onto transport vehicles to be driven on site. A construction crane will be located on site to lift large equipment from transport vehicles onto foundations.

The combustion turbine, generator, and transformer for the new generating unit will be set first, followed by the remaining auxiliary equipment. Erection of the turbine's modular air inlet and the exhaust stack will take place next.

The greatest number of onsite workers will be present during the erection of the turbines, detailed wiring and piping, and while work is being performed in the substation. Gas pipeline work will occur while the site work is being completed.

Great River Energy will be constructing an overhead transmission line from the generator step-up transformers to the onsite substation or switchyard as plant work nears completion. Work will also be ongoing in the substation or switchyard to install breakers, a transformer, and additional protection devices. Final stages of construction activities will include installation of the inlet air filter and bird screen, completion of equipment platforms, insulation, and painting.

Pre-operational testing will take place for one to two months in preparation for start-up of the new unit currently targeted for May 2009. The initial turbine start-up requires a two-week schedule. The first days will fire gas in the unit and bring it up to full speed with no load on the turbine. Next, the turbine will be run and synchronized with the grid at a low load. Subsequently the unit's output will be slowly raised to its maximum capacity while testing the performance of various plant systems.

After the completion of testing, Great River Energy and the contractor will begin to demobilize the site. By early Fall 2009, trailers, construction equipment and temporary fencing are expected to be removed from the site.

3.3 Operation

The proposed project will operate as a peaking facility to provide electricity during times of peak demand, typically during very hot and very cold days. Great River Energy currently fulfills its peaking needs primarily with its Pleasant Valley Station (424 MW) and Lakefield Junction Station (515 MW). Pleasant Valley and Lakefield Junction are dual-fuel peaking plants that began commercial operation in May of 2001. Great River Energy's Cambridge Station Unit 2 (approximately 150 MW) is also a peaking facility, which recently began operation in June of 2007.

The proposed project will be designed to be one of the most efficient CTs in the region. Typical full load heat rates (higher heating value) are 10,395 British Thermal Units per kilowatt-hour (Btu/kWh), while utilizing natural gas during the summer months, and 9,751 Btu/kWh, while utilizing ultra-low sulfur diesel during the winter months. These heat rates equate to an efficiency of approximately 33% and 35%, respectively.

Great River Energy anticipates the proposed project will have an annual capacity factor of approximately five to ten percent. The plant will have a short start-up sequence, which is characteristic for an "F-Class" machine. When operating on natural gas, the start-up time would be approximately ten minutes, and the ramp rate would be approximately 30 MW per minute. When operating on distillate oil, the start-up time would be approximately 30 minutes, and the ramp rate is expected to be approximately 10 MW per minute. The short start-up sequence and rapid loading rate is ideal for the peaking service intended for this project.

Operational characteristics of the Project are summarized in Table 3-3.

Table 3-3 Project Operational Characteristics Summary

	Summer	Winter
General Project Description		
Unit Type	Simple Cycle Combustion Turbine	
Capability	175 MW	211 MW[1]
Expected Annual Capacity Factor	10 percent	
Expected Heat Rate	10,395 Btu/kWh (HHV)	9,751 Btu/kWh (HHV)
Expected Efficiency	33 percent	35 percent
Fuel Use		
Fuel Type	Natural gas or fuel oil	
Fuel Use Rate	1,810 Mcf/hr natural gas	15,699 gal/hr fuel oil
Expected Annual Fuel Use	1.45 Mcf natural gas, 1.16 MG fuel oil	
Water Use		
Expected Annual Water Use	1.5 million gallons	
Expected Annual Wastewater Discharge	500-800,000 gallons	

[1] The unit is capable of operating at a maximum of 211 MW during typical winter conditions when firing fuel oil; however, the MISO transmission service request is limited to 200 MW. All reported data is based on 211 MW.

3.4 Maintenance

Great River Energy has extensive experience operating and maintaining CTs including types such as the General Electric (GE) Frame 5, the Pratt & Whitney FT4, the GE 7EA, the Siemens V84.3A2, and the Westinghouse 501D5A. Great River Energy maintains those units using a combination of Great River Energy staff, the CT manufacturer staff through long-term service agreements, and subcontractors. Great River Energy is committed to providing its operations and maintenance (O&M) staff with the very best in continuing education and training to ensure a high level of reliability and availability of its generation assets.

Great River Energy has an excellent project maintenance record with a generation availability of greater than 98% at its PVS and LJS peaking plants in 2006.

Great River Energy will continue to utilize its O&M model for the proposed project by utilizing the intelligence it has gained from O&M on its existing facilities to train the proposed project operators.

The Project includes procurement of sufficient spare parts to ensure the reliability of the unit. Great River Energy will maintain the Project according to prudent utility practice with the intent to provide excellent reliability and availability.

Table 3-4 lists the chemicals anticipated to be used on-site for operation and maintenance activities.

Table 3-4 List of Chemicals Anticipated to be Used On-Site*

Chemical	Use	Typical Quantity Stored Onsite	Form/Type
Laboratory reagents	Various	Small amounts, generally less than 5 pounds each	Liquid and granular
Mineral insulating oil, C-10	Transformer systems	15,000 gallons	Insulating fluid
Sulfur hexafluoride, (SF_6)	Substation electrical insulating gas	33 pounds	Insulating gas
Lubrication oil	Rotating equipment	3,500 gallons	CTs bearing lubricating oil
Diesel fuel	Backup fuel for CT	600,000 gallons	Diesel fuel
Various detergents	Combustion turbine on/off line water wash skid	200 gallons stored	Liquid
Compressed gases			
Carbon dioxide (CO_2)	Fire Protection System	8 tons	Compressed gas
FM200	Fire Protection System	300 pounds	Compressed gas
Welding Gases	Maintenance	4 100-pound cylinders	Compressed gas

*All chemical types and quantities are preliminary estimates. The chemical types and quantities may change as the project design progresses.

4 Environmental Information

4.1 Preferred Site Analysis

The Project consists of the installation of a simple cycle combustion turbine. The turbine will be capable of firing either natural gas or fuel oil. The preferred Project plant site is an existing industrial site, which includes power production as a co-product from the combustion of refuse-derived fuel.

The addition of the peaking combustion turbine and the upgrades to transmission lines and substations will not result in significant adverse environmental impacts to the site or the site surroundings. The effects of the project on air quality, water quality, noise levels, land use, socio-economic resources and the natural environment are described below.

4.1.1 Air Impacts

The Project includes a new combustion source, which will emit products of combustion to the air. Estimated emissions are summarized in Table 4-1.

Table 4-1 Permitted Project Air Emissions

Criteria Pollutants				
Pollutant	**Emission Rate**[1] Lb/hr at Rated Project Capacity (Worst-case conditions)		**Emissions** (tons/year)	
	Natural Gas	Fuel Oil	Natural Gas[2]	Fuel Oil[3]
NOx	151	331	109.5	110.4
CO	110	240	80.0	80.0
VOC	28.8	7.5	21.0	2.5
PM_{10}	10.8	8.7	47.4	38.2
SO_2	0.1	3.1	0.7	1.0

Hazardous Air Pollutants (selected list from EPA's AP-42 emission factor database and EPA Combustion Turbine Emissions Database v.5)		
Pollutant	**Emissions** (tons/year)	
	Natural Gas[2]	Fuel Oil[3]
Formaldehyde	0.85	0.19
Toluene	0.15	0.37
Xylenes	0.08	0.36
Acetaldehyde	0.05	0.007
Ethyl benzene	0.04	-
Propylene oxide	0.04	-
Benzene	0.01	0.04
Acrolein	0.008	0.06
PAH	0.003	0.03
Naphthalene	0.002	0.02
1,3-Butadiene	0.0005	0.01
Lead	0.06	0.01
Manganese	0.006	0.54
Selenium	-	0.02

[1] NOx, CO, VOC, PM_{10} emission factors provided by turbine manufacturer; SO_2 emission factor provided by US EPA AP-42, Section 3.1 (assumes ultra low sulfur distillate).

[2] 1,454 hours per year based on a CO limit of 80 tons/yr).

[3] 668 hours per year based on a CO limit of 80 tons/yr).

A preliminary analysis of the impacts of the estimated combustion emissions, summarized in Table 4-2, indicates the project will have no significant impact on area air quality. The potential to impact ambient air quality was modeled using AERMOD. The background concentrations plus modeled concentrations are well below the National Ambient Air Quality Standards and Minnesota Ambient Air Quality Standards for all pollutants, demonstrating that the Project will have a minimal impact on area air quality for all pollutants modeled.

Table 4-2 Impacts to Ambient Air Quality – Preliminary Modeling (April 2007)

Natural Gas Combustion - Emissions Modeling						
Pollutant	**Averaging Period**	**Significant Impact Level (ug/m^3)**	**Maximum Modeled Concentration (ug/m^3)**	**Background Concentration (ug/m^3)**	**Total Concentration (ug/m^3)**	**Ambient Air Quality Standard (ug/m^3)**
PM_{10}	24-hour	5	0.27	42	42	150
	Annual	1	0.011	21	21	50
NOx	Annual	1	0.065	23	23	100
CO	1-hour	2000	2.8	--	2.8	40,000
	8-hour	500	0.94	--	0.94	10,000
SO_2	1-hour	25	0.025	181	181	1,300
	3-hour	25	0.016	128	128	1,300
	24-hour	5	0.004	60	60	365
	Annual	1	0.0001	5	5	80

Table 4-2 Impacts to Ambient Air Quality – Preliminary Modeling (April 2007) - Continued

Fuel Oil Combustion – Emissions Modeling						
Pollutant	**Averaging Period**	**Significant Impact Level (ug/m^3)**	**Maximum Modeled Concentration (ug/m^3)**	**Background Concentration (ug/m^3)**	**Total Concentration (ug/m^3)**	**Ambient Air Quality Standard (ug/m^3)**
PM_{10}	24-hour	5	1.9	42	44	150
	Annual	1	0.08	21	21	50
NOx	Annual	1	0.38	23	23	100
CO	1-hour	2000	40	--	40	40,000
	8-hour	500	14	--	14	10,000
SO_2	1-hour	25	0.51	181	182	1,300
	3-hour	25	0.33	128	128	1,300
	24-hour	5	0.08	60	60	365
	Annual	1	0.0027	5	5	80

The Project also triggers the MPCA's requirement to prepare an assessment of air emission risks to human health. The MPCA's "Air Emissions Risk Analysis (AERA) Guidelines" [http://www.pca.state.mn.us/air/aera-guide.html] requires the establishment of a baseline risk for the existing site and an analysis of the impact of the new emissions from the turbine installation. Great River Energy will submit a completed AERA with the air permit application to the MPCA, who will ultimately review the AERA and make a risk determination. A preliminary air toxics

review has been completed for the CT that indicates its incremental impacts are well below the MPCA's risk thresholds. The results for the CT are summarized in Table 4-3. Farmer cancer risks are the highest; however, the farmer scenario is not applicable at the worst-case receptors because these receptors are located on property that has been developed and is no longer suitable for farming.

While incremental impacts from the project are negligible, the MPCA has stressed that understanding the baseline risk is important to its risk decision. Great River Energy has developed the baseline risks associated with the existing operations at the Elk River campus and will work with the MPCA through the air permitting process to complete the baseline risk analysis. The complete AERA report is provided as Appendix B to this application.

Table 4-3 Preliminary Screening-Level Incremental Air Emissions Risk Analysis (AERA) – Preferred Site

[Turbine Project Only]

Air Toxics Screen [1]												
Total Inhalation Screening Hazard Indices and Cancer Risks				Total Indirect Pathway Screening Hazard Indices and Cancer Risks				Total Multipathway Screening Hazard Indices and Cancer Risks				
Acute	Subchronic Noncancer	Chronic Non-cancer	Cancer	Farmer Non-cancer [2]	Farmer Cancer [2]	Resident Non-cancer	Resident Cancer	Farmer Non-cancer [2]	Farmer Cancer [2]	Resident Non-cancer	Resident Cancer	
3.7E-01	4.2E-03	2.4E-02	8.E-07	1.2E-04	3.E-04		1.E-06	2.4E-02	3.E-04	2.4E-02	2.E-06	
1.0E+00	1.0E+00	1.0E+00	1.0E-05	1.0E+00	1.0E-05	1.0E+00	1.0E-05	1.0E+00	1.0E-05	1.0E+00	1.0E-05	<<< Acceptable Level
OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	<<<OK or Not?

[1] Cancer risks rounded to one significant figure per U.S. EPA guidance (1989; 2005).
[2] Farmer risks reported but farming is not a current land use at the Elk River Station property boundary. Reasonably foreseeable future land use indicates it is highly unlikely for a farmer to be located at the property boundary.

Another potential source of air emissions is fugitive dust from site preparation and construction activities. However, construction-related fugitive emissions will be of a short-term duration and will be controlled by watering or applying dust suppressants to exposed soil surfaces as necessary to reduce the impact on area residents.

There are no air impacts associated with the Project transmission line upgrades or the improvements to the substation.

4.1.2 Water Use and Wastewater Generation

4.1.2.1 Water

The Plant's water supply will come from ERMU, which operates 7 wells with a combined capacity of approximately 6,800 gpm. The Project would have a peak water usage rate of 600 gpm for the demineralization process. This usage would occur over approximately 24 hours to fill an existing 846,000-gallon above ground storage tank on site, and GRE expects that the tank would require filling only once or twice per year. The Project could have a peak use of 85 gpm for evaporative cooling that could be coincidental with ERMU's summer peak demand. Evaporative cooling is not critical for the plant's operation. In the event that ERMU could not operate a well due to maintenance or other reasons, GRE would be willing to coordinate with ERMU and not operate the evaporative coolers during their peak. Considering the flexibility GRE has in scheduling water usage, the Project would not have and significant impact on the ERMU water supply system

4.1.2.2 Wastewater

ERPS plans to dispose of Project process wastewater to the city WWTP. The wastewater discharge will not significantly impact the city WWTP. The city WWTP has an average discharge of 1.1 million gallons per day (MGD) and a maximum discharge of 1.2 MGD. ERPS would contribute up to 13% of the flow to the plant at its maximum discharge, but less than 0.3% on average. Discharge to the WWTP will require a pre-treatment permit that will include contaminant discharge limits.

4.1.3 Noise

The Project will not result in any violation of Minnesota Noise Standards at the residences located near the Project plant site. Operation of the new generation unit will result in an increase in frequency of operational noises, but not a significant increase in maximum noise levels at nearby residences.

Noise will be generated during the construction and operation of the Project. Construction noise will be predominantly intermittent sources originating from diesel engine-driven construction equipment. Potential noise impacts will be mitigated by proper muffling of construction equipment and restricting activities conducted during nighttime hours.

Noise from the turbine operation is a result of air flow through the combustion air intake and from the exhaust gases discharging from the stack. The Project air inlet will be appropriately sized and fitted with diffusers to minimize velocity and therefore the noise of air moving into the inlets. The stack will be fitted with silencers to reduce the noise of exhaust gases leaving the plant.

Noise from the operation of the new peaking station is expected to be predominantly low frequency noise, as is noise from traffic. Noise from Project operation will not significantly impact the acoustical environment given the noise control technology that will be employed by the new generating unit, the high background noise levels from nearby US Highways 10 and 169, the distance of the Project plant site from adjacent properties and operational noise from the existing facility.

Upgrades to the Project transmission lines and substation will not create a new noise source, and will not result in significant increases in existing noise levels.

4.1.4 Land Use Impacts

The Project plant site will be located on the existing Great River Energy Elk River campus. The campus includes offices, warehouses, pole yard and RDF Power Plant. Locating the new generating facility on the existing Great River Energy campus takes advantage of existing infrastructure, including roads, water, and sewer. Since the Project plant location has been previously used for utility purposes, as a Great River Energy pole yard, the new facility will not notably change the land use of the site. Land use in the vicinity of the Project is diverse.

4.1.4.1 Stormwater – Existing NPDES Permit

The Project will operate under an existing Minnesota General Industrial Stormwater Discharge Permit (Permit #MNG611000). In addition, the facility will be designed to avoid the discharge of stormwater off of the site. In extreme precipitation events, stormwater would be directed to sand filters, then discharged via the Minnesota DOT-controlled highway 169 drainage ditch to the Mississippi River.

There are no additional stormwater impacts associated with the Project transmission line or substation upgrades.

4.1.4.2 Land Use and Zoning

The proposed activities at the Project plant site meet the Sherburne County land use designation and City of Elk River zoning overlay for the site.

Sherburne County Planning and Zoning Department lists the current land use of the Project plant location as "Public Utility Land – Preferred" (Sherburne County 2007). The project falls within the approved uses for that designation. Adjacent land uses within one mile of the Project plant location include:

- Public Utility Land – Non-Preferred.
- Residential/Apartments Over 4 Units.
- State Public Property.
- Commercial.
- Industrial.

- Residential 2-3 Units.
- Residential Single Unit.
- Vacant Land.

According to the City of Elk River Department of Commercial Development, the Elk River Peaking Station site is zoned as Light Industrial/Solid Waste Facility (City of Elk River 2007). The Project falls within the approved uses for that designation. Zoning for parcels immediately adjacent to the Project plant site includes the following designations:

- Business Park.
- Planned Unit Development.
- Highway Commercial.
- Central Commercial.
- Townhouse/Multi-Family.

Land use and zoning maps of the Project area are included as Figures 4-1 and 4-2, respectively.

The Project will not require the displacement of any occupied residences or businesses. Work on the Project will not displace any other existing or planned land use, including residential land uses. The proposed site for the new generating unit is located within a parcel currently owned by Great River Energy and used for power generation (see Figure 2-2). The nearest residence is located approximately 1,200 feet north-northwest of the Project location.

Land use in the vicinity of the Project transmission line upgrades is diverse. The Project transmission lines cross lands under the zoning authority of the Metropolitan Council, Sherburne County and the City of Elk River. The Metropolitan Council and the Sherburne County Planning and Zoning Department list the following current land uses along the Project transmission line upgrade:

- Municipal Property.
- State Public Property.
- Agriculture.
- Residential Single Unit.

As noted above, the Project transmission line upgrades utilize an existing transmission corridor and the substation at County Road 78 and Bunker Lake Blvd. As a result, the Project transmission line upgrade will not change current land use of the areas crossed.

According to the City of Elk River Department of Commercial Development, areas crossed by the Project transmission line upgrade include the following zoning designations:

- Light Industrial.
- Business Park.
- Planned Unit Development.
- Single Family Residential.
- Agricultural Research.

.

The Project transmission line upgrade will not require the displacement of any occupied residences or businesses. Work on the upgrade will not displace any other existing or planned land use, including residential land uses.

4.1.4.3 Aesthetics

Area aesthetics will not be significantly changed by the Project. The Project plant site is on the existing Great River Energy campus, and has been previously used for various purposes related to utility operation and maintenance. The plant site and immediate vicinity have an evident industrial/commercial aesthetic. The proposed plant maintains this aesthetic.

The Project transmission line upgrades will occur along an existing transmission line corridor. Upgrades to the Project transmission lines may involve the use of poles that will be approximately 10-20 feet taller than the existing poles. However, taller poles would not appear significantly different than the existing transmission line configurations, and the current visual aesthetic would be maintained.

4.1.4.4 Impacts to Industries

Area industries will not be adversely impacted by any component of the Project. No agricultural land will be used for the Project. No forestry-related industry will be adversely impacted by the Project. Area tourism and recreation areas will not be adversely impacted by the Project.

4.1.5 Social, Cultural and Economic Impacts

4.1.5.1 Public Health and Safety

The Project plant will be constructed on the existing Great River Energy campus. As a result, the Project plant will utilize Great River Energy's existing framework for supporting public health and

safety on the campus. This includes facilities and procedures for fire safety, emergency first aid capabilities, and general procedures and policies to ensure a safe operating environment. Fire alarms and emergency fire suppression equipment will be located throughout the facility to provide early detection of fire and enable initial response to reduce the risk and spread of fire. Emergency first aid equipment including eyewash stations and first aid kits will also be installed throughout the facility. Employees would have regular training in safety and first aid. Severe weather shelters will be designated and clearly identified.

4.1.5.2 Public Services and Infrastructure

Infrastructure on the Great River Energy campus includes water and sewer facilities. The Project plant will utilize this existing infrastructure. In addition, the Great River Energy campus is served by Elk River fire and police.

Primary access to the Great River Energy campus is off of U.S. Highway 169 , U.S. Highway 10 or Main Street. Access to the Project plant location will primarily be off Highway 169. The current annual average traffic count on Highway 169 near the plant site is 52,000 vehicles per day with a heavy commercial vehicle count of 3,700 per day. Traffic on Highway 169 will increase slightly, but the increase will not be perceptible considering the existing traffic volumes.

4.1.5.3 Archaeological and Historical Resources

The Minnesota State Historic Preservation Office (SHPO) was contacted to request a Historic, Archaeological and Architectural Inventory database search for the Project plant site and for areas along and adjacent to the Project transmission line upgrade.

According to the SHPO database, there are 29 historic and/or architectural sites in Elk River. The closest to the Project plant site are the twenty-two sites in the historic downtown area of Elk River, approximately 0.7 mile northwest of the Project site in the 300-block of Jackson Street, and on the 600- and 700-blocks of Main Street.

The SHPO database query also indicates that there are two known archaeological sites in the Project plant vicinity. The nearest is a lithic scatter site approximately 2,300 feet northeast of the Project plant site. The other archaeological database record in the vicinity is an artifact scatter approximately 3.8 miles southeast of the Project plant site.

Further south and east of the generating facility, along the Project transmission line upgrade, SHPO has no Architectural or Historic records. However, there are two archaeological lithic scatter records near the northwest shore of Lake Itasca in Sections 18 and 19 of Township 32 North, Range 25 East. The Project transmission line upgrade passes within 2,000 feet of these areas at its closest. There is an additional archaeological historic documentation record in the southwest quarter of Section 19, Township 32 North, Range 25 East. This record is south of the BNSF railroad line. The Project transmission line upgrade will have no impact on any of the SHPO sites.

4.1.5.4 Economic Benefits

The local community will benefit from the Project construction. Construction of the generating facility, the transmission line upgrades and the substation improvements will require an estimated 100 skilled craft workers to be on site at any one time over the 12-month construction period. These are high-skill, high paying positions including pipe fitters, iron workers, millwrights, boilermakers, carpenters, electricians, and other trades. Day-to-day operation of Elk River Peaking Station will require two to three full-time employees after construction.

The Project will contribute to Sherburne County's tax base. The state and Sherburne County will also benefit from income and sales taxes paid as a result of the construction of the Project. The operating staff associated with the Project will continue to pay payroll taxes.

4.1.6 Effects on the Natural Environment

4.1.6.1 Geology and Soils

The geology and soils at the Project plant site, along the Project transmission line upgrades and at the substation improvement are structurally suitable construction of the Project components. The geology and soils do not present any special concerns related to water or wastewater management for the Project. Surficial and bedrock geology for the Project components are shown in Figures 4-3 and 4-4.

The entire Project, including plant, transmission lines and substation, is located within the Anoka Sand Plain region and is underlain by approximately 150 feet of unconsolidated sediments, according to regional well logs. Pleistocene-aged trace deposits associated with mixed clasts of the

Superior and Des Moines lobes are directly beneath the site. These deposits consist primarily of sand, gravelly sand, and cobbly gravel (Meyer et al 1993).

Soils for the Project site and associated facilities are shown in Figure 4-5. The Soil Survey of Sherburne County, Minnesota (Grimes 1968) indicates soils found on the Project plant site are Hubbard loamy sands. Hubbard series soils are nearly level to gently sloping and formed in outwash sands. Soils are excessively drained. The Project plant site has been utilized as a utility pole storage yard; thus the soils have been compacted and otherwise altered due to prior activities.

Hubbard series soils do not meet the productivity criteria for prime farmland. There are no prime farmland units associated with the Project plant site.

The Soil Surveys of Sherburne County (Grimes 1968) and Anoka County (Chamberlain1977) indicate soils found along the Project transmission line upgrade are:

- Hubbard loamy sands.
- Isanti sandy loam.
- Nymore loamy coarse sand.
- Nymore loamy sand.

Soils at the existing substation were originally mapped as Sartell fine sand and Lino loamy fine sand. These soils types are all formed in outwash sands. The Project transmission line upgrade utilizes an existing transmission corridor and substation; thus, the soils have likely been moderately compacted along the existing corridor and moderately to heavily compacted at the substation.

These soils do not meet the productivity criteria for prime farmland. There are no prime farmland units associated with the Project transmission line or substation upgrades.

4.1.6.2 Rivers, Streams and Lakes

The Project will not significantly impact area water bodies. The Project plant site is located within the Mississippi River (St. Cloud) watershed, USGS/MN DNR major watershed #17. The nearest named stream is the Mississippi River, (see Figure 4-6). The Project plant site lies within USGS/MN DNR minor watershed #1700100, an area of approximately 16 square miles.

The Project transmission line upgrade is located within portions of three major watersheds. For the overall Project, the major and minor watersheds crossed and their drainage areas are summarized in Table 4-4 below:

Table 4-4 – Major and Minor Watersheds Crossed by the Transmission Line Upgrade

Major Watershed USGS/MNDNR Number	Major Watershed Name	Major Watershed Drainage Area (square miles)	Minor Watershed Number	Minor Watershed Area (square miles)
17	Mississippi River (St. Cloud)	1128	1700100	16
21	Rum River	1559	2105200	30
20	Mississippi River (Metro)	1016	2004100	18

The Project transmission line upgrade will not significantly impact area water bodies. The Project transmission line upgrade crosses Trott Brook twice, and an unnamed tributary to Trott Brook once. Trott Brook joins the Rum River approximately 5.5 miles east of the Project transmission line upgrade's furthest downstream crossing. Streams will be crossed by spanning, with poles placed in locations that will avoid disturbance to the stream banks. As a result, the Project transmission line upgrades will not introduce additional sediments into area streams.

No lakes or major rivers are crossed by the Project transmission line upgrade. Letters have been sent to the MNDNR and the U.S. Army Corps of Engineers requesting information on potential impacts of the Project on area water resources.

4.1.6.3 Vegetation

According to the MNDNR Ecological Classification System (MNDNR 2005), the Project plant site and its associated components are located along the southern edge of the Anoka Sandplain landform, in the Minnesota and Northeast Iowa Morainal Section of the Eastern Broadleaf Province. Pre-settlement vegetation was primarily composed of oak openings and barrens (savanna) on the upland areas and river bottom forest adjacent to the Mississippi River at lower elevations.

Most of the native vegetation was initially removed to allow the land to be converted first to lumber and then to agricultural uses. More recently, the Project plant site has been part of Great River Energy's campus, and has had a number of uses including an ash storage and utility pole yard. These uses and the associated regradings of the land surface have left a mixture of primarily non-native grasses and forbs on the site, with a small stand of red pine (*Pinus resinosa*) to the east. Any disturbance to vegetation due to the Project transmission line upgrade will be minimal and limited to the areas immediately adjacent to pole placements.

Remnants of native vegetation communities with pre-settlement characteristics remain in the vicinity of the Project plant location. The nearest of these remnants is a series of five islands in the Mississippi River approximately one mile west of the Project location. The Minnesota County Biological Survey (MCBS) has mapped these islands as Silver maple – Virginia creeper floodplain forest (Figure 4-7). This floodplain forest features a canopy of well-spaced silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*) and American elm (Ulmus americana), with wood nettle (*Laportea canadensis*) and ostrich fern (*Matteuccia strutheopteris*) in the ground layer. This floodplain forest has reportedly never been grazed, although the northern island was used as a vegetable garden in the 1930s.

The other area of native vegetation communities is approximately 1.25 miles southeast of the Project plant location. MCBS mapped this area as a dry oak savanna/oak brushland complex. The area is dominated by a relatively open oak canopy, primarily bur oak (*Quercus macrocarpa*), with native prairie grasses and forbs in the ground layer.

4.1.6.4 Fauna

The Project is not expected to adversely impact area wildlife. The United States Fish and Wildlife Service (USFWS) lists the bald eagle (*Haliaeetus leucocephalus*) as the only Federally-listed species known to occur in Sherburne County. In order to evaluate the potential presence of State-listed species, the MNDNR Natural Heritage Program was contacted to review the Natural Heritage Information System (NHIS) database.

Results of the NHIS search identified only the bald eagle as being present in the vicinity of the Project plant site. The NHIS records do not indicate that bald eagles nest on the Project plant site itself. Rather, the records show bald eagle nests approximately 3,600 feet to 3,800 feet west of the

Project plant location, nesting in the floodplain forest on a series of five islands in the Mississippi River. The nearest edge of the nearest island is 3,100 feet west of the Project plant location. If bald eagles were to nest on the mainland side of the river, across from the islands, they would still be over 2,800 feet west of the Project plant location. These distances are more than twice the 0.25-mile (1,320 feet) buffer that the USFWS normally considers to be necessary to avoid disturbance of an eagle nest. A project review request letter has also been sent to the USFWS to determine if the Project will affect any threatened or endangered species.

The NHIS records indicate that no other State-listed species are known from the Project plant site.

The Project transmission line and substation upgrades are also not expected to adversely impact area wildlife. The local presence of bald eagles is discussed above. No bald eagle nests are known along the Project transmission line upgrades.

The MNDNR Natural Heritage Program was contacted to review the NHIS database for State-listed species. Results of the database search identified the following State-listed species occurring within one mile of the Project transmission line upgrades:

- Loggerhead shrike (*Lanius ludovicianus*), threatened, proposed endangered.
- Blanding's turtle (*Emydoidea blandingi*), threatened.
- Plains pocket mouse (*Perognathus flavescens*), special concern.

These species are all known to occur within Bunker Hills Regional Park, at the far eastern terminus of the Project transmission line upgrade near the location of the substation improvements. Project transmission line work at the eastern terminus would occur within the existing Great River Energy substation, and would not involve activities that would remove or disturb these species or their habitats.

4.1.6.5 Wetlands

The Project will not impact area wetlands. No wetlands are located within the Project plant site. However, several wetlands are found in the area surrounding the plant site, the nearest of which is an emergent wetland approximately 3 acres in area about 1000 feet north of the plant site. The only other wetlands located within 1,320 feet (0.25 mile) of the Project plant site are east of Highway 169 and will not be affected by the Project. Figure 4-8 shows the wetlands in the vicinity of the

Project plant site and Table 4-5 lists the Cowardin classification for all wetlands within approximately 1,320 feet of the Project plant site.

Table 4-5 Wetlands – Preferred Site

Distance and Direction from Project Site	Cowardin Code	Area (acres)	Cowardin Classification
1000 ft N	PEMC	3.5	Palustrine emergent wetland, seasonally flooded
600 feet E	PEMC	~14	Palustrine emergent wetland, seasonally flooded
900 feet SSE	PEMC	1.8	Palustrine emergent wetland, seasonally flooded
1200 ft S	PEMC	4.6	Palustrine emergent wetland, seasonally flooded

The Project transmission line upgrade will also not significantly impact area wetlands. However, several wetlands are crossed by the upgrade. Figure 4-9 shows the wetlands in the vicinity of the transmission line upgrade and Table 4-6 lists the Cowardin classification for all wetlands crossed by the transmission line upgrade.

Table 4-6 Wetlands Summary – Transmission Line Upgrades for Preferred Alternative

Cowardin Classification of Wetland Crossed[1]	Length of Crossing(s)[2] in Feet
PEM	50
PEM	230
PEM	416
PEM	780,520
PEM	885,192,565,867
PSS	302,259,142,164
PSS/EM	1060
PEM	997
PFO/SS	252

1 PEM – Palustrine emergent wetland; PSS – Palustrine scrub-shrub wetland; PFO – Palustrine forested wetland
2 – Several wetlands have multiple crossings

The Project transmission line upgrade follows an existing transmission corridor. Wetlands are primarily spanned to minimize disturbance. Wetlands that are too large to span have existing poles. In these situations, disturbances associated with the Project transmission line upgrade will be minimal and limited to pole replacement as needed.

4.1.6.6 Rare and Unique Natural Resources

The Project will not adversely impact Federally- or State-listed threatened or endangered species. The Natural Heritage Program of the MNDNR was contacted and asked to review its database to determine if any rare plant or animal species or other significant natural features are known to occur within the Project site. No plants or animals of concern were identified that would be adversely impacted by the Project.

The MNDNR also maps Sites of Biodiversity Significance, and rates them as Outstanding, High, Medium or Below. (Sites rated "Below" are areas that have a degree of native community structure that is higher than disturbed or developed areas, but below the level of biodiversity significance for similar communities in the state.) The MNDNR has mapped a total of six Sites of Biodiversity Significance (SBS) near the overall Project (Figure 4-7). In the vicinity of the Project plant site, SBS are mapped within 2600 feet to the southeast and 5600 feet to the northeast, respectively. Both are rated "Below". The Project will have no impact on these sites.

The Project transmission line upgrades cross two additional SBS. Both sites are mapped as Dry Sand-Gravel Oak Savanna (Southern Type). One of the sites is rated "Moderate" for biodiversity significance, and the other is rated "Below". Both are crossed along existing transmission line corridors; therefore, there is no additional impact to these sites.

Finally, near the site of the substation improvements, there are two additional SBS. One takes up most of Bunker Hills Regional Park, and is rated "Outstanding." The other is further southeast, and is rated "Below." The proposed activities at the existing substation will have no impact on these sites.

4.2 Alternative Site Analysis

The alternative site is located in the City of Rosemount in Dakota County, Minnesota. The site is bordered on the south by County Highway 42, on the east by Emery Avenue, on the north by Ehler's Path and 140th Street.

4.2.1 Air Impacts

The Project includes a new combustion source, which will emit products of combustion to the air. An analysis of the impacts of the estimated combustion emissions indicates no significant impact on area air quality.

Table 4-7 Estimated Project Air Emissions – Alternative Site

Criteria Pollutants				
Pollutant	**Emission Rate**[1] at Rated Project Capacity (Worst-case Conditions)		**Emissions** (tons/year)	
	Natural Gas	Fuel Oil	Natural Gas[2]	Fuel Oil[3]
NOx	151	331	109.5	110.4
CO	110	240	80.0	80.0
VOC	28.8	7.5	21.0	2.5
PM_{10}	10.8	8.7	47.4	38.2
SO_2	0.1	3.1	0.7	1.0

Hazardous Air Pollutants (selected list from EPA's AP-42 emission factor database and EPA Combustion Turbine Emissions Database v.5)		
Pollutant	**Emissions** (tons/year)	
	Natural Gas[2]	Fuel Oil[3]
Formaldehyde	0.85	0.19
Toluene	0.15	0.37
Xylenes	0.08	0.36
Acetaldehyde	0.05	0.007
Ethyl benzene	0.04	-
Propylene oxide	0.04	-
Benzene	0.01	0.04
Acrolein	0.008	0.06
PAH	0.003	0.03
Naphthalene	0.002	0.02
1,3-butadiene	0.0005	0.01
Lead	0.06	0.01
Manganese	0.006	0.54
Selenium	-	0.02

[1] NOx, CO, VOC, PM10 emission factors provided by turbine manufacturer; SO2 emission factor provided by US EPA AP-42, Section 3.1 (assumes ultra low sulfur distillate).

[2] 1,454 hours per year based on a CO limit of 80 tons/yr).

[3] 668 hours per year based on a CO limit of 80 tons/yr).

The potential to impact ambient air quality was modeled using AERMOD. The results of the modeling, presented in Table 4-8, show that the Project will have a minimal impact on area air quality for all pollutants modeled. The modeled concentrations are well below the National Ambient Air Quality Standards and Minnesota Ambient Air Quality Standards for all pollutants.

Table 4-8 Potential Impacts to Ambient Air Quality – Preliminary Modeling, Alternative Site (May 2007)

Natural Gas Combustion - Emissions Modeling						
Pollutant	**Averaging Period**	**Significant Impact Level (ug/m^3)**	**Maximum Modeled Concentration (ug/m^3)**	**Background Concentration (ug/m^3)**	**Total Concentration (ug/m^3)**	**Ambient Air Quality Standard (ug/m^3)**
PM_{10}	24-hour	5		42		150
	Annual	1		21		50
NOx	Annual	1		82		100
CO	1-hour	2000		664		40,000
	8-hour	500		349		10,000
SO_2	1-hour	25		56		1,300
	3-hour	25		27		1,300
	24-hour	5		13		365
	Annual	1		2.7		80
Fuel Oil Combustion – Emissions Modeling						
Pollutant	**Averaging Period**	**Significant Impact Level (ug/m^3)**	**Maximum Modeled Concentration (ug/m^3)**	**Background Concentration (ug/m^3)**	**Total Concentration (ug/m^3)**	**Ambient Air Quality Standard (ug/m^3)**
PM_{10}	24-hour	5		42		150
	Annual	1		21		50
NOx	Annual	1		82		100
CO	1-hour	2000		664		40,000
	8-hour	500		349		10,000
SO_2	1-hour	25		56		1,300
	3-hour	25		27		1,300
	24-hour	5		13		365
	Annual	1		2.7		80

The Project also triggers the MPCA's requirement to prepare an assessment of air emission risks to human health. The MPCA's "Air Emissions Risk Analysis (AERA) Guidelines" [http://www.pca.state.mn.us/air/aera-guide.html] requires the establishment of a baseline risk for the existing site and an analysis of the impact of the new emissions from the turbine installation. Since the existing site is undeveloped, the baseline risk is assumed to be zero. An analysis of the CT on the Rosemount site has not been completed; however, the analysis performed for the preferred site (Section 4.1.1) is a good indication that risks associated with the CT are negligible. A complete AERA would be conducted to confirm the impacts if the Project was to be constructed at the alternative.

Table 4-9 Preliminary Screening-Level Incremental Air Emissions Risk Analysis

[Turbine Project Only]

Air Toxics Screen [1]												
Total Inhalation Screening Hazard Indices and Cancer Risks				Total Indirect Pathway Screening Hazard Indices and Cancer Risks				Total Multipathway Screening Hazard Indices and Cancer Risks				
Acute	Subchronic Noncancer	Chronic Non-cancer	Cancer	Farmer Non-cancer [2]	Farmer Cancer [2]	Resident Non-cancer	Resident Cancer	Farmer Non-cancer [2]	Farmer Cancer [2]	Resident Non-cancer	Resident Cancer	
3.7E-01	4.2E-03	2.4E-02	8.E-07	1.2E-04	3.E-04		1.E-06	2.4E-02	3.E-04	2.4E-02	2.E-06	
1.0E+00	1.0E+00	1.0E+00	1.0E-05	1.0E+00	1.0E-05	1.0E+00	1.0E-05	1.0E+00	1.0E-05	1.0E+00	1.0E-05	<<< Acceptable Level
OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	<<<OK or Not?

[1] Cancer risks rounded to one significant figure per U.S. EPA guidance (1989; 2005).
[2] Farmer risks reported but farming is not a current land use at the Elk River Station property boundary. Reasonably foreseeable future land use indicates it is highly unlikely for a farmer to be located at the property boundary.

Another potential source of air emissions is fugitive dust from site preparation and construction activities. However, construction-related fugitive emissions will be of a short-term duration and will be controlled by watering or applying dust suppressants to exposed soil surfaces as necessary to reduce the impact on area residents.

4.2.2 Water Use and Wastewater Generation

4.2.2.1 Water

Water supply at the Rosemount site would be from one of two existing onsite wells or a new well. The existing wells are used for irrigation and are permitted for 800 gpm each or annual maximum pumping of 39.1 and 52 million gallons per year (MGY) each. A dedicated pipeline would deliver the water to the plant pre-treatment system prior to use in the plant.

The project will require de-mineralized water for NOx controlling while firing fuel oil. A rented de-mineralizer would treat water to be stored in a tank on site.

4.2.2.2 Wastewater

Wastewater from the plant would be discharged to MCES sewer lines. New sewer discharge lines approximately 0.75 miles long would be required to connect to MCES sewers. A pretreatment permit will likely be required from MCES for the waste waterdischarge. Alternatively, an NPDES permit would be obtained to allow direct discharge to the Mississippi River. The NPDES could require additional onsite wastewater treatment. A pipeline similar to that required for an MCES discharge would be required to connect to the Empire WWTP outfall.

4.2.3 Noise

Operation of the Project at the Rosemount site would result in an increase in frequency of operational noises, but not a significant increase in maximum noise levels at nearby residences. Siting of the Project at the Rosemount site will not result in any violation of Minnesota Noise Standards at the residences located near the facility.

Noise would be generated during the construction and operation of the Project. Construction noise would be predominantly intermittent sources originating from diesel engine-driven construction equipment. Potential noise impacts would be mitigated by proper muffling equipment fitted to construction equipment and restricting activities conducted during nighttime hours.

4.2.4 Land Use Impacts

The entire land use within the boundary of the Rosemount site is currently agricultural crop land. The Rosemount site is about 320 acres, of which 215 acres, or 67% of the total area, is considered prime farmland. Minn. Rules 4400.3450 Subp. 4 prohibits use of more than 0.5 acres of prime farmland per megawatt of capacity for sites where large generating plants are located (unless no feasible alternative exists). Given the 175 MW capacity of the proposed facility, this rule would allow use of up to 87.5 acres of prime farmland for the Rosemount site. The proposed facility would utilize approximately 40 acres, or about 46% of the maximum allowable area. Therefore, construction of the Project at the Rosemount site is consistent with Minn. Rules 4400.3450 regarding use of prime farmland.

The Rosemount location takes advantage of existing roads. A new generating unit would require additional water and sewer infrastructure. Construction of the Project at the Rosemount site would change the land use of the area from agricultural to industrial.

4.2.4.1 Stormwater – New NPDES Permit

The Project would operate under a new Minnesota General Industrial Stormwater Discharge Permit. Stormwater collected from areas that may be contaminated by fuel or oil spills will flow through oil/water separators or containment systems that allow inspection prior to discharge to a stormwater pond.

4.2.4.2 Zoning and Displacement

The alternative site is located within the City of Rosemount corporate boundary, which encompasses approximately 36 square miles (City of Rosemount 2007). The City's zoning map (Figure 4-10) shows the Rosemount parcel zoned as "Agricultural." Adjacent zoning includes "Waste Management" (a landfill) to the north and "Public/Institutional" (public golf course) to the west. Adjacent areas to the east and south are zoned agricultural.

No businesses or residences would be displaced by the Project at the Rosemount site.

4.2.4.3 Aesthetics

The Rosemount site is visually dominated by lands used for row-crop agriculture to the south and east. Several local farmsteads exist nearby. A landfill is to the north, with mixed native/non-native vegetation around its perimeter. A golf course is to the west. Industrial properties dominate further north and northeast, including an oil refinery.

4.2.4.4 Impacts to Industries

Area industries would not be adversely impacted at the Rosemount site. The Rosemount site would use primarily agricultural land. No forestry-related industry would be adversely impacted at the Rosemount site. Area tourism and recreation areas, including the adjacent golf course, would not be adversely impacted at the Rosemount site.

4.2.5 Social, Cultural and Economic Impacts

4.2.5.1 Public Health and Safety

Security at the Rosemount site would be provided through the use of security gates and surveillance cameras. Fire alarms and emergency fire suppression equipment would be located throughout the facility to reduce the risk and spread of fire. Emergency first aid equipment, including eyewash stations and first aid kits would also be installed throughout the facility. Employees would have regular training in safety and first aid. Severe weather shelters would be designated and clearly posted.

4.2.5.2 Public Services and Infrastructure

The Rosemount site is agricultural land in the vicinity of an established industrial use area. There are basic public utility services of phone, sewer, water and electricity in the vicinity of the Rosemount site. The Rosemount site would utilize this existing infrastructure. The Project would not be expected to greatly increase the demands on the local infrastructure.

A natural gas supply is required for firing the combustion turbine generators as discussed in section 3. A natural gas pipeline is about 8000 ft from the property boundary and only a short distribution line will be required to supply the plant with the required gas. A short transmission line will also be required to connect the plant to nearby transmission lines. The site would be served by local fire and police.

Major routes to and from the Rosemount site include a variety of highways. County Highway 42 is a local east-west route to the City of Rosemount 7 miles to the West. County Highway 42 is located directly adjacent to the site and connects to US Highway 52, 0.75 miles to the west side of the site. It is anticipated that any significant construction or supply access to the site would follow this route. The north side of the site is bounded by Ehler's Path and 140th St. East. Emery Ave East runs north-south along the east side of the Great River Energy site.

4.2.5.3 Archaeological and Historical Resources

The Rosemount area was originally inhabited by the Lower Band Mdewanton of the Santee Sioux tribe. On August 5, 1851, Chief Little Crow, the leader of the New Ulm Indian uprising, signed a treaty at Pilot Knob, Mendota, turning the land over to the government.

Dakota County was established in 1849, one of the first counties in the new Territory of Minnesota. The western boundary of the county was the Missouri River, which is now halfway across the Dakotas. The county was named for the people who inhabited it prior to white settlement, the Dakota people. Some of the earliest immigrants to Dakota County were the French-Canadians who came to trade for furs with the Dakota people (Dakota County Historical Society, 2003).

In 1853, the first settlers, William and Walter Strathern and C. H. Carr came to the Rosemount area from Scotland. They were followed soon after by many immigrants, most of whom were Irish Catholics. On May 11, 1858, settlers met at the home of Thomas Dowd for the first township meeting. Coincidentally, this was the same day that Minnesota became a state. Because of strong Irish sentiments and the fact that there is a village in Ireland of the same name, Rosemount was chosen (City of Rosemount 2003).

The State Historical Preservation Office (SHPO) was contacted and asked to review their database. Based on the SHPO response, an archaeological survey was conducted in compliance with SHPO standards.

4.2.5.4 Economic Benefits

The local community will benefit from the Project construction. Construction of the Project will require an estimated 100 skilled craft workers to be on the site at any one time over the 12-month construction period. These high-skill, high paying positions, including pipe fitters, iron workers, millwrights, boilermakers, carpenters, electricians, and other trades, are estimated to have a payroll of about $xx million over the course of the Project. Day-to-day operation of Rosemount Station would require two to three full-time employees after construction.

The Project will contribute to Dakota County's tax base. The state and Dakota County will also benefit from income and sales taxes paid as a result of the construction of the Project. The operating staff associated with the Project will continue to pay payroll taxes.

4.2.6 Effects on the Natural Environment

4.2.6.1 Topography

The Rosemount site lies within 3.25 miles west of the Mississippi River on level to gently rolling uplands at a mean elevation of approximately 840 feet above sea level. Construction and operation of the proposed facility at the Rosemount site would not substantially alter the existing topography.

4.2.6.2 Geology and Soils

Topography in the area is the result of a variety of geologic processes. Sedimentary rocks that were deposited 600-400 million years ago underlie all of Dakota County. The lower layers of rock consist of sandstone and shale. These are the older Paleozoic layers of Jordan sandstone, St. Lawrence and Franconia formations, Ironation and Galesville sandstones, Eau Claire formation and Mt. Simon sandstone (Balaban and Hobbs 1990). The upper layers were deposited later, and consist of sandstone, shale and limestone, and are at or near the surface across much of the county. This uppermost bedrock is Prairie du Chien group. These bedrock layers have been eroded by glaciers and by weathering.

The depth to bedrock is between 50-150 feet under the Rosemount site. The transmission corridors transverse areas of 0-50 feet depth to bedrock, 50- 150 feet depth to bedrock, and corridors that extend the furthest north are on areas with up to 500 feet depth to bedrock.

Glacial sediments were deposited directly by glaciers as loamy unsorted till. The Rosemount site is underlain by mixed outwash from the Des Moines lobe [Hobbs, 1990 #69]. This outwash generally consists of sand, loamy sand, and gravel. The Project transmission corridors are primarily underlain by outwash from the Superior lobe deposits. The Superior lobe outwash consists of gravel and sand. Large rivers that formed when the glaciers melted deposited sandy outwash across much of the county. Since glaciation thick layers of loamy to silty alluvium have accumulated along major rivers and in side valley tributaries. The Project transmission corridors may also cross riparian terrace deposits, which consist of clean sand and gravel, with the lower terraces lying 5 to 70 feet, and the middle lying 70 to 130 feet above the present floodplain.

Soils in the area are Waukegan-Wadena-Hawick Associations, which are level to very steep, well drained and excessively drained soils formed in silty and loamy sediments over sandy outwash, on

outwash plains and terraces (Figure 4-11). These soils formed mainly in glacial till, glacial outwash, loess, alluvium, and bedrock. Most of this soil map unit is used for cultivated crops and some areas are used for building sites. Waukegan soils are the most common soil type in the Rosemount site and corridor areas. Where drained, Waukegan soils are considered prime farmland.

Of the 320 acres of land at the Rosemount site, roughly 87% are deep and moderately deep, moderately well and well drained soils that have moderately coarse texture and moderate infiltration rates. Approximately 10% of the soils are deep, well drained to excessively well drained sands and gravels with high infiltration rates. The remaining 2% are soils that can be drained then classified. At the Rosemount site 66% of the area is prime farmland soils, and 1% are prime farmland soils if drained.

4.2.6.3 Rivers, Streams and Lakes

The Project will not significantly impact area water bodies. The Project site is located within Mississippi River (Metro) watershed, USGS/MNDNR major watershed #20. The nearest named stream is the Mississippi River, (see Figure 4-12).

Review request letters have been sent to the MNDNR and the U.S. Army Corps of Engineers requesting information on potential impacts of the Project on area water resources.

4.2.6.4 Vegetation

The pre-settlement vegetation of the Rosemount site was upland oak woodland-brushland and prairie (Marschner 1930). There may have been patches of dry oak savanna, and mesic or dry sub-type oak forest patches. Because of the fairly low groundwater table, the site was likely dominated by an assemblage of mesic to dry forest and prairie plants, such as bur and northern pin oaks, and big bluestem. Within the Project transmission corridors native vegetation consisted of oak openings and barrens, which consist of scrubby forms of oak with some brush and thickets. Some areas of upland deciduous forest may have existed along the Mississippi River.

Since settlement, the site and its vicinity have been logged, ditched, tiled and tilled which has effectively removed all evidence of the pre-settlement vegetation. The native vegetation is almost entirely replaced with agricultural crops, dominated by corn and soybeans. The remaining non-agricultural areas were replaced by industrial development.

According to the Minnesota Land Cover Classification System (MLCCS), the entire Rosemount site consists of upland soils dominated by row crops.

Plant communities were ranked by Dakota County based on MLCCS vegetation criteria. Minnesota County Biological Survey (CBS) natural communities were scored the highest. Natural communities are defined by the CBS as groups of native plants and animals that interact with each other, and their abiotic environment, in ways not greatly altered by modern human activity, or by introduced organisms. CBS natural communities did not occur within the Rosemount site, and are generally situated adjacent to the Mississippi River within transmission corridors in the floodplain. No native plant communities exist at the Rosemount site.

4.2.6.5 Fauna

The pre-settlement species of wildlife that resided in oak woodland-brushland and prairie included numerous large and small mammals and birds that are no longer present in the area. These species included the American bison, common elk, pronghorn antelope, black tailed prairie dog and the prairie chicken.

The post-settlement conversion of the sites to agricultural crops and industrial areas has partly accounted for the complete removal of many wildlife species (agricultural crops do not provide suitable cover for most species of wildlife and do not support the diet that maintained these species prior to settlement).

At the Rosemount site, the loss of crops and herbaceous plants would displace the limited amount of wildlife that may utilize the area. However, an abundant amount of similar type habitat exists in the surrounding area, so it is not anticipated that the overall carrying capacity of the region would be significantly impacted.

Nearly all of the wildlife species will utilize the proposed site only as a food resource, with the exception of the small rodents, which may inhabit the bromegrass of the roadside ditches. These species of wildlife will feed on grains and vegetable matter or they will feed on the insects and small mammals that are supported by these crops. Corn is one of the most highly utilized crops, and soybeans are one of the least utilized crops, as forage for wildlife. Therefore, the abundance

and diversity of species found in the vicinity of the corn crop should be higher than found in the soybean crop.

Most of the wildlife that would use this area are bird species which have an ability to travel some distance to and from suitable cover. The wetland complex at the north-west corner of the Rosemount site and on the adjacent property to the north provides important habitat for waterfowl and wetland species in the proximity.

4.2.6.6 Wetlands

A wetland complex is located in the northwest corner within the Rosemount site (Figure 4-13). This wetland complex was delineated by Barr Engineering on April 28, 2003. The site was revisited in March 2007 to confirm the wetland boundaries.

The wetland is a 16.0-acre irregularly shaped basin comprising several wetland types. The western lobe of the wetland, approximately 40% of the overall area, is a Type 6 (palustrine scrub-shrub) wetland. The eastern lobe, approximately 40% of the total area, is a Type 4 (palustrine emergent, permanently flooded). The remainder of the wetland, primarily comprising the edges of the basin, is a combination of Type 1, 2 and 3 wetlands (palustrine emergent wetlands with water regimes ranging from semipermanently flooded to saturated).

Dominant plant species are narrowleaf and hybrid cattails (*Typha angustifolia* and *Typha* x *glauca*) in the emergent components of the wetland complex, and cottonwood (*Populus deltoides*) and willows (*Salix* sp.) in the scrub-shrub portion. Agricultural fields abut the wetland to the east and south. A golf course is to the west, and 140th Street East is to the north. The wetland is connected via a culvert under 140th Street East to an additional 10.5 acres of primarily Type 4 wetland.

The Project would be configured on the Rosemount site in such a way that it would have no direct impacts to the wetlands. There would be no discharge to the wetland.

An additional wetland was delineated in April 2003 on the golf course west of the alternative site. Also, the National Wetland Inventory maps for the area indicate seven smaller wetlands to the north and northeast of the alternative site. The acreages and Cowardin classifications of these wetlands are summarized in Table 4-10, and their locations are shown on Figure 4-13. Construction

of the project at the alternative site would have no impact, direct or indirect, on any of these wetlands.

Table 4-10 Wetlands Summary at Alternative Site

Distance and Direction from Alternative Plant Location	Method of Identifying Wetland	Cowardin Code	Area (acres)	Cowardin Classification
500' NNW	Delineation	PEMH	9.6	Palustrine emergent wetland, permanently flooded
1200' NW	Delineation	PSSF	6.4	Palustrine scrub-shrub wetland, semipermanently flooded
2800' WNW	Delineation	PEMC	1.8	Palustrine emergent wetland, seasonally flooded
1500' N	NWI	PEMF	2.5	Palustrine emergent wetland, semipermanently flooded
2100' N	NWI	PEMF	1.8	Palustrine emergent wetland, semipermanently flooded
5500'NW	NWI	PEMC	0.6	Palustrine emergent wetland, seasonally flooded
6000' NW	NWI	PEMA	0.5	Palustrine emergent wetland, temporarily flooded
6000' NE	NWI	PEMA	0.5	Palustrine emergent wetland, temporarily flooded
6000' NE	NWI	PEMA	0.4	Palustrine emergent wetland, temporarily flooded
6300' NE	NWI	PEMA	0.2	Palustrine emergent wetland, temporarily flooded

4.2.6.7 Rare and Unique Natural Resources

The Project will not adversely impact threatened or endangered species. The USFWS lists the following Federally-listed species as being potentially present in Dakota County:

- Higgins eye pearly-mussel (*Lampsilis higginsi*), endangered
- Minnesota dwarf trout lily (*Erythronium propullans*), endangered
- Bald eagle (*Haliaeetus leucocephalus*), threatened
- Prairie bush clover (*Lespedeza leptostachya*), threatened

The Rosemount site does not provide habitat for any of these species. There would be no discharge to potential Higgins eye pearly-mussel habitat. The intensive agricultural use of the property is incompatible with either of the plant species, as is the small wetland area (both are upland species). Finally, the trees in the wetland are not large enough to support eagle nests.

With regard to State-listed species, the MNDNR Natural Heritage Inventory System (NHIS) was queried to determine if any rare plant or animal species or other significant natural features are

known to occur within the Rosemount site. The NHIS database indicates that loggerhead shrikes (*Lanius ludovicianus*), a Minnesota threatened species, and bald eagles (*Haliaeetus leucocephalus*), a Federally threatened species, have been documented near the Rosemount site.

The MNDNR does not know the size of the full extent of the loggerhead shrike population in the project vicinity, however breeding season observations and nesting sites have been located between Hwy 55 to the north, Hwy 52 to the west, Hwy 61 to the east, and Hwy 50 to the south. The MNDNR has previously indicated in an earlier study of the Rosemount site that no further survey work is necessary to define the loggerhead shrike population, since the extent of the local population is fairly well known. Instead, in order for loggerhead shrikes to be able to continue to use the Rosemount site it would be imperative that some habitat be maintained or created within the Rosemount site buffer area.

Shrike habitat includes open country and dry upland prairie with hedgerows, shrubs, and small trees, as well as shelterbelts, old orchards, pastures, cemeteries, grassy roadsides, and farmsteads. The scattered trees, shrubs, and fencerows in these areas provide places shrikes need to hunt and nest. Shrikes feed by perching on trees, shrubs, fences or powerlines, and flying out to catch their prey (large insects, small mammals, birds, frogs etc.) in surrounding open grassy areas. Therefore, areas that are too open and have no trees or shrubs for nesting and perching are unsuitable, as are forested areas or dense brushland, which have no open areas in which to spot prey.

No plants or animals of concern were identified that would be adversely impacted by the utilization of the Rosemount site.

4.3 Comparative Summary of Preferred and Alternative Sites

Both the preferred and alternative sites offer viable options for siting of the Project with minimal effect on natural, cultural and socioeconomic resources, and with no significant adverse environmental impacts.

Locating the project on either site can be accomplished without loss of wetlands or degradation of habitat for sensitive species. Neither site has documented features with archaeological, historic or architectural significance. Water supply can be accomplished at either site without notable stresses on water availability, and stormwater discharge is minor and controlled at both locations.

Locating the Project at the preferred site would result in little or no change to the existing land use, since the preferred site is currently used by Great River Energy for utility-related activities. Locating the Project at the alternative site would result in a more significant change in land use, since the alternative site is currently in agricultural use. However, the alternative site is bounded to the immediate north by a landfill, with areas zoned Industrial Park and Heavy Industrial less than a mile to the north and northwest.

Both sites have existing infrastructure to support the proposed facility. Given the specific design of the proposed generating facility, the preferred site offers a more efficient and economic utilization of existing infrastructure.

5 References

Balaban, N.H. and H.C. Hobbs. 1990. Geologic Atlas of Dakota County, Minnesota. County Atlas Series C-6. University of Minnesota. St. Paul, MN

Chamberlain, L.M. 1977. Soil Survey of Anoka County, Minnesota, USDA Soil Conservation Service, in cooperation with Univ. of Minnesota Agricultural Experiment Station.

City of Elk River Planning Department. 2007. Zoning Map. http://www.ci.elk-river.mn.us/index.asp?Type=B_BASIC&SEC={C59DB4A3-31BF-4DAE-B553-EFBE34C44D19}. Accessed May 7, 2007.

City of Rosemount Department of Community Development. 2007. Zoning Map. http://rosemount.govoffice.com/index.asp?Type=B_BASIC&SEC={6CC78DB8-E9F8-4D72-9D01-8F739689956E}. Accessed May 9, 2007.

Grimes, M.F. 1968. Soil Survey, Sherburne County, Minnesota. USDA Soil Conservation Service. US Gov't Printing Office

Marschner, F. J. 1930. Presettlement vegetation types in Minnesota (map). U.S. Department of Agriculture, Washington, D.C.

Meyer, G.N., C.J. Patterson, H.C. Hobbs, and J.D. Lehr, 1993. "Surficial Geology" in "Anoka Sand Plain Regional Hydrogeologic Assessment." Minnesota DNR Regional Assessment Series, RHA-1, Plate 1.

Minnesota Department of Natural Resources. 2005. Field Guide to the Native Plant Communities of Minnesota: The Eastern Broadleaf Forest Province. Ecological Land Classification Program, Minnesota County Biological Survey, and Natural Heritage and Nongame Research Program. MNDNR St. Paul, MN

Sherburne County Dept of Public Works GIS Division. 2007. Interactive Land Use Map. http://www.co.sherburne.mn.us/pubworks/gis/apgismaps.htm, Accessed May 7, 2007.