APPLICATION TO THE

MINNESOTA ENVIRONMENTAL QUALITY BOARD

FOR A

GENERATING PLANT SITE PERMIT

HIGH BRIDGE COMBINED CYCLE PROJECT

EQB DOCKET NO. 05-91-PPS-XCEL HIGH BRIDGE

JANUARY 27, 2005

Xcel Energy
NORTHERN STATES POWER

Application for a Generating Plant Site Permit
High Bridge Combined Cycle Project

Table of Contents

1 Introduction 1-1
1.1 Overview 1-1
1.2 Statutory Considerations for Issuing a Site Permit 1-2
1.3 Purpose 1-2
1.4 Applicant Information 1-2
1.5 Project Schedule 1-3
1.6 Other Project Permits 1-3
1.6.1 Certificate of Need 1-3
1.6.2 Other Project Permits 1-4
2 Project Description 2-1
2.1 High Bridge Combined Cycle Project 2-1
2.2 Cost Analysis 2-2
2.3 Future Expansion 2-2
2.4 Decommissioning of Existing Plant 2-3
3 Engineering and Operational Design 3-1
3.1 Plant Components 3-1
3.1.1 Combustion Turbine Generators 3-1
3.1.2 Heat Recovery Steam Generators 3-2
3.1.3 Steam Turbine Generator 3-2
3.1.4 Facility Buildings and Structures 3-3
3.1.5 Electrical Interconnection 3-3
3.1.6 Fuel Supply 3-4
3.1.7 Water Supply/Wastewater Management 3-5
3.1.8 Air Pollution Control 3-7
3.2 Site Preparation and Remediation 3-8
3.3 Construction 3-9

3.4 Operation and Maintenance 3-10
4 Environmental Information 4-1
4.1 Air Quality Impacts 4-1
4.1.1 Air Emission Sources 4-1
4.1.2 Air Pollutants Emitted 4-2
4.1.3 Air Emission Control Measures 4-3
4.1.4 Compliance Demonstration 4-4
4.1.5 Air Pollutant Impacts 4-4
4.1.6 Air Emissions Risk Analysis 4-5
4.2 Water Use and Wastewater Generation 4-5
4.2.1 Water Use 4-5
4.2.2 Wastewater 4-7
4.3 Noise 4-9
4.4 Land Use Impacts 4-11
4.4.1 Zoning and Displacement 4-11
4.4.2 Aesthetics 4-11
4.4.3 Impacts to Industries 4-12
4.5 Social, Cultural and Economic Impacts 4-12
4.5.1 Public Health and Safety 4-12
4.5.2 Public Services and Infrastructure 4-13
4.5.3 Archaeological and Historical Resources 4-14
4.5.4 Economic Benefits 4-15
4.6 Effects on the Natural Environment 4-15
4.6.1 Geology and Soils 4-15
4.6.2 Rivers, Streams and Lakes 4-16
4.6.3 Vegetation 4-16
4.6.4 Fauna 4-17
4.6.5 Wetlands 4-17
4.6.6 Rare and Unique Natural Resources 4-17

List of Tables

Table 2-1 HBCC Plant Capacity
Table 3-1 Transmission Line Modification Requirements
Table 3-2 Fuel Requirements
Table 3-3 Operational Information Summary
Table 4-1 Projected Actual Air Emissions
Table 4-2 Future to Present Annual Emissions Comparison
Table 4-3 Water Needs Summary
Table 4-4 Wastewater Discharge Summary
Table 4-5 Projected HBCC Plant Sound Levels

List of Figures

Figure 1-1 Project Location
Figure 1-2 Project Vicinity
Figure 2-1 Existing Plant Photograph
Figure 2-2 Project Photo Rendition
Figure 2-3 Existing Plant Features
Figure 2-4 Project Layout
Figure 3-1 Combined Cycle Technology Elevation View Schematic
Figure 3-2 Combined Cycle Technology Plan View Schematic
Figure 3-3 Water Usage
Figure 4-1 Noise Monitoring Locations
Figure 4-2 Zoning Map
Figure 4-3 Recreation Areas
Figure 4-4 Traffic Counts
Figure 4-5 Soil Series
Figure 4-6 Bedrock Geology
Figure 4-7 Surficial Geology
Figure 4-8 Water Bodies
Figure 4-9 Communities of Significant Biological Diversity

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;	1.4
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;	1.4
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;	2.1
G. the engineering and operational design for the large electric power generating plant at each of the proposed sites;	Section 3
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;	2.2
I. an engineering analysis of each of the proposed sites, including how each site could accommodate expansion of generating capacity in the future;	2.3, Section 3, Section 4
J. identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility;	3.1.5, 3.1.6, 3.3, 4.5.2
K. a listing and brief description of federal, state, and local permits that may be required for the project at each proposed site; and	1.6
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.	1.6.1

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;	4.3, 4.4, 4.5
C. a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;	4.4.3
D. a description of the effects of the facility on archaeological and historic resources;	4.5.3
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, 4.2, 4.6
F. a description of the effects of the facility on rare and unique natural resources;	4.6.6
G. identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route; and	Section 4
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, 2.2

1 Introduction

1.1 Overview

Northern States Power Company, doing business as Xcel Energy ("Xcel Energy"), hereby applies to the Minnesota Environmental Quality Board ("MEQB") for a Site Permit pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes 116C.51 through 116C.69) and Minnesota Rules Chapter 4400.

As part of its Metro Emissions Reduction Proposal (MERP), Xcel Energy proposes to replace the existing 271-MW coal-fired High Bridge Plant with a 480-665 MW capacity (nominal range depending on operating conditions) natural gas-fired 2-on-1 combined cycle system and associated facilities (the "Project"). The Project is to be placed in service in the spring of 2008. The construction of the new generating units at the High Bridge Generating Plant site falls within the definition of a Large Electric Power Generating Plant ("LEPGP") in the Act and, thus, requires a Site Permit from the MEQB prior to construction.

The Project is described in more detail throughout this Application. The location of the Project and the Project vicinity are shown on Figures 1-1 and 1-2, respectively. The Project will be completely within the City of St. Paul.

Xcel Energy informed the MEQB by its December 20, 2004 letter that we are electing to apply and have our proposal reviewed using the procedures of Minnesota Rules 4400.2000 through 4400.2950, referred to as the Alternative Permitting Process. The Project is eligible for the Alternative Permitting Process because the proposed units will be fueled by natural gas (Minnesota Rules 4400.2000, Subp. 1, B).

The Project is part of the broader MERP, which includes projects at Xcel Energy's King and Riverside Generating Plants near Bayport, Minnesota and in Minneapolis, Minnesota, respectively. These sites were chosen because of: (1) the opportunity to reduce air emissions; (2) the existing infrastructure at the existing plants; (3) their suitability for repowering or upgrading; and (4) the availability of transmission capacity.

Greenfield sites and sites that would require major transmission system upgrades were not considered.

1.2 Statutory Considerations for Issuing a Site Permit

Minnesota Statutes § 116.57 establish site selection standards and criteria under which the MEQB must be guided by in their determination of designating a site for a proposed generating plant. Xcel Energy believes the information provided in this application is sufficient for the MEQB to determine that the proposed Project meets the *"…state's goals to conserve resources, minimize environmental impacts, minimize human settlement and other land use conflicts, and ensure the state's electric energy security through efficient, cost-effective power supply and electric transmission infrastructure"* (Minn. Statutes § 116.57, Subd. 4.); and the MEQB should issue a site permit for the proposed Project.

1.3 Purpose

The purposes of the Project, as a component of the MERP, are to:

- Provide environmental improvement at a major metropolitan power plant through significant reductions in SO_X and NO_X emissions and eliminating lead and mercury emissions;

- Assure the availability of clean, reliable generating capacity at a time when additional capacity is needed—the Project will replace the existing coal-fired plant with 271 MW of capacity with a new natural gas-fired combined cycle plant with 480-665 MW of generating capacity (nominal range depending on operating conditions) ; and

- Avoid costly and time-consuming investment in additional transmission and other infrastructure by taking advantage of existing infrastructure at the High Bridge Plant site.

1.4 Applicant Information

The Project will be constructed, owned and operated by Northern States Power Company d/b/a Xcel Energy. Xcel Energy, headquartered in Minneapolis, Minnesota, is the fourth-largest combination electric and natural gas energy company in the United States. Northern States Power Company is a wholly owned subsidiary of Xcel Energy, Inc.

Northern States Power Company d/b/a Xcel Energy will be the permittee. The contact person at Xcel Energy regarding this Project is:

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1.5 Project Schedule

In order to meet the anticipated need for additional base load duty generating capacity in the spring of 2008 construction must begin in the early summer 2005.

We anticipate that Plant and associated facilities construction will proceed in parallel, testing and start up activities will occur in late 2007 and early 2008, and the Plant will be placed in commercial service in May 2008. The demolition of the existing coal-fired plant will be completed after the commissioning of the new Plant.

1.6 Other Project Permits

1.6.1 Certificate of Need

No Certificate of Need is required for the Project.

On July 26, 2002, Xcel Energy submitted an emission reduction proposal to the Minnesota Public Utilities Commission, the Metropolitan Emission Reduction Proposal (MERP) and accompanying rate rider, pursuant to Minn. Stat. § 216B.1692. The proposal identified emission reduction options at three plants located in the Twin Cities metropolitan area, including the High Bridge Plant in St. Paul. The MERP included replacing the existing coal-fired units at the High Bridge Plant with a natural gas, 2-on-1 combined cycle system, eliminating air emissions from burning coal and increasing generation capacity.

On March 8, 2004 the Minnesota PUC issued an Order approving the MERP (PUC Docket No. E-002/M-02-633). The PUC Order, Paragraph 7. states: "The Commission clarifies that Xcel Energy need not obtain a Certificate of Need for conversion of the High Bridge Plant as that conversion is exempted from the Certificate of Need requirements of Minnesota Statutes § 216B.243."

1.6.2 Other Project Permits

Air Quality Permit

Xcel Energy will submit an application for an amendment to the High Bridge Generating Plant air emission permit, Permit No. 12300012-003, to accommodate the Project. We expect to file the application to the Minnesota Pollution Control Agency in January 2005.

Water Appropriations Permits

Xcel Energy will request an amendment to the Plant's existing Well Water Appropriations Permit No. 69-1090 (as amended Sept. 16, 2003) and existing River Water Appropriations Permit No. 76-6347 (dated January 17, 1977) in early 2005 to meet the water needs of the Project. It is not expected that either amendment will request an increase in annual appropriations from existing permit limits.

National Pollutant Discharge Elimination System (NPDES) Discharge Permit

Xcel Energy will request an amendment to the Plant's existing NPDES discharge permit in early 2005 to meet the cooling water needs of the Project. In addition to cooling water, Xcel Energy may also apply for approval of discharge of other Project process wastewater streams under the same permit.

Modifications to the cooling water intake structure to accommodate Clean Water Act 316(b) requirements may also require obtaining a Corps of Engineers Section 10 Work in Navigable Waters and Section 404 Dredge and Fill Permits and/or a Minnesota DNR Work in Protected Waters Permit.

Metropolitan Council Environmental Services (MCES) Wastewater Discharge Permit

Xcel Energy plans to dispose of Project wastewater to the St. Paul sanitary sewer that ultimately discharges to the MCES wastewater treatment system. Xcel Energy will apply for modification of the Plant's existing MCES permit to accommodate the waste streams from the Project.

NPDES Stormwater Program

The Project triggers the requirement to apply for coverage under the Minnesota Pollution Control Agency's (MPCA) NPDES Stormwater Permit Program for Construction Activities. Xcel Energy will prepare a Stormwater Pollution Prevention Plan (SWPPP) and apply for coverage under a general permit prior to

commencement of Project construction activities in 2005. Xcel Energy will require its contractors to comply with the SWPPP and the provisions of the Project construction stormwater permit.

The existing plant is currently covered under the Minnesota General Permit for Industrial Activity (MN G611000) and has a SWPPP. When the new Plant begins operation, Xcel Energy will apply for coverage under the same general permit or will apply for a Certification of No Exposure.

High-Voltage Transmission Line Route Permit

While the Project will include relocating on-site transmission line structures and reconductoring of certain transmission lines into the Plant, these activities do not require an HVTL Route Permit under Minnesota Rules Chapter 4400. The relocation of the High Bridge substation and the relocation of the transmission lines are part of this Project and are considered associated facilities under the Site Permit. There may be some additional reconductoring required to support the Project, but the planning process is not complete. Those projects are not part of the Site Permit and Xcel Energy would notify the EQB under a separate filing.

If the relocation of a transmission line impacts structures immediately adjacent to the Mississippi River, the U.S. Army Corps of Engineers will have to be notified as part of Xcel Energy's existing Section 10 permit for that line.

Gas Pipeline Route Permit

The Project will require a new natural gas pipeline to bring natural gas to the Plant site. Xcel Energy has solicited competitive proposals to obtain the gas fuel supply for the Project. We expect that the selected supplier will construct a pipeline to supply the Project that will meet the thresholds of Minnesota Statutes 116I and thus requires a Pipeline Routing Permit from the MEQB. We expect that the selected natural gas supplier will file an application for a pipeline routing permit in early 2005.

The natural gas supplier will also apply for other necessary permits for the gas pipeline, which may include:

- MPCA NPDES General Stormwater Permit for Construction Activity
- MDNR License to Cross Public Lands and Waters
- MDNR Wetland Replacement Plan Application
- U.S. Army Corps of Engineers Section 404 Wetland Permit

Other Permits

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

- Federal Aviation Administration Notice of Proposed Construction or Alteration (for exhaust stack)
- Exemption to allow burning of natural gas for power production (DOE, 10 CFR 503)
- Road Crossing Permits (Mn/DOT, Minn. Rules Chpt. 8810)
- Miscellaneous State Building and Construction Permits and Inspections
- Miscellaneous Local Building and Construction Permits and Inspection

2 Project Description

2.1 High Bridge Combined Cycle Project

The High Bridge Combined Cycle (HBCC) Project (or "Project") will consist of replacing the coal-fired plant located near downtown St. Paul on the Mississippi River with a natural gas-fired 2-on-1 combined cycle system, consisting of two combustion turbines, corresponding heat recovery steam generators, and a new steam turbine generator. The Project will provide 480-665 MW of generating capacity (nominal range depending on operating conditions) of capacity, a substantial increase of capacity from the existing coal-fired plant. The Project's generating units will be installed in a new building located at the southwest corner of the existing site. No expansion of the existing plant site will be required by the Project. Coal-fired generation would be eliminated entirely at the site. The existing plant, built in 1924, will be demolished after commissioning of the Project (see Section 2.4). Figures 2-1 and 2-2 are photo renditions of the existing plant and the Project, respectively.

The High Bridge Generating Plant property is owned by Xcel Energy, is located between Shepard Road to the northwest and Randolph Road to the southeast, and covers about 77 acres. The existing plant features and site boundaries are shown on Figure 2-3. The area immediately to the west of the Plant site is industrial in use. The area immediately to the east of the Plant site is a multi-unit residential development. A recreational corridor lies between the Plant site and the Mississippi River.

The High Bridge Generating Plant address is 501 Shepard Road, St. Paul, Minnesota 55102. The Project property is located along the Mississippi River, just southwest of the High Bridge in Township 28N, Range 23W, Sections 1 and 12 in Ramsey County.

The layout of the Project is shown on Figure 2-4. The Project will use the existing circulating water supply and return on the Mississippi River. A new substation on the Plant site and upgrades to transmission lines will be necessary. These upgrades will include relocating several transmission line structures along four transmission lines that will enter the new High Bridge substation.

The Project is expected to be supplied with high-pressure natural gas via a high-pressure natural gas pipeline connecting to the existing Northern Natural Gas

interstate pipeline at the Cedar Town Border Station in Burnsville, about 10 miles southwest of the Project.

The maximum net output of the Project depends on operating mode and ambient weather conditions (primarily temperature and humidity), as summarized in Table 2-1.

Table 2-1 HBCC Plant Capacity

Condition	Temperature, Rel. Humidity	Net Capacity	
		Non-duct Firing	Duct Firing
Summer, with evaporative cooling	89 ºF, 47% Rel. Humidity	480 MW	610 MW
Winter	12 ºF, 60% Rel. Humidity	535 MW	665 MW

The maximum expected net output of the Plant is 665 MW under winter conditions with duct-firing. Maximum gross output of the Plant is about 675 MW under winter conditions with duct-firing, but the net output is reduced by about 10 MW due to the electricity needs for operating the Plant itself.

Xcel Energy expects that the Project will operate as an intermediate load facility. Operation of the facility is described in more detail in Section 3.4.

2.2 Cost Analysis

Total construction costs for the Project are estimated to be about $428 million ($394 million construction, plus an estimated $34 million for remediation, site preparation and existing plant decommissioning).

2.3 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. In this case, we have chosen a site that is currently used for electric generation. Thus, the potential for land use and environmental impact is minimized.

The Project is not designed for further expansion. The site, after completion of the demolition of the coal-fired plant, could conceivably accommodate additional

generation facilities. However, Xcel Energy has no current plans for additional development of the site.

2.4 Decommissioning of Existing Plant

The existing coal-fired High Bridge Plant will be decommissioned after the new gas-fired plant begins commercial operation. High Bridge Plant decommissioning will include demolition and removal of equipment and structures, including the stack. Abatement activities, including removal of asbestos and lead, and, if necessary, remediation of contaminated soils, will also be completed.

The former plant site will be regraded for proper drainage, revegetated, and maintained under the ownership of Xcel Energy.

3 Engineering and Operational Design

This section describes the design of the proposed generating Plant and its operation. The proposed Plant will consist of combined cycle technology that will be operated for intermediate service.

3.1 Plant Components

The proposed Plant will consist of one combined cycle power block in a 2-on-1 configuration and associated support facilities. In a 2-on-1 configuration two combustion turbines, each directly connected to an electric generator, will exhaust hot gas to dedicated heat recovery steam generators. Steam produced by the two heat recovery steam generators will be combined and directed to a single steam turbine.

The term "combined cycle" refers to a power block arrangement with at least one combustion turbine generator, one heat recovery steam generator, and one steam turbine generator. A combined cycle plant is designed to recover waste heat in the exhaust gases of the combustion turbine to produce steam to create additional power generation. The combined cycle technology schematic is shown on Figure 3-1.

The major equipment used in the process of power generation is described below.

3.1.1 Combustion Turbine Generators

The proposed Plant is based on the use of two "F" class combustion turbine generators equipped with dry low NOx combustors. Two examples of "F" class machines are the General Electric Model 7FA and the Siemens-Westinghouse 501F.

Each combustion turbine generator consists of the following equipment in series:

- an inlet air filter
- a compressor, where air is drawn in and compressed
- a combustor, where the air/fuel mixture is ignited
- a power turbine, where the combusted gases expand to rotate a turbine
- an electric generator

The air drawn through the inlet is compressed by the rotating compressor blades, and delivered to the combustor at substantially increased pressure and temperature. In the combustor, natural gas is mixed with the inlet air and burned. The high-temperature, high-pressure gas mixture then moves through the combustion turbine causing the rotor blades and shaft to rotate. The rotor shaft turns an electrical generator that produces electrical power.

The combustion turbine generators will be housed in enclosures that provide thermal insulation, acoustical attenuation, and fire extinguishing media containment. Each combustion turbine generator unit will be approximately 100 feet long. The widest and tallest component on the combustion turbine generators will be the inlet air filters, approximately 45 feet wide and 45 feet tall.

3.1.2 Heat Recovery Steam Generators

The facility will include two heat recovery steam generators – one matched with each combustion turbine. The exhaust gases exit each combustion turbine and flow directly into the heat recovery steam generator. Inside the heat recovery steam generator, the hot exhaust gases are directed across the heat transfer tube surfaces causing the water in the tubes to boil and change phase into steam. The heat recovery steam generators are also equipped with natural gas-fired duct burners that can be used to input additional heat to increase the steam generating capability of the heat recovery steam generators. Each heat recovery steam generator will be approximately 95 feet tall, 40 feet wide, and 140 feet long.

After passing through the heat recovery steam generator, exhaust gases from each combustion turbine generator will discharge through a steel stack. Each stack will be approximately 19 feet in (inside) diameter.

3.1.3 Steam Turbine Generator

A single steam turbine will receive steam produced by the two heat recovery steam generators. Steam received from the heat recovery steam generators will be expanded through a three-stage steam turbine and will rotate the turbine shaft. The energy produced by the expanding steam in all three turbine sections will rotate the turbine shaft, which drives a generator to produce electrical power.

Exhaust steam from the steam turbine will be condensed within a water-cooled steam surface condenser. The condensed steam collects in the bottom of the condenser from which it is pumped back to the heat recovery steam generators to be reused to generate steam. Cycle heat removed from the condensing steam in

the condenser is absorbed by circulating water flowing through the condenser tubes. Heat absorbed by the circulating water will be rejected to the river. The Plant will utilize the existing circulating water supply intake and discharge structures on the river as currently used by the High Bridge Plant. Modification of the intake will be necessary to meet permitting requirements (see Section 4.2). Circulating water pumps will pump circulating water from the river intake through the condenser and back to the river discharge.

3.1.4 Facility Buildings and Structures

The combined cycle Plant will be composed of the power generation building with attached stacks, water treatment and electrical buildings. The power generation building will house the two combustion turbine generators, two heat recovery steam generators, and one steam turbine generator with associated piping. The building will be approximately 425 feet long by 350 feet wide and 100 feet tall. Two steel stacks will be located outside the building. The stacks are anticipated to be 150 feet tall, though the final stack height will be determined later based on air permit requirements. The water treatment and electrical buildings will be attached to the main power generation building.

The power generation building, exhaust stacks, and other large outdoor equipment will be in neutral colors to minimize visual impact to the surrounding area. Sound mitigation measures will be incorporated into the Plant design to meet required noise limits.

3.1.5 Electrical Interconnection

The two combustion turbine generators and the steam turbine generator will generate electricity at a voltage of 18 kV. Three generator step-up transformers will increase the voltage to 115 kV. A 115-kV overhead transmission line approximately 800 feet long will connect the transformers to the relocated High Bridge Substation located on the Project site, east of the generating Plant. The transmission interconnection will require at least two tubular steel tower structures, one adjacent to the Plant and the other just outside the substation.

In order to accommodate the Project, Xcel Energy will need to relocate the High Bridge Substation. Several transmission line structures will also need to be relocated as listed in Table 3-1.

Table 3-1 Transmission Line Modification Requirements

Line Name	Voltage	No. of Relocated Structures
High Bridge to Merriam Park and Dayton's Bluff to High Bridge	115 kV	3 (double circuit)
High Bridge to Shepard	115 kV	1 (single circuit)
High Bridge to Rogers Lake	115 kV	3 (single circuit) 1 to be removed (double circuit)

All of the relocated lines will remain at the same voltage, but will be reconductored.

3.1.6 Fuel Supply

The Project will only use natural gas for fuel to generate electricity. A new gas pipeline will provide high-pressure gas to the site. Table 3-2 summarizes the fuel requirements for the Project when the entire Plant is operating.

Table 3-2 Fuel Requirements

Fuel source	Natural gas via new distribution interconnection to Northern Natural Gas Interstate Pipeline
Natural gas volume requirements	3.2 million SCF/hr/CTG (summer conditions, with evaporative cooling, non-duct fired) 4.8 million SCF/hr/CTG (winter conditions, duct fired)
Heat Input	3,000 million Btu/hr/CTG (summer conditions, with evaporative cooling, non-duct fired) 4,500 million Btu/hr/CTG (winter conditions, duct fired)

A gas-conditioning station will include fuel gas meters and pressure regulators for control and measurement of the gas being supplied. In addition, if required by final design and quality of the natural gas being supplied, gas-conditioning equipment such as compressors, scrubbers and/or filter separators will be included to remove moisture and particulates from the gas stream.

An existing low-pressure gas line serving the existing plant space heating will continue to be used for the same purpose for the Project.

3.1.7 Water Supply/Wastewater Management

Water will be needed for the Project for several processes including:

- domestic-type uses
- fire protection
- once-through non-contact cooling (condensers)
- steam system make-up water (heat recovery steam generators)
- closed cooling system make-up water
- turbine inlet air cooling (evaporative cooling)

With the exception of fire protection, water used for each of these processes also becomes a source of wastewater. Wastewater will be discharged either to the Mississippi River or to the St. Paul sanitary sewer system (MCES). Boiler/steam generator blowdown, service wastewater, and sanitary wastewater (domestic water uses) will be discharged to the St. Paul sanitary sewer system. Once-through non-contact cooling water will be discharged to the Mississippi River. The other wastewater streams, reverse osmosis reject water, and evaporative cooling water blowdown will be discharged to the Mississippi River with the once-through cooling water when the cooling system is operating. If reverse osmosis reject water and evaporative cooling water blowdown are being generated when the cooling system is not operating, those wastewater streams will be discharged to the St. Paul sanitary sewer system (MCES). Figure 3-2 illustrates water use and waste water generation from the operation of the Project..

For the water uses identified above and described further below, there will be three sources of water: Mississippi River, a currently existing well on the Plant site, and the City of St. Paul municipal water supply. The Project demands on each of these sources and the associated permitting requirements are discussed in Section 4.2.

<u>Domestic and Fire Protection Water</u>

Water for domestic-type uses such as drinking water, washing facilities, and fire protection will be obtained from the City of St. Paul municipal water supply, which currently serves similar needs of the existing High Bridge Plant.

<u>Once-Through Non-Contact Cooling Water</u>

Once-through cooling water will be drawn from the Mississippi through the existing intake structure that will be modified as part of the Project as described

below. The water will pass through the Plant condenser, where it will increase in temperature between 15 to 24 degrees F and then be discharged back into the river immediately downstream of the Plant. (See Section 4.2 for a discussion of discharge temperatures).

Xcel Energy will modify the existing plant river water intake, referred to as the Number 2 screenhouse, as part of the Project. This modification is necessary in order to meet new requirements under Section 316 (b) of the Clean Water Act. Xcel is proposing to maintain the same withdrawal capacity and rate of water for cooling purposes (about 201 million gallons per day (MGD)). The anticipated withdrawal is approximately 2.6 percent of the mean annual river flow of 7,600 MGD (from 1901 through 2002). This is less than 5 percent of the mean annual river flow, which is required to qualify for the 316(b) Compliance Alternative 1. However, it is also required that the intake velocity be less than or equal to 0.5 feet per second, and the intake does not currently meet that requirement.

In order to lower the intake velocity to 0.5 feet per second (or lower), the intake must be modified. The current preliminary design (subject to change as the final design is completed) includes the addition of four wedge wire screens that would be placed on the river side of the existing intake structure. Each screen would be 6 feet in diameter, approximately 19 feet long and T-shaped. The screens would be protected by a sheetpile deflector wall and a curtain wall. The modification would extend the intake approximately 36 feet into the river channel. All necessary precautions will be made to identify the deflector/curtain wall to river traffic.

An air backwash system would be installed in order to clean debris from the new T-screens. Existing trashracks and traveling screens would no longer be essential to operations, but will likely be left in place as a backup to the T-screens.

Steam System Make-up and Closed Cooling Make-up Water

Water for steam system make-up and closed cooling make-up water will be obtained from the existing on-site well. Xcel Energy currently holds a water appropriations permit (No. 69-1090 G amended March 20, 1973) for an existing well (see Section 4.2.1).

Make-up water for the steam boilers and closed cooling make-up water is needed to replace water that is lost through boiler/turbine cycle evaporation, leakages, and boiler blowdown. The purpose of boiler blowdown is to control solids in the

boiler water. Blowdown protects boiler surfaces from severe scaling or corrosion problems that can otherwise occur.

The make-up water that will be obtained from the Plant water well contains minerals and other dissolved solids that require that the water be treated. A water treatment system, consisting of a reverse osmosis (RO) system followed by mixed bed deionization will be required to produce acceptable water for the make-up water. This treatment process will generate a wastewater with a concentration of the minerals that are naturally present in the source groundwater. This wastewater either will be discharged to the Mississippi River or to the St. Paul sanitary sewer system depending on Plant operating conditions.

Turbine Inlet Air Cooling (Evaporative Cooling)

The use of evaporative inlet-air cooling enhances operating efficiency of the gas-fired turbines during the warmest days of the year. An increase in turbine output between 3 and 5 percent is expected depending on the ambient temperature and relative humidity. Up to about 20 percent of the time it is anticipated that evaporative cooling may be used to cool the air entering the turbines. Air is cooled through humidification by allowing water to flow over a fabric or cellular media at the inlet to each combustion turbine. A small stream of water will be taken after the reverse osmosis treatment step and mixed with water from the municipal supply to achieve the proper water quality for evaporative cooler make-up.

3.1.8 Air Pollution Control

Air pollution control equipment will be included to achieve and maintain compliance with permitted air emission levels. The combustion turbines will be equipped with dry low NOx combustors to limit the production of NOx during combustion. These combustors are designed to maintain the fuel-to-air ratio to a near stoichiometric level, where the quantity of oxygen in the air introduced into the combustion process is just enough to allow the fuel to burn. This "lean" ratio results in a relatively cool combustion zone. NOx is produced in high-temperature zones; therefore, the lower temperature in the combustion zone will reduce the NOx produced.

Air pollution control equipment for this Project will also include the use of selective catalytic reduction reactors (SCR) for additional control of NOx emissions from the combustion turbines and duct burners. The SCR reactor is integrated into the heat recovery steam generator structure. Ancillary equipment includes catalyst change-out handling equipment (lifting devices and their controls,

as well as support structures) and reagent (aqueous ammonia) receiving, handling, storage, preparation, and delivery systems.

Inherently, natural gas combustion produces little or no particulate or sulfur emissions and, as such, no specific control equipment is required for those pollutants.

3.2 Site Preparation and Remediation

Site preparation will be necessary prior to actual construction of the Project. Those activities will start in summer 2005 and will include removal and relocating of the existing site infrastructure (such as transmission structures) and preliminary site grading. The site preparation activities are complicated by the need to continue operation of the existing plant until the Project is ready for commercial operation. The previous use of the site for coal gas storage and processing activities also complicates site preparation.

Two facilities previously operated on portions of the High Bridge site have legacy environmental issues—the Levee Station Manufactured Gas Plant (MGP) and Kopper's Coke pipeline. Levee Station was used for processing and storage of coke oven gas. Kopper's Coke pipeline was used to supply coke oven gas to Levee Station and the High Bridge Plant.

Previous remediation efforts in the coal yard have included the removal or sealing of the Kopper's Coke pipeline and the removal of "blue soil" known as spent oxide box waste, a non-hazardous industrial waste, from Levee Station site in 1997.

The buried Levee Station building foundations are within the planned footprint of the Plant construction. Those building remains and surrounding contaminated soils must be removed prior to foundation piling installation and other site work. The contents of the gasholder, located approximately 6 to 23 feet below the ground surface, will be removed, but the gasholder structure will remain. Those site remediation activities will be completed in accordance with the Minnesota Pollution Control Agency's Voluntary Investigation and Cleanup program for industrial sites.

Clean fill will be imported to bring the portion of the Project site where the buildings will be placed above the 100-year flood elevation.

3.3 Construction

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

A pile-driving rig will be set up on the site just prior to the expected start of permanent construction to prepare the area for pile driving. Piles will be driven over a 30-day period. Following the setting of pilings, turbine foundation forms will be constructed and underground services will be installed. At the same time, the foundations for the generator step-up transformers 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, including the auxiliary equipment shipped by truck and some large equipment shipped by rail or barge. These shipments will continue over a 16- to 18-month period. The timing of these shipments will coincide with the completion and readiness of their respective foundations. Shipments at the rail siding and the Plant entrance road will be coordinated by the Contractor's 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 turbines, generators, heat recovery steam generators, steam turbine generator and transformers for the new generating units will be set first, followed by the remaining auxiliary equipment. Erection of the turbine modular air inlets and the exhaust stacks will follow. Next, the building enclosure will be constructed.

The greatest number of on-site workers will be present during the erection of the turbines, detailed wiring and piping, and while work is being performed in the new High Bridge Substation.

The gas pipeline to the Project will be constructed while the site work is being completed. The pipeline is planned to enter the northwest corner of the Plant underground to a gas metering and regulating building. A contractor will take the pipeline from this point to the turbines.

The Company will be constructing an overhead 115-kV line from the generator step-up transformers to the High Bridge Substation as Plant work nears

completion. Work will also be ongoing in the substation to install breakers, transformer and additional protection devices.

Preoperational testing will then take place for four to six months in preparation for start up of the units targeted for May 2008. The Plant start up requires a four-month schedule.

After the completion of testing, Xcel Energy and the Contractor will begin to demobilize the site. By late fall 2008, trailers, construction equipment, and temporary fencing associated with the construction of the Project is expected to be removed from the site. Some equipment and trailers associated with the decommissioning of the old plant may remain on site after this date.

3.4 Operation and Maintenance

Xcel Energy will use the Project's capacity for intermediate demand periods. The new units will be operated from the Plant's central control center. The Plant can start from a complete shutdown lasting more than 72 hours to full load in five hours (cold start). If the Plant has been off line for less than eight hours, start up can be completed within two hours (hot start). A warm start occurs when the Plant is started after being shut down for eight to 72 hours and can be completed in three hours.

Typical operation will consist of combined cycle operation. Duct-firing within the heat recovery steam generator can be employed to increase Plant capacity. The Plant will also have the capability of cooling inlet air to increase Plant capacity during periods of warm weather. The Plant will be equipped with a steam bypass that will allow the combustion turbine generators to be run while bypassing the steam generator. This will allow the flexibility to operate the Plant at partial capacity should the steam turbine generator or related auxiliary equipment be out of service at a time of high demand.

Plant operational information is summarized in Table 3-3.

Table 3-3 Operational Information Summary

Description	Project Data
Nominal generating capability	480-665 MW (see Table 2-1)
Operating Cycle	Combined cycle with duct firing and inlet air cooling
Typical Dispatch Schedule	Combined cycle operation, 16 hours per day (daytime), 5 weekdays per week, year-round
Estimated Starts	Cold – 1 per week (52 per year) Warm – 4 per week (208 per year)
Anticipated annual capacity factor	30 – 60%
Anticipated heat rate (efficiency)	6,220 Btu (LHV)/kilowatt-hour (54%) – summer conditions with evaporative cooling 6730 Btu (LHV)/kilowatt-hour (50%) – winter conditions duct fired
Heat Rejected (through cooling water system at base load)	1,050 million Btu/hr (summer conditions, non-duct fired) 1,750 million Btu/hr (winter conditions, duct fired)

Xcel Energy anticipates the units will have at least a 30-year operating life. The Project is expected to be in the range of 54 percent efficient, depending on operating conditions.

Maintenance activities for the Plant's combustion turbine generators and balance of Plant equipment will be based on power industry practices and the equipment manufacturer's recommendations. Heat recovery steam generators maintenance activities are based upon routine equipment inspection and periodic replacement of SCR catalyst material. Steam turbine generator maintenance includes periodic inspections and equipment overhauls every several years.

4 Environmental Information

The Project's proposed generation Plant will be located at a site that has previously been developed for power production and, as a result, will not have significant effects on human settlement, environmental resources, recreation areas, wetlands, threatened or endangered species or archaeological/historical sites. The potential effects of the Project in each of these environmental categories are described further below. Conversion from coal to natural gas will result in a cleaner, less intrusive facility.

This section also presents an analysis and discussion of the engineering design and operational features of the Project that enhance the Project's compatibility with its surrounding environment. The Project as proposed will have very little adverse effect on the environment. The Project has been conceived and will be designed and operated with the objective of avoiding adverse environmental effects. The engineering of several Project features has included consideration of the setting of the site as described in Section 3. The Project will employ state-of-the-art equipment to minimize air emissions and solid and liquid waste generation, and control noise.

4.1 Air Quality Impacts

This section describes the air emission sources, the air pollutants emitted, and the procedures that will be used to assess air quality impacts and demonstrate compliance with air quality requirements.

4.1.1 Air Emission Sources

The new air emissions sources include the two identical combined cycle combustion turbines equipped with dry, low-NO_x combustors. Each of the combustion turbines will exhaust to a separate heat recovery steam generator equipped with supplemental duct-firing capacity. Xcel Energy will install a selective catalytic reduction (SCR) system within each heat recovery steam generator to reduce NO_x emissions from the combustion turbine and duct burner exhaust when operating in the combined cycle mode of operation. Secondary combustion sources include an auxiliary boiler and a new diesel-driven fire pump. One of the emergency diesel-driven generators from the existing High Bridge Plant will be retained for emergency backup service at the new combined cycle Plant. This unit will not be modified.

The combustion turbines, duct burners, and auxiliary boiler will all be fired by only natural gas. The new fire pump engine and the existing emergency generator will be fired with diesel fuel.

4.1.2 Air Pollutants Emitted

An upper bound estimate of the actual air emissions from the new units is presented in Table 4-1. Note that these estimates are generally lower than those represented in the air emissions permit application, which are based on *potential* emissions. Potential emissions are based on the maximum emission rate and continuous operation 24 hours a day and 365 days a year except in instances where an enforceable restriction on operation is imposed in the permit. Potential emissions far exceed the projected actual air emissions. Projected actual air emissions provide a more meaningful basis than potential emissions for comparison with the existing emission levels.

Table 4-1 Projected Actual Air Emissions

Pollutant	CT Emissions Normal Operation		CT Emissions Startup/Shutdown/ Tuning		Auxiliary Boiler		Fire Pump Diesel		Project Totals	
	Avg. (lbs/hr)[a]	(tons/yr)[b]	Avg. (lbs/hr)[a]	(tons/yr)[c,d]	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)[e]	(lbs/hr)	(tons/yr)
SO_2	3.2	8.4	1.2	0.44	0.08	0.33	0.62	0.09	6.7	9.3
NO_X	45.4	119.3	188.1	71.0	5.3	23.1	9.3	1.4	678.1	225.6
PM_{10}	19.3	50.8	6.8	2.6	0.88	3.9	0.66	0.10	36.7	57.6
CO	73.3	192.7	1,004.6	379.0	7.0	30.8	2.0	0.30	3,086.9	652.9
VOCs	38.7	101.6	43.3	16.3	0.44	1.9	0.74	0.11	203.1	123.0

[a] An average hourly emission rate was derived based on the projected annual emission rate divided by the projected hours of operation in the specified operating mode.

[b] The upper bound projected annual emissions are based on the following assumptions: 1) two GE 7FA combustion turbines operating at full load at the average ambient temperature; 2) an annualized capacity factor of 60% for the facility, which is equivalent to 5,256 hours of full load operation; and 3) the duct burners operate during 10% of the combined cycle hours of operation.

[c] Startup and shutdown (SUSD) emission estimates are based on the assumptions that there are 4 warm starts per week, 1 cold start per week, and 52 weeks of operation per year. Tuning emission estimates assume 50 hours of tuning per year.

[d] No increase in SO2 and PM_{10} emissions are assumed to occur during SUSD operation. SUSD emission were calculated assuming the same emission factors as for normal operations.

[e] The fire pump engine operates no more than 300 hours per year.

A comparison of the estimated annual emissions from the new Plant to actual emissions from the existing plant is presented in Table 4-2.

Table 4-2 Future to Present Annual Emissions Comparison

Pollutant	Future Projected Emissions (tons/yr)	Past Actual Emissions (tons/yr)	Projected Emissions Change (tons/yr)
SO_2	9.3	3,946.7	-3,937.4
NO_X	225.6	5,835.4	-5,609.9
PM_{10}	57.6	476.8	-419.3
CO	652.9	257.3	395.6
VOCs	123.0	30.6	92.4

In addition to the pollutants identified in the table, there will be a small release of ammonia from the combustion turbine stacks. Xcel Energy proposes to utilize SCR systems in the heat recovery steam generators to control NO_x emissions from the combustion turbines and duct burners. Ammonia emissions result from the use of ammonia as a reagent in the SCR system. Ammonia emissions, also referred to as "ammonia slip," will be at a low concentration of less than 10 ppm.

Xcel Energy must obtain a Prevention of Significant Deterioration (PSD) permit from the MPCA prior to construction of the Facility. An air permit application will be submitted to the MPCA in January 2005. The project will be subject to PSD review for emissions of carbon monoxide and volatile organic compounds. Emissions of other regulated pollutants will decrease, as illustrated in Table 4-2, and are therefore not subject to PSD review.

4.1.3 Air Emission Control Measures

Xcel Energy will apply the following emissions control strategies:

- Fire only natural gas in the combustion turbines, duct burners, and auxiliary boiler to minimize NO_x, SO_2, and particulate emissions.
- Use dry low-NO_x combustors in the combustion turbines to further reduce the formation of NO_x.
- Install SCR to control NO_x emissions from the combustion turbine and duct burners.
- Limit testing of the emergency fire pump to less than 300 hours per year.

The PSD rules require that pollutants subject to PSD review must be controlled through the application of the Best Available Control Technology (BACT). All of the combustion sources will employ good

combustion practices to minimize emissions of CO and VOCs. The application of SCR to reduce NO_x emissions qualifies the combustion turbines and duct burners for "Clean Unit Designations" under the PSD rules, because the controls are comparable to BACT.

4.1.4 Compliance Demonstration

Compliance with emissions permit limits on NO_x and CO will be demonstrated by means of Continuous Emission Monitoring Systems (CEMS) operating according to demonstrated performance criteria, by periodic stack emissions tests, or by monitoring fuel. Xcel Energy is proposing to install CEMS to continuously measure CO and NO_x emissions from the stacks associated with the combustion turbines. Stack testing or fuel monitoring will be required for the other pollutants as specified by the MPCA in the air permit for the facility.

4.1.5 Air Pollutant Impacts

As part of the PSD permit application, air-dispersion modeling will be performed to demonstrate that the emissions from the facility will not cause or contribute to a violation of an ambient air quality standard or PSD increment. Modeling will be performed using a modeling protocol that conforms to U.S. Environmental Protection Agency (EPA) standards to predict the maximum ambient concentrations of NO_2, and CO.

<u>Increment Modeling</u>

PSD increments have been established for NO_2, SO_2, and PM_{10} to prevent degradation to air quality by limiting the cumulative change in ambient concentrations that can occur due to construction or modification of facilities in the region after the specific baseline date for each pollutant. Xcel Energy will perform increment modeling for NO_2 to demonstrate that the combustion turbines and duct burners are eligible for designation as "Clean Units." The MPCA has identified the District Energy facility as the only other facility that would need to be included in the analysis if increment modeling for NO_2 is required to obtain Clean Unit Designation for emissions of NO_x.

<u>NAAQS Modeling</u>

Xcel Energy sources will be modeled to determine compliance with the National and Minnesota Ambient Air Quality Standards. MPCA guidance

will be relied upon to determine the appropriate background concentrations for NO_2 and CO.

A complete modeling report will be submitted as part of the PSD permit application. The PSD permit application will be reviewed by the MPCA and will be placed on public notice in accordance with the requirements of the application process.

4.1.6 Air Emissions Risk Analysis

The project is exempt from the requirement to conduct an Air Emissions Risk Analysis (AERA) in accordance with MPCA technical guidance (Air Emissions Risk Analysis Guidance; Version 1.0; March 2004). The purpose of the AERA is to assess the potential health risk attributed to air emissions from a given source.

MPCA guidance exempts natural gas-fired combustion units from review. Further, Xcel Energy has agreed to accept limits of 300 hours per year or less on the new diesel-driven emergency fire pump, which exempts this unit from review as well.

4.2 Water Use and Wastewater Generation

Water usage and wastewater generation associated with operation of the Project will be similar to that of the existing plant, so the Project will not have a major impact on water supplies or wastewater treatment facilities. See the discussion of the Project water and wastewater systems in Section 3.1.7.

4.2.1 Water Use

Water will be needed for the Project for domestic-type uses, fire protection, turbine inlet air evaporative cooling, steam system make-up water, closed cooling system make-up water, and once-through cooling. Xcel Energy will request an amendment to the Plant's existing Well Water Appropriations Permit No. 69-1090 (as amended Sept. 16, 2003) and existing River Water Appropriations Permit No. 76-6347 (dated January 17, 1977) in early 2005 to address the change in water usage for the Project from the uses currently described in the permits. No increase in appropriation rate or annual withdrawal volume will be requested in either permit amendment request. A summary of expected Project water appropriations is presented in Table 4-3. The water usage estimates provided in

this document are based upon operation of the Plant at a 50 percent annual capacity factor (capacity factor is estimated to range from 30 to 60 percent).

Table 4-3 Water Needs Summary

Estimated maximum river water pumping rate	201 million gallons per day (MGD) (intermittent)
Estimated annual river water use	37,000 million gallons (at 50% capacity factor)
Estimated maximum groundwater pumping rate	95 gallons per minute (gpm) (intermittent)
Estimated annual groundwater use	23 million gallons (at 50% capacity factor and assuming evaporative cooling used for 20% of operating hours)
Estimated maximum municipal supply withdrawal rate	65 gallons per minute (gpm)
Estimated annual municipal supply use	7 million gallons

Mississippi River

The greatest use of water for the Project will be for the once-through cooling system. The water intake will be constructed in accordance with the requirements of Section 316 (b) of the Clean Water Act. Xcel is proposing to maintain the same withdrawal capacity and rate of water for cooling purposes. The anticipated withdrawal (see Table 4-3) is approximately 2.6 percent of the mean annual river flow of 7,600 MGD (from 1901 through 2002). This is less than 5 percent of the mean annual river flow, which is required to qualify for the 316(b) Compliance Alternative 1. However, it is also required that the intake velocity be less than or equal to 0.5 feet per second. Therefore, the existing intake will be modified to meet this requirement. A description of the design of the intake is provided in more detail in Section 3.1.7.

This once-through cooling system water will be withdrawn from the Mississippi River, pass through the Plant condenser, and then returned immediately to the river about 1,000 feet further downstream from where it was withdrawn. The thermal load of the Project will be slightly less than the thermal load of the existing plant (see Section 4.2.2).

Groundwater

Water will be withdrawn from the existing well on the Project site for steam system make-up water and closed cooling make-up water. The proposed appropriation rate (Table 4-3) is less than the currently permitted volume of

50 million gallons per year at a maximum rate of 0.25 MGD. The existing well is constructed in the Prairie du-Chien/Jordan bedrock aquifers.

In contrast to other high-volume users in the area, including the City of St. Paul, other industries and golf courses, the estimated annual groundwater appropriation for the Project is small.

While groundwater is available from the alluvial outwash, most municipal, industrial and private wells in the Project vicinity are finished in the Prairie du-Chien/Jordan bedrock aquifer. Other, deeper bedrock aquifers are also available for drinking water uses. Water from the Prairie du-Chien/Jordan aquifer is of high quality, suitable for drinking water without pretreatment (except for the addition of chlorine and fluoride). Large quantities of water are available in this aquifer. As examples, the city of St. Paul has seven municipal water supply wells, six of which are located in the Prairie du-Chien/Jordan aquifer. The six wells are permitted to withdraw up to 13.8 billion gallons per year, and the city routinely withdraws 900 million gallons or more from the wells each year. Other industrial users in the area also have high-volume Prairie du-Chien/Jordan wells, as do golf courses, mobile home parks and private wells. For instance, the St. Paul Pioneer Press is permitted to withdraw 250 million gallons per year.

Municipal Water Supply

Expected annual municipal water usage by the Plant will be a small fraction of the annual water available from the St. Paul Water Utility. The average annual water provided by the St. Paul Water Utility is 18,300 million gallons, and the water treatment plant capacity is 53,000 million gallons.

4.2.2 Wastewater

There will be five main wastewater streams generated by the Project. They will include:

- Once-through cooling water discharge
- Steam boiler process blowdown discharge
- RO reject discharge
- Evaporative cooler blowdown discharge
- Service and domestic wastewater

A summary of the wastewater discharged and proposed final discharge location for the Project is presented in Table 4-4 (see also Figure 3-3).

Table 4-4 Wastewater Discharge Summary

Wastewater Source	Estimated Volume	Discharge Location
Once-through Cooling Water Discharge	37,000 million gallons/year	Mississippi River
Steam Boiler Blowdown	11 million gallons/year	Sanitary Sewer
RO Reject Discharge	5 million gallons/year	Mississippi River or to the sanitary sewer depending on operating conditions
Evaporative Cooler Blowdown	2 million gallons/year	Mississippi River or to the sanitary sewer depending on operating conditions
Service and Domestic Wastewater	3 million gallons/year	Sanitary Sewer

The primary source of wastewater will be the once-through cooling water (Mississippi River). It is estimated that a negligible amount of the water will be lost to evaporation and the discharge from this source will be approximately the same as that withdrawn from the river. It is not anticipated that there will be a significant change in the quality of this water and all of the wastewater from this source will be discharged back to the river.

The thermal input to the once-through cooling water for the proposed Plant will be less than the thermal input to the cooling water for the existing plant. It is expected that there will be minimal differences in the discharge temperature for the existing and proposed Plant and, as a result, temperatures downstream in the Mississippi River are not expected to increase compared to historical operations.

The discharge temperatures of the once-through cooling water for the proposed Plant are expected to be similar to the range of historical discharge temperatures of cooling water used in the existing Plant. At a design flow rate of 201 MGD, the discharge temperature of the proposed Plant is expected to range from 76ºF to 115ºF. With discharge flow rates ranging from 90 to 180 MGD, the discharge temperatures of the current Plant (outfall SD 030) ranged from 70ºF to 109ºF during the 2004 water year (October 2003 through September 2004).

The current NPDES permit (MN0000884) limits discharges from the existing Plant such that the temperature of the Mississippi River is not increased by more than 5ºF at the edge of the regulatory mixing zone. The permit also provides

limits that are based upon in-stream river temperatures that cannot be exceeded. Temperature transect studies were completed from 1977 and 1978 and demonstrated compliance with the permit conditions. Because the proposed Plant will have lower thermal input compared to the existing Plant and discharge temperatures are expected to be similar for the proposed Plant, the proposed Plant will be capable of complying with the thermal discharge limits of the current NPDES permit.

Water quality of the various discharges will reflect the water source, processes that concentrate the water quality of the water source by evaporation or treatment (reverse osmosis), and the addition of chemicals either for process water treatment or water scaling protection.

The water chemistry of the once-through cooling water is expected to be similar to the water chemistry of the Mississippi River, which serves as the source water. Chlorine as sodium hypochlorite will be added to the once-through cooling water to prevent scaling on cooling system components. It is expected that chlorine usage and residual levels for the proposed Plant will be similar to the existing plant historical levels given the similar expected use and flow rates.

The water quality of the other wastewater sources, the reverse osmosis reject water, discharge from the evaporative coolers, mixed-bed deionization system reject water, and steam process boiler blowdown, is a function of how the source water becomes concentrated and chemicals used in the treatment process.

The process wastewaters will be combined with the cooling water discharge for discharge to the Mississippi when the cooling system is operating. The process wastewaters will be discharged to the St. Paul Sanitary System (MCES) if they are generated while the cooling system is not operating

The service wastewater and domestic wastewater from the Project will be discharged to the St. Paul sanitary sewer system.

4.3 Noise

The Project will not result in perceptible increases in noise levels in nearby residential areas and the Project, by itself, will not result in violations of state and local noise standards. The area surrounding the Plant site is currently subjected to high noise levels. In fact, our recent monitoring data indicates that the current background noise levels in the nearby residential areas exceed daytime and

nighttime noise standards and, based on our observations, the cause of the exceedances is traffic and not the existing plant.

Noise will be generated by 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 equipment fitted to construction equipment and restricting activities conducted during nighttime hours.

Noise from the operation of the new Plant 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 high background noise levels (particularly in low frequencies) from nearby roadways (e.g., High Bridge, Shepard Road) and the noise control technology that will be employed by the new generating units.

Noise from combined cycle plant operation is a result of air flow through the combustion air intakes and from the exhaust gases discharging from the stacks. The Project air inlets will be appropriately sized and fitted with diffusers to minimize velocity and, therefore, the noise of air moving into the inlets. The stacks will be fitted with silencers to reduce the noise of exhaust gases leaving the Plant.

The Minnesota Noise L_{50} standard is the sound level that must not be exceeded for more than 50 percent of any given hour (30 minutes). The nighttime standards (the most restrictive) apply from 10 p.m. through 7 a.m. Noise standards apply at the point of the receiver, not at the boundary of the noise source. The Project was modeled by itself (not accounting for any other potential noise sources) and the effects upon residences evaluated. Model results show that noise levels from the Project at the nearest residences will be below all the applicable Minnesota standards. Six locations around the Plant were modeled. The residences highlighted on Figure 4-1 are used as model observation points. These sites were chosen for their proximity to the existing and proposed plants. Projected levels are shown in Table 4-5.

Table 4-5 Projected HBCC Plant Sound Levels

Receiver	Projected dB(A)	Applicable Minnesota Nighttime L_{50} Noise Standard[1]
1 - Centex Apartments (E)	44	50
2 - Cliff Street (N)	46	50
3 - Cherokee Avenue (S)	46	50
4 - Island Station (W)	43	50
5 - Island Station Point (SW)	48	50
6 - Southwest Cliff Street (NW)	48	50

L_{50} – The sound level that is exceeded 50% of the time

4.4 Land Use Impacts

The Project location takes advantage of existing infrastructure. The new generating units will be located within the footprint of an existing plant in an industrial-zoned area, so will not change the land use of the area (see Figure 4-2). The conversion from a coal-fired facility to a smaller gas-fired facility will result in reduced visual impact on nearby residential areas.

4.4.1 Zoning and Displacement

The area surrounding the High Bridge Generating Plant is zoned by the City of St. Paul as an I-2 Industrial Zone. A zoning map of the Project area is included as Figure 4-2.

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 units is located within a 77-acre parcel owned by Xcel Energy (see Figure 2-2). The nearest residential area is a townhouse development directly northeast of the Project site.

4.4.2 Aesthetics

Area aesthetics will be improved by the Project. The proposed Plant site is already developed, housing the existing High Bridge Generating Plant and its coal storage area. The new gas-fired Plant will be smaller than the existing coal-fired plant, and new exhaust stacks will be lower than existing stack. The 125,000-ton coal storage

area will be eliminated. Since no discernable land use change will occur, no change in cultural values will result. The conversion from a coal-fired to gas-fired facility will result in a less industrial look and reduced visual impact on the surrounding areas.

The National Park Service, in cooperation with Metropolitan Council, the MN Department of Natural Resources, and local authorities, has designated the Mississippi River corridor for protection and improvement. The Mississippi National River and Recreation Area (MNRRA) was established in 1988, and extends along both sides of the river from Dayton to Hastings. The High Bridge Plant site is located along the Mississippi River, within the MNRRA boundary (see Figure 4-3). The City of St. Paul maintains Shepard Road and Sam Morgan Regional trails along the north and south boundary of the property, respectively. The conversion to a gas-fired plant at the site should be more in line with city, state, regional and Park Service plans for the Mississippi River corridor than continued operation as a coal-fired facility.

4.4.3 Impacts to Industries

Area industries will not be adversely impacted by the Project.

The decommissioning of the existing plant will result in the loss of a source of steam that the Rock-Tenn Paper Company is currently using. Rock-Tenn is aware of this future loss and has several years to address this change.

No agricultural land will be used for the Project. No prime farmland will be taken out of production. No forestry-related industry will be adversely impacted by the Project. Area tourism and recreation areas (see Figure 4-3) will not be adversely impacted by the Project.

4.5 Social, Cultural and Economic Impacts

4.5.1 Public Health and Safety

Typical health and safety concerns associated with electricity generation are related to air emissions, noise, and security and emergency preparedness. Air and noise impacts from the Project are addressed in Sections 4.1 and 4.3, respectively. Plant security and emergency preparedness is discussed below.

During construction of the Project, Xcel Energy will employ a security service to guard equipment and prevent vandalism at the Project during the day. The Plant

has a six-foot high chain link fence around the property to prevent vandalism and to secure operations on site.

The St. Paul Police provide law enforcement services in the area. The St. Paul Police Station is located in the downtown St. Paul, a few miles from the Plant. The local police force currently does, and in the future will be able to, accommodate any law enforcement needs at the Plant.

The Project will be equipped with a complete fire protection system, including water and carbon dioxide fire protection measures. This system will be designed in accordance with National Fire Protection Association (NFPA) requirements.

4.5.2 Public Services and Infrastructure

The Project will not require extraordinary public services nor strain the public infrastructure. Construction and operating simplicity associated with combined cycle technology result in minimal burden on roadways and public services.

The Project will utilize its own generating capacity to provide ongoing operational electrical needs.

The site does not currently have natural gas utility service adequate to serve the Project. The Project natural gas fuel supply will be furnished through a new natural gas transmission pipeline that will be constructed in association with the Project. The natural gas transmission pipeline is described in Section 3.1.2 and will be the subject of a separate application to the Environmental Quality Board for a Pipeline Route Permit.

The major traffic route in the area is Shepard Road, which runs east-west along the northern boundary of the Plant site. Other major traffic routes in the Project vicinity include Minnesota Highway 5 (West 7th Street), the Smith Avenue High Bridge, Interstate 94 and Interstate 35E (see Figure 1-1).

The Union Pacific and Canadian Pacific Railway tracks pass directly adjacent to the north portion of the Plant property. The Holman Field Airport is located approximately two miles to the east and the Minneapolis/St. Paul International Airport is located approximately five miles west of the Plant (Figure 1-1). The operation of either airport will be not be adversely affected by the Project.

Additional traffic generated by the Project is limited to the truck traffic associated with ammonia deliveries. The estimated 50 additional truck trips annually will not significantly affect area transportation services.

Three to four unit trains (115 cars) per week currently deliver coal to the High Bridge Plant. Per year, approximately 1,700 trailer loads of ash are trucked to a landfill from the site. In addition, in the summer there is significant on-site use of a watering truck to minimize dust and fire danger. Conversion to natural gas will eliminate all of this traffic.

The proposed modifications to the water intake structure have been discussed with the Corps of Engineers and are not expected to adversely impact recreational or commercial navigation on the Mississippi. Specific requirements related to river navigation issues will be addressed in the Corps of Engineers Section 10 permit that will be obtained prior to work on the intake structure.

4.5.3 Archaeological and Historical Resources

The Project will be on a previously industrial site, thus there will be no direct impacts to any buildings, including historic structures, except the existing High Bridge Plant. The Project will have no adverse effect on the numerous historical properties in the vicinity of the Project site. A review of the Minnesota State Historic Preservation Office (SHPO) records indicated there are numerous reported historic or archaeological resources in the vicinity of the Project site, including the existing High Bridge Plant, the St. Paul Gas and Light Company Island Plant just southwest of the Project site, and the John J. Ramsey house, approximately 2,500 feet north of the Plant.

Because of the listing of the existing Plant in the SHPO database and the close proximity of a large number of historical properties, the 106 Group Ltd., a St. Paul cultural resource consultant, was retained to conduct a Phase I architectural history evaluation and Area of Potential Effect (APE) scoping for the Project. The purpose of the investigation was to evaluate the eligibility of the existing High Bridge Plant for the National Register of Historic Places (NRHP) and to define the Project's visual effects APE. The conclusions of the investigation are:

1. The existing plant is not eligible for individual listing on the NRHP due to lack of historical significance. In addition, the plant is not eligible for listing on the NRHP as a contributing property within an existing or potential historic district.

2. While the proposed visual effects APE encompasses a large area due to the height of the existing Plant's smoke stack, the proposed project is unlikely to have an adverse effect on the historic properties within the APE.

4.5.4 Economic Benefits

The local community will benefit from the Project construction. Plant and construction will require an estimated 300 construction workers over the 18-24 month Plant construction period. These high-skill, high-paying positions, including pipe fitters, iron workers, millwrights, boilermakers, carpenters, electricians, and other trades, are estimated to add over $15 million of payroll into the regional economy. Operation of the Project after construction will require approximately 25 full-time positions. Periodic major maintenance will also create local jobs.

The Project will contribute property taxes for the City of St. Paul, Ramsey County and the St. Paul School District. The state and Ramsey 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.

4.6 Effects on the Natural Environment

4.6.1 Geology and Soils

The Project is located on an existing industrial site. Therefore, conversion from a coal-fired to gas-fired plant will not negatively impact area geology and soils. Figure 4-5 illustrates the soil series in the Project area. All soils on the Project site are currently classified as "Urban Land." The soils were already disturbed and in industrial use prior to the Soil Survey. The area to be disturbed for construction has already been graded and filled, and is currently used as the plant's coal storage area. No areas containing "prime farmland" soils, as defined by Minnesota Rules 4400.3450, Subp.4, are present at the Plant site.

Figures 4-6 and 4-7 illustrate area geology. The Site is located within the Mississippi Bottomland geomorphic region and is underlain by approximately 100-160 feet of unconsolidated sediments according to site well logs. This region is located within a buried bedrock valley that was eroded and filled during a series of late- and post-glacial events. Directly beneath the site are Holocene-aged sediments associated with the current Mississippi River. These sediments are composed primarily of sand and gravel with some fine-grained sediments and organic material. Beneath these sediments lie a sequence of interbedded Pleistocene-aged till and stream sediments, which likely represent both Late-Wisconsinan and older glacial deposits. To the north and west of the Site is a terrace with sediment from the Glacial River Warren, which is composed of sand and gravel with some silt and clay. These sediments are generally less than 20 feet

thick. Elsewhere in the region are till and stream sediments associated with both the Superior Lobe and the Grantsburg Sublobe.

The unconsolidated sediments at the Site are underlain by Ordovician-aged sedimentary rocks. The Site is located within a buried bedrock valley, with the Prairie du Chien Group subcropping within the center. Beneath the northwestern portion of the Site, the St. Peter Sandstone is the uppermost bedrock unit. The Prairie du Chien Group is the uppermost bedrock unit beneath the southeastern portion of the Site. The St. Peter Sandstone is composed primarily of fine- to medium-grained quartz sandstone with beds of mudstone, siltstone, and shale near the bottom of the unit. The contact between the St. Peter Sandstone and the underlying Prairie du Chien Group is an erosional surface. The Prairie du Chien Group is commonly sandy or oolitic dolostone with thin beds of sandstone, chert, and intraclastic dolostone.

4.6.2 Rivers, Streams and Lakes

The Project will not significantly impact area water bodies. The Project site lies on the north bank of the Mississippi River. River water usage will remain approximately the same as the current plant for the new facility (see Section 4.2). Surface water runoff from the Project will follow existing drainage patterns to an on-site infiltration basin at the west end of the site or to existing catch basins located on the eastern portion of the site that discharge directly to the Mississippi River. No streams (other than the Mississippi River) or lakes exist on or around the Project site (see Figure 4-8).

4.6.3 Vegetation

The site of the new generating Plant is currently industrial and already free of vegetation. The pre-settlement nature in the vicinity of the Project was floodplain forest. Since settlement, the Project vicinity has been developed, which has effectively removed most evidence of the pre-settlement vegetation. The native forests were almost entirely replaced with industrial, commercial and residential land uses. There are some remnants of pre-settlement oak and maple-basswood forest vegetation indicated by the Minnesota County Biological Survey across the Mississippi River from the Plant site (Figure 4-9). Because of their location on the opposite side of the river, these remnants will not be negatively impacted by construction activities.

4.6.4 Fauna

Urban-adapted wildlife, including foxes and songbirds, has been observed on the property. Conversion from the existing coal fired plant to the new gas-fired plant is not expected to negatively impact wildlife in the area.

4.6.5 Wetlands

The only wetland on the Project site is the Plant's stormwater storage pond in the southwest corner of the property. This wetland will remain in use in its current capacity. At the time of the National Wetland Inventory, the Plant's former stormwater storage pond at the northern edge of the property was identified (see Figure 4-8). This wetland no longer exists, apparently having been filled during the construction of new Shepard Road. Other nearby wetlands will not be affected by the Project.

4.6.6 Rare and Unique Natural Resources

The Project will not adversely impact threatened or endangered species. The Natural Heritage Program of the MDNR was contacted and asked to review their database to determine if any rare plant or animal species or other significant natural features are known to occur within the Plant site. No plants or animals of concern were identified that would be adversely impacted by the Project except the peregrine falcon and fish and mussel species discussed below.

Peregrine falcons, a state-listed threatened species, began nesting under the High Bridge in 1999. Peregrine falcons began disappearing from their natural habitats during the 1950s, and by 1965 they had virtually disappeared from the eastern United States, with only a handful remaining in the Rocky Mountains. To assist in conservation of this rare species, High Bridge Generating Plant installed a falcon nest box on the Plant exhaust stack, which falcons began using in 2000. The nest box has been used by falcons every year since, and according to the MDNR, 17 young falcons have successfully fledged from the site. While the existing smokestack will be removed as part of this Project, Xcel Energy will continue to work with the DNR to aid in peregrine falcon conservation efforts. The falcon nest box will be removed from the existing exhaust stack prior to stack demolition and during a time when the birds are not nesting (May – April nesting period to be avoided). Xcel Energy will work with MDNR Nongame Wildlife staff to determine if an appropriate location and time to place a new falcon nest box at the Project can be identified.

The Mississippi River also provides habitat for a number of rare fish and mussel species. Conversion from coal to gas will not adversely impact these sensitive species. Other nearby occurrences of rare natural resources include a bat concentration and a dry sand-gravel prairie habitat across the Mississippi River from the Project site, at Lilydale-Harriet Island Regional Park. Because of their location across the river from the Project site, these resources will not be negatively impacted by Project activities.