414 Nicollet Mall
Minneapolis, Minnesota 55401

May 13, 2011

—VIA ELECTRONIC FILING—

Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101

RE: APPLICATION TO THE MINNESOTA PUBLIC UTILITIES COMMISSION
FOR A GENERATING PLANT SITE PERMIT AND A TRANSMISSION LINE
ROUTE PERMIT FOR THE BLACK DOG REPOWERING PROJECT
DOCKET NO. E002/GS-11-307

Dear Dr. Haar:

Northern States Power Company, a Minnesota corporation ("Xcel Energy" or the "Company") is pleased to submit to the Minnesota Public Utilities Commission ("Commission") for consideration this Application for a Generation Site Permit and Transmission Line Route Permit for the Black Dog Repowering Project. This Application is the companion to the Company's Certificate of Need application in Docket E-002/CN-11-184. Commission approval will allow us to increase the electrical generating capabilities of the Minnesota plant by approximately 450 MW (from a current capacity of about 250 MW to about 700 MW). We submit this Application pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850.

Increased capacity will be achieved through the repowering of the existing coal fired units 3 and 4 to a natural gas fired combined cycle facility. The addition of these new facilities will also require the possible rebuild of an existing 1,000 to 1,500 foot section of 115 kV transmission line and the construction of approximately two, 4,000 foot sections of double circuited 345 kV transmission lines. Approval of this application will not only provide a needed resource, it will also add environmental benefits and provide a valuable variable resource with load following capabilities.

Pursuant to Minn. Stat. § 216E.18 and Minn. R. 7850.1800, Mr. Scott Ek, Minnesota Department of Commerce, Division of Energy Resources, informed the Company that the permitting fees associated with the Application will be $40,000.00 and Mr. Ek requested us to submit $20,000.00 up-front. The Company will submit a check in the amount of $20,000.00 under separate cover.

Pursuant to Minn. Stat. § 216.17, subd. 3, we have electronically filed this document with the Commission and Minnesota Department of Commerce, Division of Energy Resources. Copies of our Application can be obtained from the Xcel Energy web site at www.xcelenergy.com.

Please contact Sara Cardwell at sara.j.cardwell@xcelenergy.com or (612) 330-7975 if you have any questions regarding this filing.

Sincerely,

/S/

Sara Cardwell
Manager, Regulatory Administration
Regulatory Affairs

Enclosures

APPLICATION TO THE MINNESOTA PUBLIC UTILITIES COMMISSION FOR A GENERATING PLANT SITE PERMIT AND A TRANSMISSION LINE ROUTE PERMIT BLACK DOG REPOWERING PROJECT

DOCKET NO. E002/GS-11-307

MAY 13, 2011

Submitted by
Northern States Power Company

Application for a Generating Plant Site Permit and a Transmission Line Route Permit
Black Dog Repowering Project
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Application Content Requirement

Rule Citation	Regulatory Requirement	Application Section
Minn. R. 7850.1300, Subp. 2	No person may construct a high voltage transmission line without a route permit from the commission.	All Chapters
Minn. R. 7850.1300, Subp. 3(C)	Except as provided in part 7850.1500 or 7850.4800, no person shall increase the generating capacity or output of an existing large electric power generating plant without a permit from the commission.	All Chapters
Minn. R. 7850.2800, Subp. 1(B) and 1 (D)	Subpart 1. **Eligible Projects.** An applicant for a site permit or a route permit for one of the following projects may elect to follow the procedures of parts 7850.2800 to 7850.3900 instead of the full permitting procedures in parts 7850.1700 to 7850.2700: large electric power generating plants that are fueled by Natural Gas; high voltage transmission lines in excess of 200 kV and less than five miles in length in Minnesota;	Section 1.1
Minn. R. 7850.2800, Subp. 2.	Subpart 2. **Notice to PUC**. An applicant for a permit for one of the qualifying projects in subpart 1, who intends to follow the procedures of parts [7850.2800 to 7850.3700], shall notify the PUC of such intent, in writing, at least ten days before submitting an application for the project.	Appendix B

Rule Citation	Regulatory Requirement	Application Section
7850.1900, Subp. 1 (per Minn. R. 7850.3100)	**Site Permit Application Contents**	
	(A) a statement of proposed ownership of the facility as of the day of filing the application and after commercial operation	Section 2.1
	(B) the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated;	Section 2.1
	(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;	N/A, per Minn. R. 7850.3100
	(D) a description of the proposed large electric power generating plant and all associated facilities, including the size and type of the facility;	Sections 1.1, 1.3, 3.1
	(E) environmental information required under Subp. 3;	See checklist below for Minn. R. 7850.1900, Subp. 3.
	(F) the names of the owners of the property for each proposed site;	Section 2.1
	(G) the engineering and operational design for the large electric power generating plant at each of the proposed sites;	Chapter 3

Rule Citation	Regulatory Requirement	Application Section
	(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;	Section 2.3
	(I) an engineering analysis of each of the proposed sites, including how each site could accommodate expansion of generating capacity in the future;	Sections 2.5 and 2.6
	(J) identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility;	Chapter 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	Section 2.4
	(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.	Application submitted on March 15, 2011 See Docket E002/CN-11-184
Minn. R. 7850.1900, Subp. 2 (per Minn. R. 7850.3100)	**High Voltage Transmission Line Application Contents**	
	(A) a statement of proposed ownership of the facility at the time of filing the application and after commercial operation;	Section 2.1

Rule Citation	Regulatory Requirement	Application Section
	(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;	Section 2.1
	(C) at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference;	N/A, per Minn. R. 7850.3100
	(D) a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line;	Sections 1.1, 3.1.4, and 3.6
	(E) the environmental information required under subpart 3;	See checklist below for Minn. R. 7850.1900, Subp. 3.
	(F) identification of land uses and environmental conditions along the proposed routes;	Section 4.5
	(G) the names of each owner whose property is within any of the proposed routes for the high voltage transmission line;	Sections 1.1, 3.6 and 4.5
	(H) United States Geological Survey topographical maps or other maps acceptable to the commission showing the entire length of the high voltage transmission line on all proposed routes;	Figure A-4
	(I) identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share the right-of-way with the proposed line;	Sections 1.1 and 3.6

Rule Citation	Regulatory Requirement	Application Section
	(J) the engineering and operational design concepts for the proposed high voltage transmission line, including information on the electric and magnetic fields of the transmission line;	Sections 3.6, 4.7.5
	(K) cost analysis of each route, including costs of constructing, operating, and maintaining the high voltage transmission line that are dependent on design and route;	Section 2.3
	(L) a description of possible design options to accommodate expansion of the high voltage transmission line in the future;	Section 2.6
	(M) the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction, and maintenance of the high voltage transmission line;	Section 3.6.2
	(N) a listing and brief description of federal, state, and local permits that may be required for the proposed high voltage transmission line; and	Sections 2.4, 3.6.2
	(O) a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required.	N/A
Minn. R. 7850.1900, Subp. 3	**Environmental Information Requirements**	
	(A) a description of the environmental setting for each site or route	Chapter 4

Rule Citation	Regulatory Requirement	Application Section
	(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	Sections 4.4, 4.5, 4.6, and 4.7
	(C) a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;	Sections 4.6.5 and 4.7.3
	(D) a description of the effects of the facility on archaeological and historic resources	Section 4.6.4
	(E) a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna	Sections 4.1, 4.2, 4.7.1, 4.7.3, 4.7.6 and 4.7.7
	(F) a description of the effects of the facility on rare and unique natural resources	Section 4.7.8
	(G) identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route; and	Sections 4.6, 4.7
	(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	Chapter 4

1 Introduction

1.1 Overview

Northern States Power Company, a Minnesota corporation ("Xcel Energy" or the "Company") is pleased to submit this application to the Minnesota Public Utilities Commission ("Commission") for a Site Permit and Route Permit ("the Application") for the Black Dog Generating Plant ("Plant") Repowering Project ("Project" or "Black Dog Repowering Project") and the associated transmission necessary for the direct interconnection of the Project. We are filing this Application pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850).

The Project consists of replacing coal-fired generating Units 3 and 4 at the Plant with natural gas-fired, combined cycle generation located in what is now the coal storage yard. The total output of Black Dog Units 3 and 4 was summer rated at 253 megawatts ("MW") for the operating year 2010. Replacing that capacity with the Project at a summer rating of about 700 MW will result in over 450 MW of additional generating capacity at the Plant. The Project results in a cost-effective way to meet long term load growth, removes older coal generation (and its associated emissions profile) from our portfolio, takes advantage of a unique opportunity to maximize the use of, and increase capacity at, an important existing generating site, and provides environmental and economic benefits to our customers and the region.

The addition of generating capacity at the Black Dog Generating Plant also requires a new 345 kilovolt ("kV") substation, the possible rebuilding of a 1,000- to 1,500-foot section of existing 115 kV transmission line and the building of two, approximately 4,000-foot sections of, double circuited 345 kV transmission lines. The new sections of 345 kV lines will interconnect the new substation to the existing Blue Lake to Prairie Island 345 kV transmission line and the existing Blue Lake to Inver Hills 345 kV transmission line. The new sections of 345 kV lines will be built on Company-owned land that is already part of the existing Plant site ("the Plant Site"). Transmission structure locations will be determined in the detailed engineering phase for that portion of the Project. Some structure placement may need to occur within Black Dog Lake.

The Project is described in more detail throughout this Application. The location of the Project and a preliminary Project rendering are shown in Appendix A, Figures A-1 and A-2, respectively. The transmission lines are shown on Figure A-4.

We have prepared this joint application for the Site Permit and the Route Permit and request that the Application be processed in a joint proceeding in accordance with Minnesota Rule 7850.1600. We further request that this review be consolidated with the Certificate of Need application and be reviewed under the Alternative Permitting Process at Minnesota Statutes Section 216E.04 and Minnesota Rules 7850.2800 to 7850.3900. We filed our application for a Certificate of Need on March 15, 2011 (Docket No. E-002/CN-11-184). The Project is eligible for the Alternative Permitting Process because the proposed units will be fueled by natural gas (Minn. Stat. § 216E.04, subd. 2(2); Minn. R. 7850.2800, Subp. 1, (B)) and the proposed transmission lines in excess of 200 kV are less than five miles long (Minn. Stat. § 216E.04, subd. 2(4); Minn. R. 7850.2800 Subp. 1, (D)).

We plan to secure firm natural gas pipeline capacity supply contracts for the Project through a competitive bidding process. Any needed gas pipeline improvements and associated approvals will be the responsibility of the supplier.

1.2 Purpose and Need

This Project was included as part of our Five-Year Action Plan as discussed in our August 2010 Resource Plan (Docket E-002/RP-10-825) filing and in our Certificate of Need Application (Docket E-002/CN-11-184). Our Black Dog Repowering Project is designed to address two developing system needs. Our forecast of peak demands predicts an increase over time that will exceed the current generating capacity on our system. Furthermore the two existing coal fired units are half a century old. In addition to ongoing maintenance and refurbishing to keep aging units running, new federal rules will require substantial pollution control additions to keep the units operating. Our analysis indicates that our customers will be better off if we retire Units 3 and 4 and replace the 250 megawatts they produce as part of a Repowering Project. The Black Dog Repowering Project is designed to address both long-term customer demands and the retirement of aging infrastructure in the most cost

effective way possible at an important existing plant site while also delivering improved environmental performance.

1.3 Project Description

The existing Plant is a coal- and gas-fired generating station. The original Unit 1 boiler/turbine and the Unit 2 boiler, installed in the 1950s and fired on coal, were replaced in 2002 with a natural gas-fired combined cycle unit (Unit 5), which includes a natural gas-fired combustion turbine-generator combined with a heat recovery steam generator ("HRSG"). It utilizes state-of-the-art technology for controlling nitrogen oxides ("NOx") releases. Exhaust heat from Unit 5 produces steam in the HRSG that powers the Unit 2 steam turbine. The Unit 5/2 repowering project, completed in the summer of 2002, increased output from the two original units by more than 100 MW, and resulted in greater operating efficiency and cleaner generation. Unit 5/2 is summer rated at 283 MW. These units will not be modified as part of the Project.

Units 3 and 4 are dual-fuel boilers with steam turbines that currently utilize low-sulfur western coal as their primary fuel. Natural gas is used as a backup or topping fuel to obtain maximum generation for both units. Unit 3, completed in 1955, is rated at 89 MW. Unit 4 is rated at 164 MW and was completed in 1960.

The Project will consist of installing natural gas-fired combined cycle electric generating technology to replace the existing Units 3 and 4. The Project will include the installation of two new natural gas-fired combustion turbine-generator sets combined with two new HRSGs and one steam generator in the existing coal yard. The existing Units 3 and 4 pulverized coal-fired boilers and steam turbine-generators will be retired.

Upon completion, the Project will provide a nominal generating capacity of about 700 MW, which is the net capacity during summer conditions when the combustion turbines are operated at full load and the HRSGs are supplementary duct-fired to obtain peak output.

The Project will also include the construction of a new substation, the possible rebuilding of a 1,000- to 1,500-foot section of existing 115 kV transmission line and the building of two, approximately 4,000 foot sections of, 345 kV double-circuit transmission line to provide an outlet for the new generating capacity.

The proposed structures for the 345 kV double circuit lines will be between 90 to 110 feet tall and will have an average span length between 300 and 500 feet. The finish of the proposed poles will be galvanized steel. The existing transmission line structures in this area are wood poles of H-frame construction, and galvanized steel lattice design. The proposed steel poles will give the new transmission line a somewhat cleaner and more modern appearance. The conductor will be bundled, 795 KCmil 26/7 ACSR. As previously mentioned, Xcel Energy is currently determining specific engineering details, such as transmission structure placement locations.

1.4 Project Environmental Benefits

The Project provides several environmental benefits by retiring aging coal-fired generation technology and replacing it with flexible, clean and efficient natural gas-fired combined cycle technology. These benefits include:

Utilizing an existing site and existing transmission to renew and expand our fleet to avoid the proliferation of generating sites and transmission corridors in the state;

Taking advantage of existing infrastructure available for use at the plant site, such as transmission lines, water and wastewater systems, and transportation infrastructure;

Reducing air emissions; and

Enabling Xcel Energy's system to operate reliably with increased wind generating capacity.

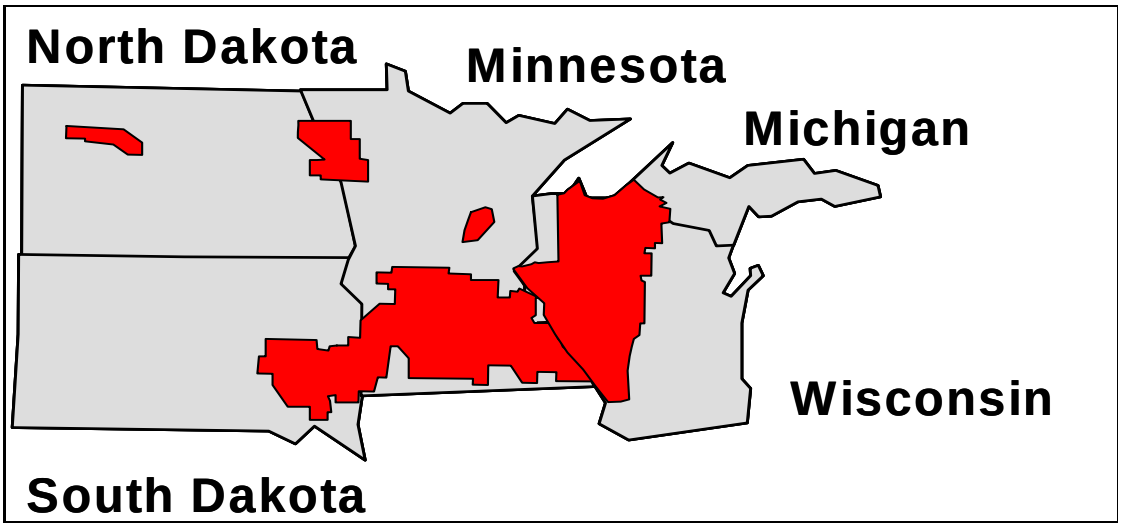
2 General Applicant and Project Information

2.1 Applicant Information

The Black Dog Generating Plant is owned by Northern States Power Company, a Minnesota corporation and the Project, including the new substation and transmission lines, will be owned by Northern States Power Company, a Minnesota corporation. Northern States Power Company is a public utility under the laws of the state of Minnesota. The legal name of Xcel Energy is Northern States Power Company ("NSP"), a Minnesota corporation. NSP and its parent public utility holding company, Xcel Energy, are headquartered in Minneapolis, Minnesota. NSP is the applicant or permittee responsible for this Site Permit and Route Permit request and does not currently anticipate transfer of either permit.

Xcel Energy is a public utility that generates electrical power and transmits, distributes, and sells it to approximately 1.5 million residential and business customers on an integrated system basis within service territories assigned by state regulators in parts of Minnesota, South Dakota, and North Dakota, with our affiliate utility serving portions of Wisconsin and the upper peninsula of Michigan.(*see* Figure 2-1) The Company owns and operates a number of electric generation facilities serving this area using a variety of technologies and fuels including, wind, coal, oil, natural gas, hydro, biomass, refuse derived fuel ("RDF"), and nuclear. Additional wind, landfill gas, biomass and hydropower are also included in our generation portfolio through purchased power agreements ("PPAs").

Figure 2-1: Xcel Energy Upper Midwest Service Territory



The contact person at Xcel Energy regarding this Project is:

Sara Cardwell
Manager, Regulatory Administration
Xcel Energy
414 Nicollet Mall, 7th Floor
Minneapolis, MN 55401
Phone 612-330-7975

2.2 Project Schedule

Xcel Energy currently plans for commercial operation of the Black Dog Repowering Project by January 1, 2016. The existing Units 3 and 4 will continue to operate through 2015 on natural gas only; coal use will be discontinued during the construction phase. We believe that pending environmental regulations will require coal use be discontinued by the end of 2014 absent significant expenditures on pollution control equipment.

The regulatory approval effort is underway with the submittal of this Application and the Certificate of Need Application. Pending required regulatory approvals, site preparation activities are expected to start in spring 2012. Substation and transmission line work is expected to start in late 2013.

2.3 Cost Analysis

In our 2010 Resource Plan analysis, we estimated the capital cost of the Project to be approximately $600 million. Capital costs include the repowered plant costs, substation costs, interconnecting transmission line costs and the incremental costs of a cooling tower attributable to the Project. We are estimating that the operation and maintenance costs will be about $0.002/kWh.

Our cost estimates are based on the Project schedule with a January 2016 commercial operations date. Delays could affect the costs.

Below we show the substation and interconnecting transmission line costs.

Table 2-1: Transmission Costs

Transmission Line Costs	$7.5 Million
Transmission O&M Costs	Typically $300-$500 per mile/year
Substation Costs	$18 Million

2.4 Other Project Permits and Approvals

2.4.1 Minnesota Certificate of Need

Under Minnesota Statutes Section 216B.243, no large energy facility can be sited or constructed in Minnesota without the issuance of a Certificate of Need by the Commission. Under Minnesota Statutes Section 216B.2421, subdivision 2, a *"Large energy facility"* means: *"(1) any electric power generating plant or combination of plants at a single site with a combined capacity of 50,000 kilowatts or more and transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system."* The Certificate of Need Application was filed on March 15, 2011[1].

[1] A Certificate of Need is not required for the transmission lines associated with the Project. The 115 kV transmission line does not fall within the statutory requirements found at Minnesota Statutes Sections 216B.2421, subdivision 2 and 216B.243, subdivision. A Certificate of Need is not required for the 345 kV transmission lines as they qualify for the exemption found at Minnesota Statutes Section 216B.243, subdivision 8(4).

2.4.2 Gas Pipeline Routing Permit

The Company will issue an RFP for firm natural gas pipeline capacity supply. If this requires the construction of a new natural gas distribution pipeline, the selected provider will apply for a routing permit, if needed, in accordance with the requirements of Minnesota Statutes Section 216G.02 and Minnesota Rules Chapter 7852, as well as any other necessary authorizations for any gas pipeline construction and operation, such as coverage under a general National Pollutant Discharge Elimination System ("NPDES") State Disposal System ("SDS") permit for Construction Activity, if required by the pipeline project's estimated area of disturbance.

2.4.3 Other Permits and Approvals

Generation Interconnect Agreement
On September 10, 2010, we filed the required Generation Interconnect Agreement Request with the Midwest Independent System Operator ("Midwest ISO") to cover the expected capacity increase. The Midwest ISO evaluates interconnection requests to determine if additional transmission system improvements will be needed to maintain reliable operation of the system.

Transmission Service Request
On February 10, 2011, the Midwest ISO confirmed that the Company would receive firm transmission service to cover the expected capacity increase at the Plant Site, conditional on the completion of two previously planned Midwest ISO Midwest Transmission Expansion Plan ("MTEP") projects.

Air Emission Permit
In May 2011, we will submit an application to the Minnesota Pollution Control Agency ("MPCA") for an amendment to the Black Dog Generating Plant air emission permit, Permit No. 03700003-009, to accommodate the Project.

NPDES Discharge Permit
We will file an application to renew and amend the Plant's existing NPDES/SDS discharge permit (MN0000876) in the fall of 2011 to incorporate modifications to the Plant's intake and discharges associated with the Project. Modifications will entail the cooling water system and its discharges and the process water system and its discharges. The NPDES permit renewal process will address the Project, the future operation of existing Unit 5/2 as well as components of the existing Unit 3 and 4 wastewater operations. In addition,

an application may be filed with the Metropolitan Council Environmental Services ("MCES") for approval to direct some Plant wastewater streams to the sanitary sewer system. Intake or discharge work (e.g. an outfall structure to the Minnesota River or to Black Dog Lake) may also require obtaining a U.S. Army Corps of Engineers ("USACE") Section 10 or Section 404 Authorization and a Minnesota Department of Natural Resources ("MnDNR") Work in Waters Permit.

NPDES Stormwater Program

The Project triggers the requirement to apply for coverage under the MPCA's NPDES Stormwater Permit Program for Construction Activities. We will prepare a Stormwater Pollution Prevention Plan ("SWPPP") and apply for coverage under our state general permit prior to commencement of site work. The SWPPP is developed just before the application for the construction stormwater permit is submitted as much of the SWPPP's content is dependent on specific construction activities. We will require contractors to comply with the SWPPP and the provisions of the Project construction stormwater permit. Training will be provided as needed to reinforce the requirements.

For existing operations, the Plant maintains an Industrial Activity SWPPP as required by the Plant's NPDES permit. The stormwater section of the existing NPDES permit will be incorporated into the renewal and amendment of the permit with any needed updates. Prior to the Project's commercial operation, Xcel Energy will update the Industrial Activity SWPPP as necessary.

Section 10 and, or 404 Permit / 401 Water Quality Certification

Depending on the extent of work in wetlands and possibly Black Dog Lake or the Minnesota River, some construction activities may require obtaining a Section 10 and, or a Section 404 Dredge and Fill Permit from the USACE. For work in wetlands or Black Dog Lake, if Section 404 permitting becomes necessary, Project activities would be likely be authorized by the USACE under a Letter of Permission (LOP-05-MN) or the utility line discharge provision of the Regional General Permit (RGP-3-MN).

If authorized under provisions of LOP-05-MN or RGP-3-MN, the need for a Section 401 Water Quality Certification ("WQC") from the MPCA is waived. However, if Project activities do not meet the USACE thresholds under LOP-05-MN or RGP-3-MN and an individual permit from the USACE becomes necessary, then a separate Section 401 WQC from the MPCA would need to be obtained. The Lower Minnesota Watershed District will be copied for review

and comment on any permit filing for work in wetlands, Black Dog Lake, or the Minnesota River.

MnDNR's General Permit for Temporary Water Appropriations
This permit is required for construction dewatering, etc. (#1997-0005).

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

Federal Aviation Administration ("FAA") Notice of Proposed Construction or Alteration (for exhaust stack and potentially other structures)

MnDNR Public Waters Work Permit, License to Cross Public Waters, and/or Crossing Permits for Associated Utilities (e.g. electric transmission lines, natural gas lines, sewer lines) by Xcel Energy or by the provider

Local Government Unit approval administered by the City of Burnsville pursuant to the Minnesota Wetland Conservation Act ("WCA")

Exemption to allow burning of natural gas for power production (Department of Energy, 10 Code of Federal Regulations 503)

Road Crossing Permits (Minnesota Department of Transportation ("MnDOT"), Minnesota Rules Chapter 8810)

Endangered Species Act ("ESA") Review (United States Environmental Protection Agency ("EPA") and United States Fish & Wildlife Service ("FWS"))

MnDNR Natural Heritage Review (Potential Takings Permit as per Minnesota Rule 6212.1800)

Miscellaneous State Permits (Minn. Stat. § 216E.10, subd. 2)

The Company plans to continue to work closely with local government officials to address any reasonable concerns as we move forward with the Project in our Site and Route Permit process.

2.5 Rejected Sites and Routes

This Application is being submitted under the alternative review process as allowed by Minnesota Statutes Section 216E.04 and Minnesota Rule 7850.2800.

Under the alternative process, Minnesota Rule 7850.3100 states "…the applicant need not propose any alternative sites or routes to the preferred site or route. If the applicant has rejected alternative sites or routes, the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them."

In our 2007 Resource Plan (Docket No. E-002/RP-07-1572) we indicated that we were studying repowering options for Black Dog Generating Plant Units 3 and 4. In our 2010 Resource Plan (Docket No. E-002/RP-10-825) we included this Project as part of our Five Year Action Plan. The Project will replace and expand the generating capacity at an existing Plant Site. Therefore, no other sites for the Project were considered. However, in Chapter 4 of our Certificate of Need Application (Docket No. E-002/CN-11-184), we provided an analysis of other alternative generating facilities constructed at different sites.

Xcel Energy also did not consider other routes for the transmission line interconnection because of the proximity of the existing Blue Lake to Prairie Island 345 kV transmission line and the Blue Lake to Inver Hills 345 kV transmission line, which are located on Company property as part of the Plant Site.

2.6 Future Expansion

Minnesota Rule 7850.1900, Subpart 1(I) and 2(L) require an applicant to describe the extent to which a proposed generating plant site and transmission line route can accommodate future expansion. The Project, as proposed, will take advantage of available space at an existing generating plant site. Other portions of the site may accommodate future expansion for generation. Xcel Energy has no specific plans at this time to further expand generating capacity at the site beyond what is proposed in this Application.

The proposed transmission lines will be double circuited on each transmission tower and will not be able to accommodate additional transmission lines. The new substation will have the capability for expansion. However, the Company has no plans at this time to expand the new substation beyond what is proposed in this Application.

3 Engineering and Operational Design

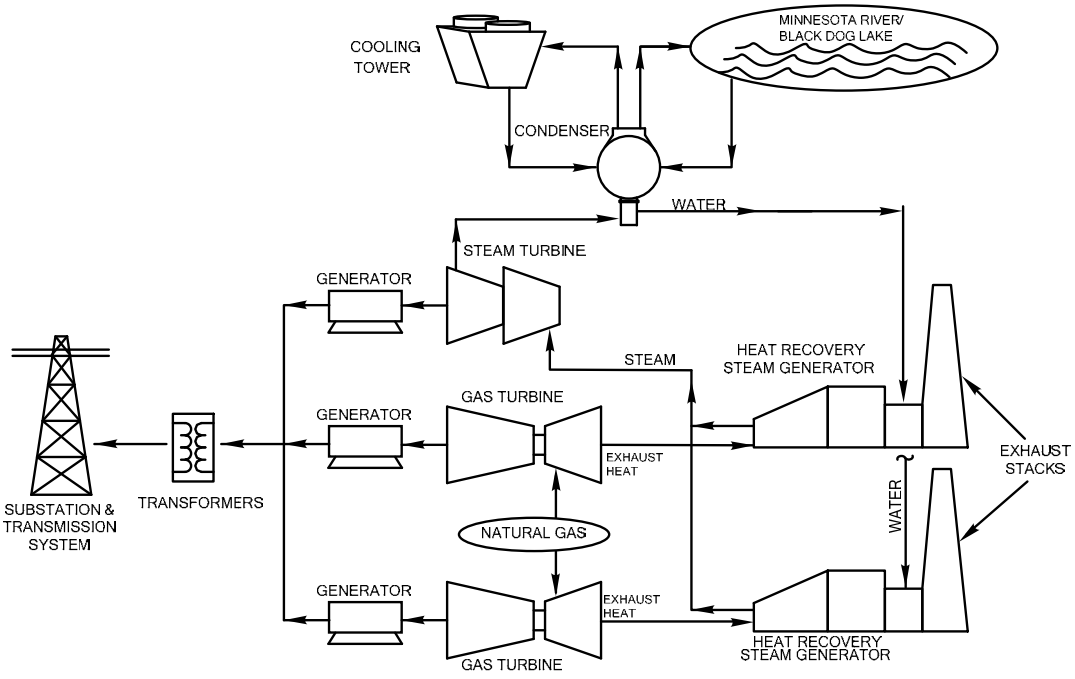
3.1 Description of Operating Cycle and Plant Components

The proposed Project will include two natural gas-fired combustion turbine generators ("CTGs") and a single steam turbine-generator set, referred to as a 2-on-1 combined cycle configuration.

A natural gas-fired combined cycle power plant is a combination of combustion turbine technology, heat recovery and electric generation. In the combustion turbine, incoming air is compressed and mixed with the natural gas fuel. Igniting this mixture results in an expansion of gases (the combustion products and excess air) through a power turbine that in turn drives an electric generator. Hot exhaust gases exiting the combustion turbine pass through the HRSG to produce steam that is used to drive a steam turbine connected to a second electric generator. Typically, of the overall electric output from a combined cycle unit, two-thirds is produced by the CTG and one-third by the steam turbine-generator.

The combined cycle generating process for the Project is shown schematically below. Also refer to Figure A-3 in Appendix A which contains an overlay of the Project on the existing Plant site.

Figure 3-1: Combined Cycle Technology Schematic



The major equipment used in the process of power generation includes the following components described in more detail below.

Two natural gas combustion turbine – generator sets

Two HRSGs

Two exhaust stacks

Steam turbine generator, condenser and cooling tower

Electrical interconnection

Natural gas interconnection

3.1.1 Combustion Turbine Generators

The design capacity of the Project is based on the performance characteristics of an F class combustion turbine (similar to the existing Unit 5) with supplemental firing to increase steam generation to the steam turbine. In a typical unfired combined cycle plant, the combustion turbine capacity is approximately double the steam turbine capacity.

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

Inlet Air Filter

Compressor, where air is drawn in and compressed

Combustor, where the air/fuel mixture is ignited

Power Turbine, where the combusted gases expand to rotate a turbine

Generator set

3.1.2 Heat Recovery Steam Generators and Exhaust Stacks

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

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

The two combustion turbines will provide exhaust heat to produce sufficient steam to generate more output with the steam turbine. Supplemental duct firing of the HRSGs to increase their steaming rate will allow the Project to capture the full load capability of the steam turbine during periods when peak output is desired.

3.1.3 Steam Turbine Generator, Condenser, and Cooling Tower

A single steam turbine will receive steam produced by the two HRSGs. Steam received from the HRSGs will be expanded through a reheat steam turbine, which drives a generator to produce additional 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 HRSGs 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 or to the cooling tower. Circulating water pumps will pump circulating water from the river intake or the cooling tower through the condenser and back to Black Dog Lake or the cooling tower.

3.1.4 Electrical Interconnection

The two combustion turbine generators and the steam turbine generator will generate electricity at a voltage of 16.5-18 kV. Three generator step-up transformers will be located next to the generation building and increase the voltage to 345 kV. Then 345 kV overhead transmission lines will connect the transformers to a new 345 kV substation. The substation will interconnect to existing transmission lines through new sections of 345 kV line as described in Section 3.6.

Auxiliary transformers will be used to convert some of the output power to lower voltages for use in the Project's auxiliary equipment.

3.1.5 Facility Buildings and Structures

The power generation building will house the two combustion turbine generators, two HRSGs, and one steam turbine generator with associated piping. The building will be approximately 425 feet long by 280 feet wide and 140 feet tall. Two steel stacks will be located outside the building. The stacks are anticipated to be about 230 feet tall, however, the final stack height will be determined later based on air permit requirements. The proposed cooling tower will be 760 feet long by 55 feet wide by 70 feet tall.

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 design to meet required noise limits.

3.1.6 Fuel Supply

The Project will be fueled entirely by natural gas with no backup fuel. We plan to secure firm natural gas pipeline capacity contracts through a competitive bidding process. Any needed gas pipeline improvements and associated approvals will be the responsibility of the supplier.

A gas-conditioning station will be installed on-site and will include pressure regulators for control 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 scrubbers and/or filter separators will be included to remove moisture and particulates from the gas stream.

3.1.7 Water Supply/Wastewater Management

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

Domestic-type uses

Fire protection

Condenser cooling water and auxiliary non-contact cooling water

Steam system make-up and equipment closed cooling system make-up water

Turbine inlet air cooling (evaporative cooling)

Domestic-type uses and fire protection are self-explanatory processes. Water used for each of these processes also becomes a source of wastewater.

Condenser Cooling Water and Auxiliary Non-Contact Cooling Water
Currently, once-through condenser cooling water and auxiliary non-contact cooling water are drawn from the Minnesota River via the intake screenhouse. The resultant heated water is directed to Black Dog Lake for cooling purposes to meet temperature conditions at two outfalls to the Minnesota River. The use of Black Dog Lake as the Plant's cooling lake is currently allowed per past deliberations with the MPCA and the EPA. In consideration of the EPA's existing Clean Water Act Section 316(b) language and the proposed rule for existing plants, the Project is planning for the installation of a cooling tower to facilitate closed-cycle operation of the cooling water system (condenser and

auxiliary non-contact) as fish and aquatic life protection technology. Operation in closed-cycle mode with the cooling tower may be seasonal to coincide with times of high potential for fish entrainment into or impingement at the cooling water intake. Actual operation requirements will be determined during the NPDES permitting process. Cooling water use is more fully described in Section 4.2.

Steam System Make-up and Equipment Closed Cooling Make-up Water
Water for steam system make-up and equipment closed cooling make-up will be obtained from the existing on-site well. We currently hold a MnDNR Groundwater Appropriations Permit (No. 1961-0271) for an existing well.

Make-up water for the HRSGs and equipment closed cooling make-up water is needed to replace water that is lost through leakage, used during startup, and used during blowdown. The purpose of blowdown is to control chemistry in the water. Blowdown protects 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 the water to be treated (i.e. purified). A water treatment system called a Reverse Osmosis ("RO") system will be required to purify water for use as make-up water. The RO system will likely consist of a softener, followed by reverse osmosis membranes, and then followed by electrode ionization or mixed bed deionization. This treatment process produces multiple wastewater streams (e.g. softener regeneration and RO concentrate) which contain most of the minerals and dissolved solids originally present in the source groundwater. This treatment system wastewater and HRSG blowdown will be discharged to surface waters under the NPDES permit or to the sanitary sewer system under the MCES permit.

Turbine Inlet Air Cooling (Evaporative Cooling)
The use of evaporative inlet-air cooling enhances the operating efficiency of the gas-fired turbines during the warmest days of the year. An increase in turbine output between three and five percent is expected depending on the ambient temperature and relative humidity. Up to 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 purified water from the RO system will be mixed with water from the well to achieve the proper water quality for evaporative cooler make-up. Most of the water is evaporated in the process. Some wastewater in the form of system

blowdown will be generated and will be directed to surface waters under the NPDES permit or to the sanitary sewer under the MCES permit.

3.1.8 Air Emission Control

Air emission 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 and carbon monoxide ("CO") 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 a selective catalytic reduction ("SCR") system for additional control of NOx emissions from the combustion turbines and duct burners. The SCR system is integrated into the HRSG structure. Ancillary equipment includes catalyst change-out handling equipment (lifting devices and their controls as well as support structures) and reagent (19% aqueous ammonia) receiving, handling, storage, preparation, and delivery systems.

The Project will also include an oxidation catalyst to further control CO emissions from the turbine. The oxidation catalyst will be integrated into the HRSG near the SCR.

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

3.2 Site Fill and Preparation

Site file and preparation will be necessary prior to actual construction of the Project. The site preparation activities are complicated by the need to continue operation of the existing Units 3 and 4 until the Project is ready for commercial operation.

Fill will be imported to bring portions of the Project construction site above the 100-year flood elevation. Specifics will be determined during the detailed design phase of the Project. Fill may be utilized at lower elevations in other areas for other Project purposes, including coal and ash system closure work.

Xcel Energy has entered portions of the Plant Site into the MPCA's Voluntary Investigation and Cleanup ("VIC") program to provide a regulatory process for addressing potential legacy issues in the Project Site (*see* Section 4.5.3).

Mobilization for the site fill and preparation activities will be the first significant site work. Setting up field offices, parking areas, lay down areas, security fencing, and site entrances will be the earliest work activities followed by several months of importing and placing fill to elevate portions of the site. After a suitable time for new fill settling, final grading will occur to bring the site to the desired pre-construction elevation.

3.3 Project Construction

The Project construction will commence following site fill and preparation activities. Portions of the site preparation activities may overlap with the Project construction phase.

Just prior to the expected start of permanent construction, pile-driving rigs will be set up on-site in preparation for pile driving. Piles will be driven over a three to seven month (not necessarily consecutive) period. Following the installation of the pilings, turbine, HRGS and building foundations will be constructed and underground utilities will be installed. The foundations for the generator step-up transformers, cooling tower and miscellaneous equipment will be constructed as required by the Project schedule.

Within two to three months of foundation construction, equipment deliveries will begin at the site, including the auxiliary equipment shipped by truck and some large equipment shipped by rail or possibly barge. These shipments will continue over a 16 to 24 month period. The timing of these shipments is planned to coincide with the completion and readiness of the respective foundations and structures. Shipments at the rail siding and the Plant entrance road will be coordinated by the heavy haul contractor. Equipment will be lifted from the rail cars and loaded onto transport vehicles to be driven to the site. Construction cranes will be located on-site to lift equipment from transport vehicles onto foundations or into the Plant building.

The two natural gas-fired combustion turbine-generator sets, two HRSGs, and one steam turbine generator will be set first, followed by the remaining auxiliary equipment. Erection of the turbine air inlets and the exhaust stacks will follow the building steel erection and HRSG erection respectively. Next, the building enclosure will be completed.

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 substation. The contractors for the new equipment construction will be essentially demobilized in early 2016.

3.4 Retiring the Existing Units 3 and 4

The existing coal-fired Units 3 and 4 will be retired after the new gas-fired units begin commercial operation. The retirement will likely include demolition and removal of coal, ash and air quality control system equipment and structures external to the generation building, including stacks. Abatement activities, including removal of asbestos and lead, and, if necessary, remediation of contaminated soils, will also be completed. The areas not reused for the Project will be re-graded for proper drainage, re-vegetated, and maintained under Company ownership.

3.5 Operation and Maintenance

The Project will be integrated into our remote dispatch control center. We expect to use the Project's unfired capability for intermediate load service, dispatching it after all incrementally cheaper and "must run" units have been dispatched. The additional capacity of the Project, available through supplemental firing of the HRSG, will be utilized for peak demand periods as dispatched.

3.5.1 Load Following

The Project will also serve to load follow as requirements change. The Project will have the ability to ramp at approximately 5 to 10 MW per minute and will be able to begin start up after a 30-minute notice depending on the pre-existing steam turbine condition.

3.5.2 Capacity Factor

The Project is expected to be dispatched up to 5 days per week, 16 hours per day with an initial annual capacity factor of 35 percent.

Typical operation will consist of combined cycle operation. Duct firing within the HRSG can be employed to increase the Plant capacity. The Plant will also have the capability of cooling inlet air to increase Plant capacity during periods of warm weather with evaporative cooling. The Plant will be equipped with a

steam bypass for startup that will also allow the combustion turbine generators to be run while bypassing the steam turbine. This creates 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.

We anticipate the Project will have a 35-year operating life. The Project is expected to be in the range of 50 percent efficient, depending on operating conditions.

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

3.6 Substation and Transmission Line

The Project will be interconnected through a new 345 kV substation. The electric transmission components of the Project consist of building two approximately 4,000 foot-long, double circuited, 345 kV transmission lines and the potential rebuilding of a 1,000 to 1,500 foot-long section of existing 115 kV transmission line. The proposed location of the substation, the proposed route of the 345 kV lines and rebuild of the 115 kV transmission line is shown on Figure A-4 in Appendix A. The new section of transmission lines will connect the new 345 kV substation to the existing Blue Lake to Prairie Island 345 kV transmission line and the Blue Lake to Inver Hills 345 kV transmission line. Both of these lines currently run through existing Xcel Energy Property. While we expect the new sections of transmission lines can be placed on existing Xcel Energy property, we have not yet determined the specific transmission structure locations. Some structure placement may need to occur within Black Dog Lake.

3.6.1 Transmission Design

Transmission Structures

The proposed structures (*see* Figure 3-2) for the 345 kV double circuit lines will be about 90 to 110 feet tall and will have an average span between 300 and 500 feet. By limiting the maximum span to 500 feet we can keep the conductor within the right-of-way under blowout conditions. The usual right-of-way required for these types of structures is 150 feet wide. The existing

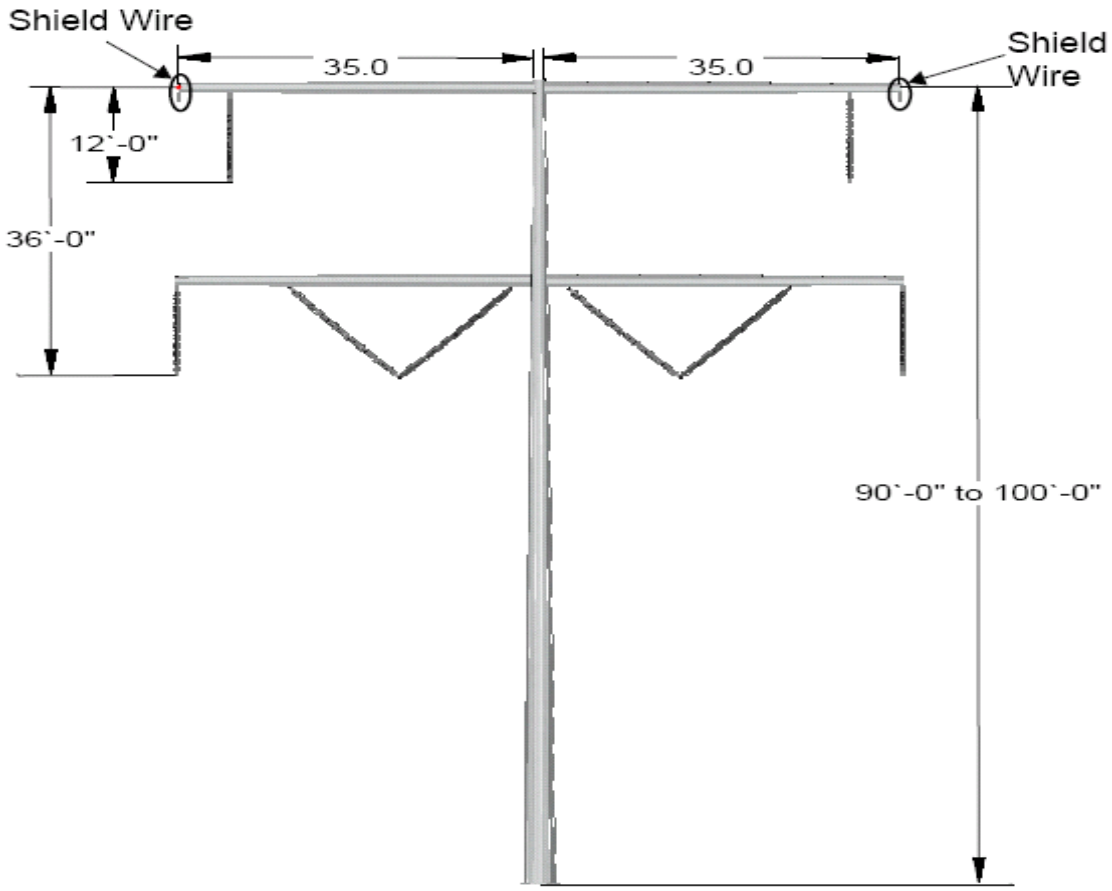
transmission line structures that the proposed transmission lines will connect to vary in height between 50 to 90 feet. As previously stated, Xcel Energy is currently determining specific engineering details such as structure placement locations.

The finish of the proposed poles will be galvanized steel. The existing transmission line structures in this area are wood poles of H-frame construction, and galvanized steel lattice design. The proposed steel poles will give the new transmission line a somewhat cleaner and more modern appearance. The conductor will be bundled, 795 KCmil 26/7 ACSR.

Table 3-1: Transmission Structure Design Summary

Line Type	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Foundation	Foundation Diameter (feet)	Span Between Structures (feet)
345 kV Double Circuit	Single pole	Galvanized steel	150	90-110	Concrete	8 to 10 foot concrete	300 to 500

Figure 3-2: Double Circuit Transmission Line Structure



3.6.2 Right-of-Way Requirements and Acquisition

The proposed transmission line will be primarily located on the existing Plant Site property. If one or more structures need to be placed in Black Dog Lake, Xcel Energy will work to obtain the necessary permits and/or licenses from the MnDNR and, or other applicable government agencies.

3.6.3 Transmission Facilities Construction

Substation

Substation construction will begin after approvals are obtained, soil conditions are determined, and the design is completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, available workforce, and materials. Construction and

mitigation practices to minimize impacts will be developed based on the proposed activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain, and other practices.

The initial construction activity will be site grading and fencing that will be designed according to Xcel Energy Civil/Structural Standards and Specifications. The fenced yard will cover an area of approximately five acres. An additional 1.7 acres NW of the fenced yard will be graded, topped with topsoil, and seeded. The final grade elevation will be brought above the 100 year flood elevation, 715 feet above sea level, with imported fill and sloped 1 - 2º for drainage. Class 5 gravel will be used to bring the yard up to the desired elevation and surfaced with four inches of crushed rock.

The installation of concrete foundations for structures, equipment, and the electric equipment enclosure ("EEE") will follow site grading. Soil borings will determine the dimensions of the pier and slab foundations to be constructed.

Once foundations have been allowed to set and strength tests have been completed, structures, equipment and the EEE will be constructed. Concrete-walled trenches will be constructed between the EEE and equipment containing control cables. Then a direct buried ground grid consisting of bare 4/0 copper conductor and ground rods 3/4" in diameter will be installed a minimum of 20' deep and cover the entire substation yard. Flexible and tubular bus will be installed to connect circuit breakers, switches, and termination structures. Transmission lines will be dead-ended on the termination structures. Installed in the EEE will be an AC and a DC system, communication facilities, protective relay panels and operational controls.

The final stage will involve the testing of the AC, DC, electrical protection, and communication systems to assure operability.

Transmission Lines

Construction will begin after all approvals are obtained, soil conditions are determined, and the design is completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues, available workforce, and materials.

The actual construction will follow standard construction and mitigation practices that have been developed from experience with past projects. These best practices address clearances, staging, erecting transmission line structures, and stringing transmission lines. Construction and mitigation practices to

minimize impacts will be developed based on the proposed activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain, and other practices. In certain cases some activities will be modified to minimize impacts to sensitive environments.

Typical construction equipment used on transmission projects includes tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks, and various trailers. Many types of excavation equipment are set on wheel or track-driven vehicles.

Steel pole structures are proposed to be used for the Project. All the structures will be set on concrete foundations, which are extended deep into the soil (drilled piers) or set on steel piles (pile foundations), depending on the soil conditions. Drilled pier foundations require excavating a hole to the bottom of the structure foundation and then filling it with concrete. Depending on the soil conditions, casings may be required to prevent the soil from caving in prior to pouring the concrete. The casings are usually left in place and become part of the foundation structure. Pile foundations involve the installation of prefabricated steel sections (piles) that are driven or forced into the ground. The piles are typically installed in groups and are connected together through their heads by a concrete block known as the pile cap. The pile caps usually extend above grade and provide a base on which the structure sits.

Wetlands present in the area are dominated by Palustrine (i.e., wetlands dominated by erect, rooted herbaceous hydrophytes, or wetland habitats having at least 25 percent cover of particles smaller than stones and a vegetation cover of less than 30 percent) and Lacustrine (i.e., open water) wetland types. Lacustrine wetlands would be affected should Xcel Energy need to place transmission structures in Black Dog Lake. If impacts to wetlands or Black Dog Lake are unavoidable, they will be minimized or addressed through the implementation of mitigation practices required by federal, state, and/or local permits and approvals. Construction crews will maintain sound water and soil conservation practices during construction to protect topsoil and adjacent water resources and to minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil. Crews will avoid major disturbance of individual wetlands and drainage systems during construction. This will be accomplished by strategically locating new access roads and spanning wetlands and drainage systems where possible.

When it is not feasible to span the wetland, construction crews will consider the following options during construction to minimize impacts:

When possible, construction will be scheduled during frozen ground conditions;

Crews will attempt to access the wetland with the least amount of physical impact to the wetland (i.e., shortest route);

The structures will be assembled on upland areas before they are brought to the site for installation; or

When construction during winter is not possible, construction mats will be used where wetlands would be impacted.

Commonly used methods to control soil erosion and assist in reestablishing vegetation include, but are not limited to:

erosion control blankets with embedded seeds;

silt fences;

hydro seeding; and

planting individual seeds or seedlings of native species.

These erosion control and vegetation establishment practices are regularly used in construction projects and will be referenced in the construction storm water permit plans. Long-term impacts are also minimized by utilizing these construction techniques.

3.6.4 Transmission Operation and Maintenance

Xcel Energy will periodically perform inspections, maintain equipment and make repairs over the life of the lines. Xcel Energy will also conduct routine maintenance approximately every five years to remove undesired vegetation that may interfere with the safe and reliable operation of the transmission line.

Transmission lines and substations are designed to operate for decades and require only moderate maintenance, particularly in the first few years of operation.

The estimated service life of the proposed transmission lines for accounting purposes is approximately 40 years. However, practically speaking, high voltage transmission lines are seldom completely retired. Transmission

infrastructure has very few mechanical elements and is built to withstand weather extremes that are normally encountered. With the exception of severe weather such as tornadoes and heavy ice storms, transmission lines rarely fail.

Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

The principal operating and maintenance cost for transmission facilities is the cost of inspections, which is usually done monthly by air. Annual operating and maintenance costs for transmission lines in Minnesota and surrounding states vary. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

Substations require a certain amount of maintenance to keep them functioning in accordance with accepted operating parameters and the National Electric Safety Code ("NESC") requirements. Transformers, circuit breakers, batteries, protective relays, and other equipment need to be serviced periodically in accordance with the manufacturer's recommendations. The substation site must be kept free of vegetation and adequate drainage must be maintained.

4 Environmental Information

The Project will be located at an existing generating site and, as a result, will not have significant adverse effects on land use, social, cultural, and economic resources or effects on the natural environment, including wetlands, threatened or endangered species or archaeological and historical sites. The repowering of an existing coal-fired electric generating facility to a cleaner, less intrusive natural gas-fired combined cycle facility will have minimal negative impacts and, in many aspects, will have beneficial effects on air quality, water use, wastewater generation, and noise. The potential effects of the Project are discussed below.

This chapter also includes an analysis and discussion of the engineering design and operational features of the Project that enhance the Project's compatibility with the surrounding 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 described in Chapter 3 has included consideration of the site setting. The Project will employ state-of-the-art equipment to minimize air emissions, solid and liquid waste generation, and control noise.

4.1 Impacts to Air

Quantities of most types of air emissions from the Project will be significantly lower than from the existing coal fired units. For most types of emissions, the pounds-per-MWh rate will decrease as compared to the existing coal fired units. Volatile organic compounds ("VOCs") will be higher on an annual basis than from the coal fired units because of emissions during startup of the combined cycle units. 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 Emissions

The existing facility operates under air emission permit No. 3700003-009, issued by the MPCA on March 3, 2009. The Project will replace the Unit 3 and Unit 4 dual fuel boilers that use low-sulfur western coal as their primary fuel with gas-fired combined cycle technology. As a result, an air emissions permit application will be submitted to the MPCA. The new air emissions sources include:

Two identical combustion turbines with dry, low-NOx combustors.

Two identical HRSGs equipped with supplemental duct-firing capacity. A SCR system will be installed within each HRSG to reduce NOx emissions from the combustion turbine and duct burner exhaust when operating in the combined cycle mode of operation. Oxidation catalysts will also be installed in each heat recovery steam generator to reduce CO emissions. The oxidation catalysts also will reduce VOC emissions and certain hazardous air pollutants.

A new fire pump to be located adjacent to the new fire/service water tank.

An auxiliary boiler will be added to the Site as a separate project but will be included in the air emission permit.

Cooling towers are a source of particulate emissions because of particulate matter in the water.

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

An estimate of the anticipated ("projected actual") air emissions from the new units is presented below in Table 4-1. Note that these estimates are lower than those that will be presented in the air emissions permit application. The air emissions permit application will be based on potential-to-emit for the cooling tower, which assumes operation every hour of the year, and a limited potential-to-emit for the CGTs, duct burners, auxiliary boiler and new fire pump, assuming some number of hours of operation annually that is higher than would occur. Potential-to-emit emissions 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: Estimated Project Air Emissions

EPA Criteria Pollutants			
Pollutant	**Emission Rate** Two Units Without Duct Firing, at Rated Capacity (average ambient conditions, base load) (lbs/hour)	**Emissions[1]** Two Units With Duct Firing, at Projected Annual Operating Hours (tons/year)	
SO_2	4	6	
NO_X	66	132-151	
PM_{10}	41	67	
CO	16	119-209	
VOCs	10-15	43-86	
Hazardous Air Pollutants (HAPs)			
Pollutant	**Emissions[2]** Two units at Projected Annual Operating Hours (tons/year)	Pollutant	**Emissions[2]** Two units at Projected Annual Operating Hours (tons/year)
1,3-Butadiene	0.00	Hexane	0.00
1,4 Dichlorobenzene	0.00	Lead	0.00
Acetaldehyde	0.24	Manganese	0.00
Acrolein	0.04	Mercury	0.00
Arsenic	0.00	Naphthalene	0.01
Benzene	0.07	Nickel	0.00
Beryllium	0.00	Polycyclic Aromatic Hydrocarbons	0.01
Cadmium	0.00	Polycyclic Organic Matter	0.00
Chromium	0.00	Propylene Oxide	0.18
Cobalt	0.00	Selenium	0.00
Dioxins	0.00	Toluene	0.80
Ethylbenzene	0.20	Xylenes	0.39
Formaldehyde	4.43		

[1]Annual emissions from two combustion turbines, with startup and shutdown periods, at 3,066 operating hours each and HRSG duct firing at 438 hours each.
[2]Annual emissions from two combustion turbines at 3,066 operating hours each and HRSG duct firing at 438 hours each. Emissions numbers do not account for reduction in organic HAPs achieved with oxidation catalyst.

A comparison of the estimated annual emissions from the Project to actual emissions from the existing Units 3 and 4 are presented below in Table 4-2.

Table 4-2: Future to Present Annual Emissions Comparison

Pollutant	Future Projected Actual Emissions (tpy)[1]	Existing Units 3 and 4 Actual Emissions (tpy)[2]	Increase/ (Decrease)(tpy)
SO_2	7	3,260	(3,253)
NO_x	173-191	6,501	(6,310)-(6,328)
PM_{10}	79	184	(105)
$PM_{2.5}$	70	184	(114)
CO	129-224	222	(93)-2
Pb	0.003	0.03	(0.03)
VOCs	46-88	26	20-62
CO_2	812,961 – 824,096	1,670,511	(846,415)-(857,550)
HAPs (total)	6.5	8.5	(2.0)
HAPs (largest single)	4.5	3.1	1.4

[1]Annual emissions from the cooling tower, two combustion turbines (with startup and shutdown periods) at 3,066 operating hours each and HRSG duct firing at 438 hours each, auxiliary boiler at 5,256 hours, and fire pump at 24 hours. HAPs data does not account for reduction in organic HAPs from the oxidation catalysts.
[2]Annual emissions based on an annual average from a 24-consecutive month period during 2008-2010, consistent with air quality regulations for netting.

In addition to the pollutants listed in the tables above, there will be a small release of ammonia from the combustion turbine stacks, referred to as "ammonia slip". An SCR system will be utilized in the HRSGs to control NOx emissions from the combustion turbines and duct burners; ammonia is used as a reagent in the SCR system. We will obtain an air emissions permit from the MPCA. The Project will be subject to Prevention of Significant Deterioration ("PSD") review for emissions of VOCs.

4.1.2 Air Emission Control Measures

We will apply the following emissions control strategies:

Fire only natural gas in the combustion turbines and duct burners to minimize NOx, sulfur dioxide ("SO_2"), and particulate material ("PM") emissions.

Use dry low-NOx combustors in the combustion turbines to further reduce the formation of NOx.

Install SCR to control NOx emissions from the combustion turbine and duct burners.

Employ good combustion practices and install oxidation catalysts to control CO emissions from combustion turbine and duct burners. These control measures will also control VOCs and certain hazardous air pollutants.

The PSD rules require that pollutants subject to PSD review must be controlled through the application of the Best Available Control Technology ("BACT"). For the Project, VOCs are subject to PSD review and BACT. BACT analyses for VOCs will be performed for the combined cycle units, auxiliary boiler and new fire pump, and submitted as part of the PSD permit application. All of the new combustion sources will employ good combustion practices to minimize emissions of VOCs. VOC emissions from the CTs and duct burners also will be controlled by oxidation catalysts, however, it is anticipated that the BACT analysis will indicate that oxidation catalysts are more stringent than BACT requires.

4.1.3 Compliance Demonstration

Compliance with emissions permit limits for the combined cycle units will be demonstrated by means of Continuous Emission Monitoring System ("CEMS") operating according to demonstrated performance criteria, by periodic stack emissions tests, or by monitoring fuel. We are proposing to install CEMS to continuously measure CO and NOx emissions from the stacks associated with the combined cycle units.

4.1.4 Air Pollutant Impacts

As part of the air emission permit application, air dispersion modeling is performed to demonstrate that the emissions from the facility will not cause or contribute to a violation of a National Ambient Air Quality Standard ("NAAQS") or Minnesota Ambient Air Quality Standard ("MAAQS") for nitrogen dioxide ("NO_2"), SO_2, CO, PM less than 10 microns in size ("PM_{10}"), and PM less than 2.5 microns ("$PM_{2.5}$"). Modeling is performed using a modeling protocol approved by the MPCA and that conforms to EPA standards, to predict the maximum ambient concentrations. The predicted contribution from the Plant Site will be added to background concentrations for each modeled pollutant.

Our emission sources will be modeled to determine compliance with the MPCA guidance and the appropriate background concentrations for each modeled pollutant.

A complete modeling report will be submitted as part of the air emission permit application. The permit application will be reviewed by the MPCA and will be placed on public notice in accordance with the requirements of the application process. Results of preliminary modeling, using maximum emission rates, are shown in Table 4-3.

TABLE 4-3: Estimated Maximum Contributions to Ambient Air Quality

Pollutant	Averaging Period	Contributions to Ground-Level Concentrations[4]									Primary Ambient Standards [5]
		New Equipment [1] ($\mu g/m^3$)			Post-Project Equipment [2] ($\mu g/m^3$)			All Site Equipment and One Emergency Engine [3] ($\mu g/m^3$)			
		Plant Contribution	Background Concentration	Total Concentration	Plant Contribution	Background Concentration	Total Concentration	Plant Contribution	Background Concentration	Total Concentration	($\mu g/m^3$)
SO_2	Annual	0.04	5.00	5.04	0.04	5.00	5.04	0.15	5.00	5.15	60
	24-Hour	1.39	21.00	22.39	1.43	21.00	22.43	3.02	21.00	24.02	365
	3-Hour	2.19	42.00	44.19	2.36	42.00	44.36	4.98	42.00	46.98	1300
	1-Hour [6]	2.29	70.00	72.29	2.69	70.00	72.69	2.69	70.00	72.69	196
NO_2	Annual	2.82	17.00	19.82	2.73	17.00	19.73	6.29	17.00	23.29	100
	1-Hour [6]	62.50	83.00	145.50	68.98	83.00	151.98	70.93	83.00	153.93	188
PM_{10}	Annual	0.29	18.00	18.29	0.29	18.00	18.29	0.38	18.00	18.38	50
	24 Hour	7.55	45.00	52.55	7.76	45.00	52.76	8.47	45.00	53.47	150
$PM_{2.5}$	Annual	0.29	10.00	10.29	0.28	10.00	10.28	0.38	10.00	10.38	15
	24-Hour	7.88	26.00	33.88	8.47	26.00	34.47	8.73	26.00	34.73	35
CO	1-Hour	683.85	1725.00	2408.85	1977.79	1725.00	3702.79	1981.41	1725.00	3706.41	35,000
	8-Hour	131.30	1380.00	1511.30	1024.88	1380.00	2404.88	1030.33	1380.00	2410.33	10,000

[1]New Equipment consists of combustion turbines 7 and 8 with duct burners, auxiliary boiler, new fire pump, and cooling towers.

[2]Post-Project Equipment consists of New Equipment plus existing combustion turbine/duct burners (Unit 5/2).

[3]All Site Equipment and One Emergency Engine consists of Post-Project Equipment plus boilers 3 and 4 burning natural gas and one worst-case emergency engine.

[4]Results represent the worst-case scenario of combustion turbine vendors under consideration.

[5]Standards listed represent most stringent state or federal standard.

[6]Intermittent emissions from emergency equipment were not included in estimating maximum 1-hour concentrations.

4.1.5 Air Emissions Risk Analysis

The Project is exempt from the requirement to conduct an Air Emissions Risk Analysis ("AERA") in accordance with MPCA guidance because emissions will not increase over AERA emission increase thresholds. The purpose of an AERA is to assess the potential health risk attributed to air emissions from a given source.

4.1.6 Air Emissions Associated with Transmission

The potential air emissions associated with the Project transmission lines are negligible. However, there is potential for ozone and NO_2 due to corona. Corona consists of the breakdown or ionization of air within a few centimeters of conductors which can produce ozone and NO_2 in the air surrounding the conductor. Typically, some imperfection such as a scratch on the conductor or a water droplet is necessary to cause corona. Ozone is not only produced by corona, but also forms naturally in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants, such as hydrocarbons from auto emissions. The natural production rate of ozone is directly proportional to temperature and sunlight, and inversely proportional to humidity. Thus humidity or moisture, the same factors that increase corona discharges from transmission lines, inhibit the production of ozone. Ozone is a very reactive form of oxygen molecules and combines readily with other elements and compounds in the atmosphere. Because of its reactivity, it is relatively short lived. For a 345 kV transmission line, the conductor gradient surface is usually below the air breakdown level.

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and NO_2. The applicable standards for these compounds in parts per million ("ppm") are presented in Table 4-4.

Table 4-4: Applicable Ambient Air Quality Standards for Transmission Projects

Pollutant	Level	Averaging Time	National or Minnesota Standard
Nitrogen Dioxide	0.100 ppm	1-hour	National
Nitrogen Dioxide	0.053 ppm	Annual	National
Nitrogen Dioxide	0.05 ppm	Annual	Minnesota
Ozone	0.075 ppm	8-hour	National
Ozone	0.08 ppm	8-hour	Minnesota

For the overhead 345 kV/345 kV double circuit design with both circuits in service on the proposed route, the predicted ozone concentration is 0.0007 ppm in foul weather (worst case) conditions. The corona loss estimate is 0.1 W/m. These calculations were obtained from the Software Applications for the EPRI AC Transmission Line Reference Book, 200kV and Above, Third Edition.

The result is well below both federal and state standards. Most calculations of the production and concentration of ozone assume high humidity or rain, with no reduction in the amount of ozone due to oxidation or air movement.

4.2 Water Use

Water usage 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. See the discussion of the Project water systems in Chapter 3.

Water will be needed for the Project for once-through cooling, cooling tower make-up water, turbine inlet air evaporative cooling, steam system make-up water, fire protection, closed cooling system make-up water, and domestic-type uses.

Surface water appropriated from the Minnesota River is currently used for cooling water and that source will be used to supply the cooling water system for the Project as well. The total surface water appropriations for the site will be within the existing MnDNR Water Appropriations Permit (#1961-0270) limitations. For once-through cooling, the withdrawal rate will be higher than recent years but similar to operations with four steam turbines up to the late 1990s.

Operation in closed-cycle mode with the cooling tower will result in significantly lower withdrawal volumes over the season when operating in such a mode. Also, when in closed-cycle mode, the evaporative loss through the cooling tower is expected to be higher than through the cooling lake ponds while in once-through mode. The closed-cycle mode will help address the requirements of the EPA's Clean Water Act Section 316(b) rule for existing facilities in terms of fish protection. The requirements and details of implementation will be part of the NPDES Permit amendment and renewal process.

Groundwater from the existing site well will supply other water needs for the Project. No increase in the groundwater appropriation limit in the MnDNR Water Appropriations Permit (#1961-0271) will be required for the Project. The annual withdrawal volumes for future site operations (Project and existing Unit 5/2) are expected to be within the range of existing Plant operations. A summary of expected Project groundwater use is depicted below in Figure 4-1, Groundwater Balance.

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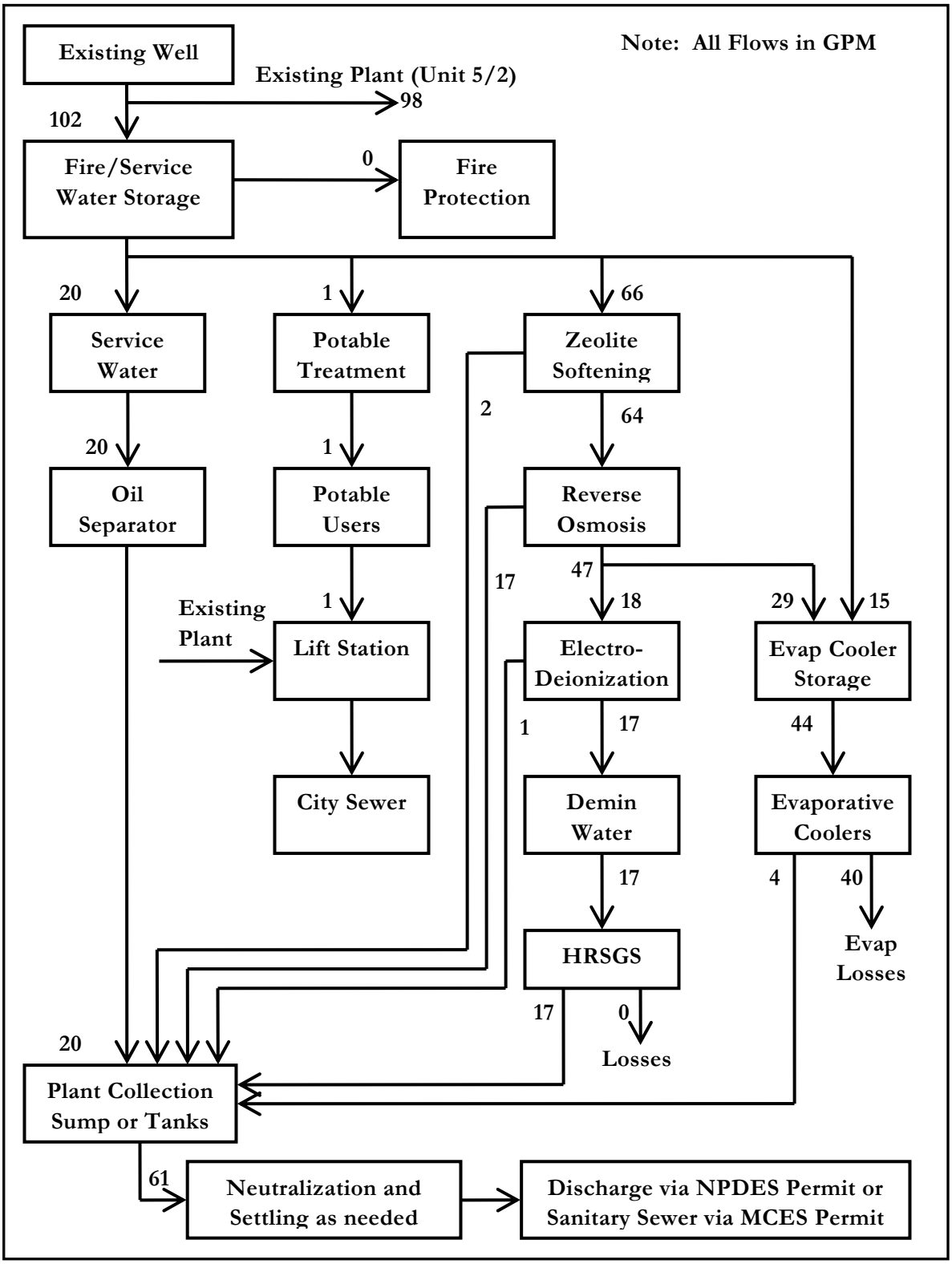
Figure 4-1: Groundwater Balance (Peak Day)



A summary of expected Project surface water use is depicted in Figure 4-2, Surface Water Balance. Figure 4-2 below shows both once-through cooling and closed-cycles for peak day operation.

Figure 4-2: Surface Water Balance (Peak Day)

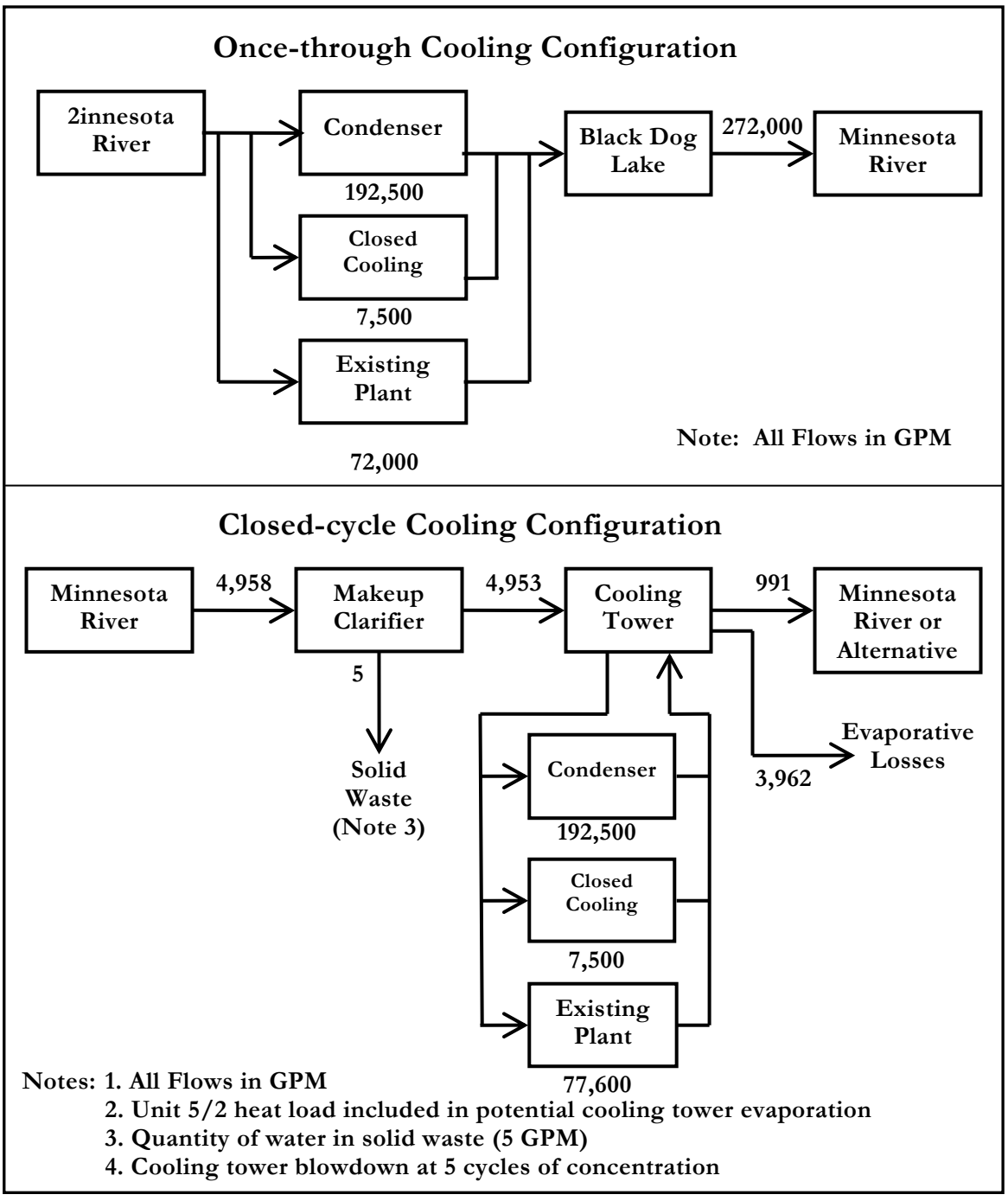


Table 4-5 below lists the amount of water expected to be used by the facility once the Project commences operation. Surface water use is for once-through cooling for the full year.

Table 4-5: Water Use

Description	Project Data
Estimated Maximum Groundwater Pumping Rate for Site	200 GPM maximum daily average, no change from current plant
Estimated Annual Project Groundwater Appropriation (assuming RO purification process)	17 million gallons/year or 52 acre-feet/year (Project use) 37 million gallons/year or 114 acre-feet (Total site use)
Surface Water Appropriation	446 cfs for Project 633 cfs for Site
Annual Project Surface Water Use	215,100 acre-feet (Project use) 319,000 acre-feet (Total site use) (Once-through cooling mode all year operation)
Annual Project Surface Water Consumption	2,250 acre-feet (Total site use) (Closed-cycle cooling mode all year operation)

4.2.1 Groundwater Use

Groundwater at the site is provided by a single well and is used to supply domestic potable water to the Plant administration building, water to the fire protection system, and raw water to the reverse osmosis RO/make-up demineralizer system. Groundwater treated by the RO system is used as make-up water to the HRSG system and as part of the supply to the evaporative coolers for cooling incoming combustion air. The on-site well draws groundwater from the Prairie du Chien/Jordan aquifer. The site annual average groundwater usage over the last five years was 37 million gallons (70 gpm average). Groundwater use for the facility is permitted by the MnDNR Groundwater Appropriations Permit (#1961-0271), which allows an annual

withdrawal volume of 50 million gallons, at a peak rate not to exceed 250 gpm. The estimated consumption due to the Project is not considered to be significant. As a result, no changes will be necessary to the Groundwater Appropriations Permit. It is estimated that 17 million gallons per year of groundwater will be used specifically for the Project and the total post Project site use will be similar to the existing usage of 37 million gallons.

4.2.2 Surface Water Use

Once-through and closed-cycle modes have significant differences in surface water use. To comply with the Clean Water Act Section 316(b) requirements for protection of fish regarding entrainment into and impingement at cooling water intakes, a cooling tower will be installed. The cooling tower may operate seasonally depending on NPDES permit requirements in regard to fish protection needs (e.g. operation may be aligned with the period of time with high potential for entrainment or impingement). The cooling cycle may operate with existing Unit 5/2 using once-through cooling and the Project using closed cycle cooling.

In once-through cooling mode, surface water is drawn from the Minnesota River and used for plant condenser cooling, auxiliary cooling water (non-contact cooling) systems, and intake screen wash. The circulating water system removes heat from the condensers and closed cooling systems with the once-through circulating water system. The resultant thermal discharge is cooled in Black Dog Lake prior to discharging within NPDES limits via two outfalls to the Minnesota River. Black Dog Lake is operated as the Plant's cooling lake per past deliberations with the MPCA and the EPA.

In closed-cycle mode, the circulating water system removes heat from the condensers and closed cooling water systems and sends the heat to a cooling tower that uses evaporation of a portion of the water for cooling. Surface water will be treated and utilized for make-up water to the cooling tower. Additionally, the use of recycled wastewater for cooling tower makeup is under consideration.

The annual average surface water use over the past five years was 104,000 million gallons (319,164 acre-feet) of water per year. A small percentage of this cooling water is evaporated due to Plant operations. Additional evaporation, yet still a relatively small percent, occurs in Black Dog Lake.

Surface water use is permitted by the MnDNR under Surface Water Appropriation Permit (#1961-0270). The Surface Water Appropriations

Permit allows site withdrawal of up to 458,200 acre-feet of water per year from the Minnesota River. Besides the cooling water system modifications discussed above and in earlier sections, the only other potentially significant modification to a river water system is the increase in intake traveling screen operation with its associated screen backwash. Such an increase will only be implemented if needed as an alternate or contingency fish protection measure or as a measure related to the existing unit 5/2. Such an increase in screen operation may not increase the maximum daily river water use for screen backwash but will increase the daily average usage from about 1 MGD to up to 6 MGD. Even with the cooling water modifications and the potential screen backwash increase, the Project will not introduce a withdrawal increase necessitating changes to the existing DNR Water Appropriations Permit (#1961-0270) limit.

The proposed cooling tower will be operated at approximately five cycles of concentration and withdraw significantly less water compared to once-through cooling, less than two and one-half percent of the rate for once-through cooling. The estimated additional withdrawal due to the Project is within the values previously evaluated and is not considered to be significant. Therefore, the Project will not necessitate any changes to the Surface Water Appropriations Permit.

With the cooling tower, peak surface water consumption due to closed-cycle cooling and subsequent evaporative losses and cooling tower drift is estimated at approximately 5.7 million gallons per day.

While operating the cooling towers in closed-cycle mode, substantially less water will be directed to Black Dog Lake. Therefore, during these times the lake may assume a lower level, closer to river levels.

4.2.3 Impingement and Entrainment

Section 316(b) of the Clean Water Act requires any standard established pursuant to 301 or 306 shall require the location, design, construction, and capacity of cooling water intake structures to reflect the best technology available for minimizing adverse environmental impacts (33 USC 1326 (b)). Entrainment of fish and shellfish in the early life stages through the condenser and auxiliary cooling water systems is one of the potential adverse environmental impacts that can be minimized by the use of the best available technology.

The EPA has recently proposed revised rules for implementing Section 316(b) at existing facilities. Conformance with these regulations once finalized will be

determined within the NPDES Permit renewal process as implemented by MPCA. The existing facility is currently designed with once-through cooling. In light of EPA's currently proposed requirements, the facility is planning for a cooling tower to allow closed cycle operation as needed for fish protection. Thus, no significant increase in losses due to the entrainment of organisms or impingement of fish is anticipated due to the Project. The Project's cooling water system design should significantly reduce such entrainment and impingement losses.

4.2.4 Thermal Discharge

The NPDES/SDS permit places thermal limitations on surface water discharges of cooling water from the facility. Clean Water Act Section 316(a) studies have been conducted to either develop appropriate limitations or to demonstrate that the permitted limitations are adequate to protect the Minnesota River from significant impacts due to thermal loading. With the addition of a cooling tower, the site will operate the cooling water system in closed-cycle mode for fish protection at the intake.

Under closed-cycle mode, there will be relatively small heat rejection to the lake and/or river via the cooling tower blowdown. Therefore, during closed-cycle operation, it is anticipated that the Project will significantly decrease the overall thermal loading to the river as well as the cooling lake. During the rest of the year, while in once-through operation without the cooling tower in service, the heat rejection will be similar to the present Plant Site heat rejection with all units operating normally. In this mode, Black Dog Lake is operated as the Plant's cooling lake per past deliberations with the MPCA and the EPA.

However, when duct firing is conducted while in once-through cooling mode, there will be an increase in the heat rejection rate and cumulative daily heat rejection loading. Duct firing is not anticipated to be conducted very frequently during once-through cooling mode as the corresponding months are not the highest electrical demand months. With the reduction associated with closed-cycle operation and with the minor increase of the limited period when duct firing would be employed in once-through mode, no additional restrictions or conditions beyond the existing NPDES Permit thermal discharge limitations are anticipated.

4.3 Wastewater Generation

Wastewater generation will be similar to that of the existing Plant after closure of coal and ash wastewater components. The Project will not have a major impact on wastewater treatment facilities. Any treatment changes will be determined through the NPDES and/or MCES permitting processes. See also the discussion of the Project wastewater systems in Chapter 3. Table 4-6 lists the different sources of wastewater, and the estimated volumes based on the entire Plant Site, including the Project, generating at a 35% capacity factor.

Table 4-6: Wastewater Generated

Waste	Phase	Description	Generation Rate	Disposition Method
Project Cooling Water Discharge	Liquid	Once-through cooling water discharge	(once-through mode all year operation) 70,000 MGPY (Project only) 104,000 MGPY (total site)	Discharge to Minnesota River via the cooling lake (Black Dog Lake) under NPDES permit
Cooling Tower Blowdown	Liquid	Cooling Tower Blowdown	(closed-cycle mode all year operation) 521 MGPY (total site)	Discharge to surface waters under NPDES permit or discharge to sanitary sewer under MCES permit
Process Water Blowdown	Liquid	HRSG Blowdown	3.6 MGPY (Project only)	Discharge to surface waters under NPDES permit or discharge to sanitary sewer under MCES permit
Process Water Blowdown	Liquid	Evaporator Cooler Blowdown (Spring through Fall only)	0.4 MGPY with evap cooler at 20% capacity factor (Project only)	Discharge to surface waters under NPDES permit or discharge to sanitary sewer under MCES permit
Roof/Yard Drain	Liquid	Surface / Building Runoff (quantity assumes complete runoff)	28.5 MGPY for 35 acres at 30 inches precipitation per year. (total site)	Discharge to surface waters under NPDES permit
RO Reject Water	Liquid	Water containing dissolved solids present in the raw water source except at a greater concentration.	3 MGPY 20 gpm (max.) (Project only)	Discharge to surface waters under NPDES permit or discharge to sanitary under MCES permit sewer
Service Water	Liquid	Equipment wash water.	5.3 MGPY similar to present except	Discharge to surface waters under NPDES

			during construction (Project only)	permit or discharge to sanitary sewer
Sanitary Wastewater	Liquid	Domestic wastewater.	0.2 MGPY similar to present (total site)	Existing sewer system

4.3.1 Process Wastewater Discharges to Surface Water

NPDES/SDS Permit #MN000876 regulates five separate discharge locations, a cooling lake (Black Dog Lake), and an ash settling pond system. The permit requires monitoring of flow from all five discharge points, and limits the temperature of the discharge from the cooling lake to the Minnesota River. The permit requires the monitoring of additional parameters from the discharge of once-through condenser cooling water and the discharge of the ash pond to the cooling lake.

The Company will close the four existing ash ponds. However, the Company may install one or two new ponds, one for treating cooling tower blowdown prior to discharge and one for site stormwater management. The Company will work with the MPCA to amend the NPDES permit to include the discharge of blowdown water from the proposed cooling tower. Use of the cooling tower during summer months will significantly decrease the thermal load to the cooling lake and reduce the impingement and entrainment of aquatic organisms as discussed in Sections 4.2.3 and 4.2.4.

4.3.2 Process Wastewater Discharges

Process wastewater derived from the Plant's groundwater well is currently discharged to surface waters under the NPDES permit. Current process wastewater includes concentrate and other wastewater (e.g. back wash from softening and deionization treatment processes) from the RO system, blowdown from the HRSG system, blowdown from the evaporative cooler system, and other miscellaneous wastewaters.

The process wastewaters will be similar to current Plant wastewaters except that coal- and ash-related waste streams will be eliminated. Additionally, cooling tower blowdown water will be created from the cooling tower and potentially a wastewater component may be created from the clarifier for cooling tower make-up.

The wastewater streams will be evaluated for the most appropriate management and discharge, either to surface waters under a renewal of the existing NPDES/SDS or to sanitary sewer. The addition of industrial wastewater to the existing sanitary sewer will require obtaining a discharge permit with the MCES, an upgrade in the existing sanitary sewer from the Plant, and potentially payment of sewer availability charges ("SAC").

4.3.3 Industrial Stormwater Discharges

Industrial stormwater generated at the Plant is managed and discharged in accordance with terms of the Plant's NPDES/SDS permit. The issuance of this permit in 2008 incorporated appropriate conditions from the State's General Permit thereby allowing termination of coverage under the State's General Permit that formerly covered the Plant. The Plant has developed and implemented a SWPPP to manage and minimize industrial exposure to stormwater. The current largest sources of stormwater exposure: coal handling, processing and storage and ash management will be eliminated with the Project. Industrial stormwater conditions will be part of the renewed NPDES/SDS permit as well and the SWPPP will be updated accordingly, including the elimination of properly closed coal and ash areas.

4.3.4 Construction Wastewaters

Some wastewaters will result from the construction area or as a result of construction processes. Construction wastewaters typically entail stormwater runoff, groundwater or pond dewatering, hydrostatic test (tank, pipeline, pond) drainage, landscape irrigation runoff, and excess dust suppression. The wastewaters will be managed as appropriate through best management practices as well as in compliance with any applicable requirements of pertinent permits, such as the MPCA's NPDES Stormwater Permit or the MnDNR's General Permit for Temporary Water Appropriations (such as construction dewatering). In general, with the exception of some runoff, construction wastewaters will ultimately be managed and treated with other site wastewaters with discharge to surface waters as part of the site's NPDES permit or with discharge to sanitary sewer under an MCES permit.

4.4 Noise

The Company believes that the Project will not result in any significant changes to the character, sources, or energy of noise generated at the Plant. A sound level test was conducted at the site in June 2002 to verify that sound levels

resulting from the operation of Unit 5/2 met the contractual requirements and vendor sound level guarantees. Far field sound levels were measured at the nearest residential receptor, located over 1,500 feet away from the Plant. With Unit 5/2 down, background sound level tests were performed. The existing coal-fired Units 3 and 4 were operating and could be heard at the measurement location. On a different day sound level tests were performed when Unit 5/2 was operating, with duct burners. (Units 3 and 4 were not operating.) Unit 5/2 was not audible during this test.

The Company has contracted for a noise assessment study and a contractor has been hired. The contractor will begin work either later this month or in the early June timeframe. We estimate it will take a few months to complete the study. The objective is to have the study available prior to the public comment period.

Depending on the results of the noise assessment study and to ensure compliance with applicable noise standards, we will include some or all of the following design features to minimize noise:

Totally enclosed generation building containing the major generation equipment including the combustion turbines, HRSGs, feedwater pumps and steam turbine

HRSG flue gas stack silencers

Low noise transformer packages

Generation building acoustical louvers

Generation building roof fan noise reduction packages

Combustion turbine generator air inlet silencer

Generation building wall and ceiling insulation

Steam vent silencers

Diesel engine fire pump silencer

Noise from the operation of the Project is expected to be predominantly low frequency noise, as is noise from traffic. Noise from Project operations will not significantly impact the acoustical environment given the noise control technology that will be employed for the new generating units. In addition, the existing coal fired Units 3 and 4 will be retired along with the noise associated with coal trains and other coal and ash handling processes.

Noise will be generated during Project construction. Construction noise will be predominantly intermittent sources originating from diesel engine equipment. Potential noise impacts will be mitigated by proper muffling equipment fitted to construction equipment and restricting activities if necessary.

Additional noise will be generated by pile driving activities. Pile driving activities are expected to last three to seven months (not necessarily consecutive months) and to occur in the early portion of Project construction after site preparation activities.

An estimated 60,000 truck loads of fill will be delivered to the Project during site fill and preparation activities. In addition, there will be a temporary impact associated with vehicle traffic during construction. It is estimated that an additional 650 vehicles per day will visit the site during the peak of construction.

4.5 Land Use Impacts

The generation portion of the Project will remain within the existing Plant footprint, in particular the existing coal yard and ash pond areas. The transmission facilities associated with the Project are proposed to be primarily located on the Plant Site but there is the possibility that one or more structures may need to be placed in Black Dog Lake. As a result, none of the Project-related activities represent any changes in land use or displace other land uses because the Site is already developed for power generation.

Resources such as groundwater or surface water will be utilized within the established appropriation limits. There are no anticipated changes to the distribution or demand for these resources that could affect other economic activities. Tourism, forestry, and mining activities are not dependent on the site or its immediate environs, and therefore are unlikely to be increased or decreased as a result of the Project.

4.5.1 Zoning and Displacement

Land uses near the Project are not expected to change as a result of the Project construction or operation. No residential or business displacement will occur. Permanent impacts will be limited to the area currently owned and occupied by Xcel Energy, to where structures (e.g. poles) are placed, and to the construction areas as described in Chapters 1 and 3.

Site and Route Permits issued by the Minnesota Public Utilities Commission supersede and preempt local land use and zoning requirements (Minnesota Statutes § 216E.10). Issues related to land use and zoning should be addressed in the Site and Route Permit process and not in separate or additional administrative proceedings. Xcel Energy has and will continue to work closely with local units of government to address their land use concerns regarding the existing plant and the proposed Project as well as facilitate their participation in Commission proceedings.

The entire Project Area is within a Conservancy District as shown on the City of Burnsville's 2009 Zoning Map (Appendix A, Figure A-5). Utility uses and expansion of existing uses are allowed as conditional uses in the Conservancy District according to the City of Burnsville zoning ordinance. Several overlay districts in the City ordinance, including floodplain and shoreland overlay districts, would also apply to the Project Area. In general, the Project will address the conditions that would be imposed on development within those districts to the extent practicable. For example, requirements on setbacks, slopes and stormwater management will be met for the most part, but building height limitations cannot be met. Additional discussion of floodplain issues is provided in the following section.

4.5.2 Flood Plain

As part of the Project, fill will be placed on portions of the site in order to elevate the Project above the 100-year flood level, which is approximately 715 feet above mean sea level ("MSL"). This filling activity and the development of the Project in the FEMA-designated Flood Fringe will be subject to several federal and state requirements. Flood Fringes are portions of the 100-year floodplain outside the floodway but still subject to flooding.

By law, Minnesota's flood-prone communities are required to: 1) adopt floodplain management regulations when adequate technical information is available to identify floodplain areas; and 2) enroll and maintain eligibility in the National Flood Insurance Program ("NFIP") so that the people of Minnesota may insure themselves from future losses through the purchase of flood insurance. In 1987, the State Flood Plain Management Act was amended to establish a state cost-sharing grant program to help local government units plan for and implement flood hazard mitigation measures. The MnDNR is the state agency with overall responsibility for implementation of the State Flood Plain Management Act.

At the state level, the MnDNR has established minimum standards for floodplain management entitled "Statewide Standards and Criteria for Management of Flood Plain Areas of Minnesota" (Minn. Rules 6120.5000 - 6120.6200). These standards have two direct applications: 1) all local floodplain regulations adopted after June 30, 1970 must be compliant with these standards; and 2) all state agencies and local units of government must comply with Minnesota Regulations in the construction of structures, roads, bridges or other facilities located within floodplain areas delineated by local ordinance. Local floodplain regulatory programs, administered by county government, predominately for the unincorporated areas of a county, and by municipal government for the incorporated areas of a county, must be compliant with federal and state floodplain management standards. Both federal and state standards identify the 100-year floodplain as the minimum area necessary for regulation at the local level. These regulations are intended to protect new development and modifications to existing development from flood damages when locating in a flood prone area cannot be avoided.

Dakota County is in the process of updating their Digital Flood Insurance Rate Map ("DFIRM") and Flood Insurance Study ("FIS"). The re-mapping is scheduled to become effective in early July 2011. We have met with the City of Burnsville several times since 2008 to discuss the floodplain designation revision for our property. We have demonstrated to the City of Burnsville, MnDNR, and FEMA that the Plant site (for the length from the existing 115 kV substation to the existing ash pond 4 at a breadth from about Black Dog Lake to Black Dog Road) can be removed from the designated Flood Fringe and converted to Flood Fringe with no negative impact on flood levels. This change is incorporated into the floodplain remapping that will become effective in July 2011 (*see* Appendix A, Figure A-15). The conversion of the plant site to Flood Fringe designation will simplify the final review process the Company must follow in order to elevate the Project site (with fill) above the 100-year flood level. The final review process is this Application.

As discussed above, the Site Permit process preempts the City of Burnsville's zoning authority for this Project. However, the State and Federal criteria that will apply to the Project are generally those adopted into the City's floodplain requirements under its zoning ordinance that would be applicable to similar work if not for this Application. Under the City ordinance (as well as state criteria) the Company would be allowed to place fill within the Flood Fringe to the desired building elevation with specific requirements for fill compaction, building setbacks, and freeboard requirements.

Some work will occur in areas beyond the Flood Fringe and into the Floodway, e.g. transmission towers and closure of settling/ash pond 4. Utility line placement is typically a permitted activity in floodway areas, subject to state permitting and routing criteria (e.g. this Application). For activities not typically permitted in the floodway, the necessary review of flood stage effects, including HEC-RAZ modeling if necessary, will be conducted to ensure there is no significant increase in the upstream stage. The pond 4 closure work will entail replacing the volume of removed ash and water with fill to the high pond elevation. Fill beyond the high pond elevation will be subject to the review of flood stage effects.

4.5.3 Voluntary Investigation and Cleanup Program

The Black Dog Plant has had a coal yard since the beginning of Plant operations in the early 1950's. In January 2011 Xcel Energy entered into the MPCA's VIC program to address potential legacy issues associated with the proposed Project site. There are no statute requirements pertaining to the VIC program as it is completely voluntary. We have participated in VIC programs before at High Bridge and we have another site (Riverside Ball Fields) in VIC right now. Other companies use this approach as well to help manage sites with complex histories and complicated contamination issues when they are not required to clean them up but for one business reason or another decide to do so voluntarily.

The VIC site has been identified as areas of the coal yard and ash ponds that will be potentially affected by the proposed Project. It is anticipated that the primary focus of this investigation will be associated with historical coal and ash management practices. Groundwater modeling and a risk evaluation will be performed to support a risk-based site evaluation. The process includes collecting existing information, doing environmental investigative work, evaluating the information and preparing a proposed Response Action Plan ("RAP") for MPCA review and approval. The RAP will identify the remedial actions necessary to manage the risks associated with the Project. It is anticipated that the RAP will be submitted to the MPCA in December of 2011 with implementation of the RAP scheduled to begin as early as spring 2012 as part of the site preparation activities.

4.5.4 Aesthetics

The Project will improve the visual appearance of Plant features from outside the Plant boundaries; therefore there is no anticipated aesthetic impact. The

Plant Site is already developed, housing the existing Plant and its coal storage area. The new building will be smaller than the existing coal-fired plant, and new exhaust stacks will be similar to the existing Unit 5 stack. The coal storage and unloading area will be eliminated. The large (600 foot) stack currently used for Units 3 and 4 along with the inactive stacks for Units' 2 and 3 will be removed. 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 conversion should be more in line with city, state, regional and Park Service plans for the Minnesota River corridor than continued operation as a coal-fired facility.

Because the Project will be constructed within the existing Plant footprint and adjacent to an existing, active railroad line, as well as within an area populated by transmission lines and structures, the Project will have nominal effects on the visual and aesthetic character of the area. The proposed structures for the 345 kV double circuit lines will be similar to the other 345 kV transmission lines used on the Xcel Energy system and in the Plant area. The structures will be between 90 and 110 feet tall and will have an average span between 300 and 500 feet. The finish of the proposed poles will be galvanized steel. The existing transmission line structures in this area are wood poles of H-frame construction, and galvanized steel lattice design. The proposed steel poles will give the new transmission line a somewhat cleaner and more modern appearance. The conductor will be bundled, 795 KCmil 26/7 ACSR.

Like the existing 115 kV and 345 kV transmission lines in the area, the new section of double circuit 345 kV and rebuilt 115 kV transmission lines will be visible to area residents. The majority of the landscape in the Plant area is commercial/industrial but bordered by a wildlife and recreational area as well as residences. The visual effect will depend largely on the perceptions of the observers. Much of the residential groupings in the area are on top of bluffs overlooking the Minnesota River Valley. The visual contrast added by the transmission structures and lines may be perceived as a visual disruption or as points of visual interest. The transmission lines that already exist in the area will limit the extent to which the new lines are viewed as a disruption to the area's scenic integrity. We will work with landowners to identify concerns related to the transmission line aesthetics.

The proposed cooling tower will operate by evaporating a relatively small amount of water to cool the remaining water. This evaporation may result in a visible plume of water vapor that will at times appear as fog. The extent and duration of the visible plume will vary depending on ambient conditions (temperature, humidity, and wind speed) and plant load. Generally speaking the plume will be shorter on warmer days and more prominent on cooler days.

A cooling tower plume modeling analysis is being conducted to study the plume characteristics including the potential for visible water vapor, ground level fogging and ground level icing. Specific areas of study for fogging will include local neighborhoods, Highways 77 and 13, and Interstate 35W. Expected visible plume frequency, length and direction will be included in the study results. We anticipate the results will be available in the July 2011 time frame.

While the proposed cooling tower location is along the eastern fringe of the southern approach way for the Minneapolis – St. Paul International Airport's Runway 17/35, the FAA imposes no restrictions on the towers based on their height. The FAA also does not have standards or restrictions for either visible or thermal plumes from a cooling tower.

4.5.5 Traffic

Two roads serve the Plant. The first is East Black Dog Road, which enters the Plant Site to the north. East Black Dog Road runs between the Minnesota River and the northern border of Black Dog Lake and, from the Plant entrance, extends west approximately 1.2 miles before becoming West Black Dog Road. West Black Dog Road continues west for approximately 0.8 miles, at which point it intersects with Interstate 35W. Currently, West Black Dog Road is closed due to a bridge issue. The second road runs adjacent to the rail spur into the existing plant from the south. Use of this road is restricted to plant staff for limited use when Black Dog Road is unavailable.

The nearest county road or state highway to the Plant Site is State Highway 13, which is about 0.8 miles south (*see* Appendix A, Figure A-6). Annual Average Daily Traffic ("AADT") on State Highway 13 is 25,500 vehicles (MnDOT, 2009) (*see* Appendix A, Figure A-7). Local roads serving residential areas are located over 500 feet south of the Project Area. AADT on these roadways average about 2,000 vehicles.

Xcel Energy and the City of Burnsville are currently waiting for completion of the engineering studies for road options regarding site access including repair

of the West Black Dog Road bridge and an alternative entrance to the Plant Site.

The likely outcome of our study will be that the truck traffic will not impact neighborhoods. However, there will be an increase in traffic overall in the area of the Plant for equipment deliveries and construction personnel. During site fill and preparation activities, an estimated 60,000 truck loads of fill will be delivered. The supply/hauling contractor will be responsible for road maintenance to include periodic cleaning during the hauling operation.

4.6 Social, Cultural and Economic Impacts

4.6.1 Public Health and Safety

There is a chain link fence around the Plant Site to secure operations and prevent vandalism. The existing substation has an additional chain link fence to prevent unauthorized access. During Project construction, security will be provided to guard equipment and prevent vandalism.

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.

The Project will be designed in compliance with state, NESC, and Xcel Energy standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. Xcel Energy construction crews and/or contract crews will comply with state, NESC, and Xcel Energy standards regarding installation of facilities and standard construction practices. Established Company and industry safety procedures will be followed during and after installation of the transmission lines. This will include clear signage during all construction activities.

The proposed transmission lines will be equipped with protective devices to safeguard the public from the transmission lines if an accident occurs, such as a structure or conductor falling to the ground. The protective devices include breakers and relays located where the lines connect to the substation. The protective equipment will de-energize the line should such an event occur. Proper signage will be posted warning the public of the risk of coming into contact with the energized equipment.

4.6.2 Public Service and Infrastructure

The City of Burnsville provides water and sewer service to its residents. The Plant has sewer service, but utilizes an on-site well for water. The Plant site is surrounded by moderately to densely populated residential areas that rely on public utilities.

No additional impacts on public services beyond that already experienced because of the existing Plant and transmission lines are anticipated to occur as a result of the proposed Project.

4.6.3 Socioeconomics

Population and economic characteristics based on the 2000 U.S. Census are presented below in Table 4-7.

Table 4-7: Population and Economic Characteristics

Location	Population	Minority Population (Percent)	Caucasian Population (Percent)	Per Capita Income	Percentage of Individuals Below Poverty Level
State of Minnesota	5,303,925 (2010)[a]	11.4 (2009)[b]	88.6 (2009)[b]	$23,198 (1999)[b]	9.6 (2008)[b]
Dakota County[c]	396,500 (2009)	11.4 (2009)	88.6 (2009)	$27,008 (1999)	4.6 (2008)
City of Burnsville	59,135 (2009)[d]	12.5 (2000)[e]	87.5 (2000)[e]	$27,098 (1999)[e]	5.1 (1999)[e]
City of Eagan	64,186 (2009)[f]	12.0 (2000)[g]	88.0 (2000)[g]	$30,167 (1999)[g]	2.9 (1999)[g]

Sources:

[a] U.S. Census Bureau, 2010a.
[b] U.S. Census Bureau, 2010b.
[c] U.S. Census Bureau, 2010c.
[e] U.S. Census Bureau, 2010d.
[d] U.S. Census Bureau, 2010e.
[f] U.S. Census Bureau, 2010f.
[g] U.S. Census Bureau, 2010g.

According to U.S. Census Bureau data, minority groups in the area constitute a very small percentage of the total population, averaging 11.8 percent. Per capita incomes within the county and nearest cities to the area are higher than the State of Minnesota. The percentage of persons living below the poverty level in the area is approximately 50 percent less than the State average. The area does not contain disproportionately high minority populations, low-

income populations, or high percentages of persons living below the poverty level.

Approximately 300 workers on average will be required for the Project to include the transmission line construction. Approximately four years will be required to construct all aspects of the Project.

There will be short-term positive economic impacts to the surrounding communities as a result of construction activity and an influx of contractor employees during construction of the various segments of the Project. Both utility personnel and contractors will be used for construction activities. In addition to the effects that the additional workers will have on the surrounding communities, other local purchases of materials such as concrete may occur.

Long-term beneficial impacts from the Project include increased local tax base resulting from the incremental increase in revenues from utility property taxes. Upon completion, the Project will require 15 permanent positions to operate the Project.

No mitigative measures are proposed since no impacts are anticipated.

4.6.4 Archaeological and Historical Resources

In December 2010, a review of records at the Minnesota State Historic Preservation Office ("SHPO") identified two archaeological sites and one inventoried historic architectural properties located within one mile of the Project Area (*see* Appendix A, Figure A-8). Both of the archaeological sites are mound sites, confirmed as burials by excavation. Site 21DK0041, which was dated to the prehistoric Arvilla Complex (AD 500-900), was completely destroyed by development in the 1960s. Site 21HE0012 was first recorded in the 1890s as a mound site containing 36 mounds. In the 1930s a University of Minnesota student excavated Mound 21 of the site and discovered historic burials dating to the well-documented period of Dakota occupation of the Minnesota River Valley. The current condition of this site is unknown. As an unplatted burial, this site is subject to the Minnesota Private Cemeteries Act (Minn. Stat. § 307), and comes under the jurisdiction of the Office of the State Archaeologist. As a Native American burial, the site would also come under the jurisdiction of the Minnesota Indian Affairs Council. A summary of the inventoried cultural resource sites is provided in the table below.

Table 4-8: Previously Identified Historic Properties Near The Project

Type of Historic Property	Inventory Number	Description	NRHP Status
Archaeological	21HE0012	Contact Period mound site	unevaluated
Archaeological	21DK0041	Prehistoric Arvilla Complex mound site (destroyed)	N/A
Architectural	N/A	Union Pacific Railroad	Potentially eligible

The only historic architectural property within one mile of the Project Site is the Union Pacific Railroad, which runs along the southern edge of the Minnesota River Valley. This rail line between St. Paul and Mankato, which was first built in 1864, represents the early expansion of Minnesota and the transportation network that helped bring the state's agricultural products to the marketplace. A Multiple Property Nomination to the NRHP for Railroads in Minnesota 1862-1956 (Schmidt et al., 2002) establishes the criteria for NRHP eligibility for railroad properties. Although the Union Pacific Railroad is not specified as eligible for listing on the NRHP, it does meet the criteria and should be considered potentially eligible.

The cultural resource properties identified are located outside the construction footprint as shown in Appendix A, Figure A-8 and will not experience direct impacts resulting from Project construction. Site 21DK0041 is not extant. Site 21HE0012 is located on the river bluff more than one-half mile north of the Project. The Union Pacific Railroad is on the southern edge of the transmission line construction footprint, but will not be directly impacted by the proposed construction. Further, the proposed Project consists of construction within the existing Plant boundaries and the majority of the transmission line will be constructed along an artificial berm built to support the railroad spur from the Union Pacific line to the Plant. The proposed construction is in keeping with the industrial use and development of the location. The proposed construction will constitute an in-kind expansion of the existing built environment and will not create new indirect visual impacts.

No impacts on identified archaeological and historic architectural resources have been identified to date. In a letter dated February 15, 2011, the SHPO concurred that there are no properties listed on the state or NRHP, or known or suspected archaeological properties in the area that would be affected by the Project. The Company's letter to SHPO, as well as the response, is included as

Appendix C. Should a specific impact be identified, Xcel Energy will consult with SHPO on whether the resource is eligible for listing in the NRHP and appropriate mitigation measures. While avoidance would be a preferred action, mitigation for Project-related impacts on NRHP-eligible archaeological and historic resources may include resource investigations and/or additional documentation through data recovery.

4.6.5 Recreation

There are two formal recreational areas located near the Project: the Minnesota Valley National Wildlife Refuge and Black Dog Park (*see* Appendix A, Figure A-9). The Minnesota Valley National Wildlife Refuge surrounds the existing Black Dog Plant and a strip of land hosting a spur off of the Union Pacific Railroad owned by Xcel Energy, where the proposed transmission lines will be located. The City of Burnsville is home to several other parks, city trails, and general recreational areas; however, they are located within densely populated residential areas well over 0.5 miles from the Plant Site and will not experience any direct or indirect impacts as a result of the Project.

The Plant property covers about 1,900 acres south of the Minnesota River in Burnsville. The total acreage includes the Plant Site covering about 80 acres, which entails the powerhouse, coal yard, substation, settling ponds, and Black Dog Lake (used for cooling) covering about 500 acres. The majority of the remaining property (1,250 acres) is managed as part of the Minnesota Valley National Wildlife Refuge under a 1982 lease and agreement with the FWS.

Established in 1976, the Minnesota Valley National Wildlife Refuge stretches over 50 miles between Fort Snelling State Park and Belle Plaine, Minnesota, and provides habitat for a large number of migratory waterfowl, fish, and other wildlife species (FWS, 2011). The Refuge offers a variety of year-long and free outdoor recreational activities, and has two education and visitors centers, which are located over 5 and 40 miles, respectively, from the Plant Site. The Minnesota Valley National Wildlife Refuge is well known for bird watching, which is available year-round. Other recreational opportunities include wildlife observation, wildlife photography, hunting, fishing, environmental education, and interpretation. According to the FWS' website (2011), overall management of the Refuge involves "restoring wetlands, grasslands, and oak savannas, enhancing aquatic plant diversity through water level management, grassland management, exotic species control, and water quality monitoring."

The Company began a cooling lake drawdown program in 1989 in cooperation with the FWS to enhance wetland vegetation growth in Black Dog Lake and thereby increase migratory bird use. The cooling ponds allow numerous species of waterfowl, gulls and wetland birds such as the American woodcock to return earlier in spring and to remain in the area longer in winter.

About 350 feet south of the Project Area is Black Dog Park, a 38-acre park that includes softball/baseball fields, a football field, walking trails and natural areas (City of Burnsville, 2010a). The closest park-related facilities to the Project include a softball/baseball field, which is located about 750 feet west and primarily used during the spring, summer, and autumn months. About 200 feet south of the Project is a walking trail along the south side of west Black Dog Lake. The Project is not expected to impact Black Dog Park or walking trails.

In addition to the previously discussed Minnesota Valley National Wildlife Refuge, the primary tourism activities in the region include camping, recreational use of the region's lakes for fishing and boating, bicycling, hiking, bird or wildlife viewing, or cross country skiing.

The Company plans to work with the FWS and other appropriate representatives to minimize any impacts on recreational users, such as bird watchers, that may result during construction of the Project.

4.6.6 Cultural Values

Cultural values include those perceived community beliefs or attitudes in a given area, which provide a framework for community unity. The region surrounding the Project has cultural values tied to the area's strong German, Norwegian, and Irish heritage (ePodunk, 2010), and the manufacturing, retail trade, finance and insurance, and professional, scientific, and technical services economies (ePodunk, 2010a). Local community ties relate to work, worship, celebration, and recreation. An example of area culture and industry include the annual Dakota County Fair, held in August in Farmington (Minnesota Federation of County Fairs, 2010).

Construction of the proposed Project is not expected to conflict with the cultural values of the communities surrounding the Plant Site. Therefore, no mitigative measures are proposed.

4.6.7 Economic Benefits

Construction of the Project will require an estimated average of 300 construction workers. There will be peak periods where there could be approximately 500 workers on site. These high-skill, high-paying positions, including pipefitters, iron workers, millwrights, boilermakers, carpenters, electricians and other trades, are estimated to add over $30 million of payroll into the regional economy. Operation of the Project will require approximately 15 full-time positions. Both the temporary construction and permanent positions benefit society by providing needed jobs in the area.

The Project combined with the rest of the Plant will annually contribute an estimated $2 million in property taxes for the City of Burnsville, Dakota County and the Burnsville School District.

4.7 Natural Environment

4.7.1 Geology and Soils

The topography of this region was formed by the retreat of the Wisconsin glaciers and is characterized by patchwork hilly moraines, flat outwash plains, and shallow to very deep lakes. The soils were formed by glacial retreat and subsequent forest vegetation, resulting in medium to coarse texture loams. The Project is located about seven miles south and west of the junction of the Minnesota and Mississippi Rivers. This eastern-most portion of the Minnesota River is a broad lowland averaging one mile wide, with intermittent bedrock outcrops and higher river bluffs on both the north and south sides of the river. Following the last glacial retreat, the river valley was further altered by flooding events and alluvial action, and includes lakes and wetlands on both sides of the river.

Based on the Geologic Atlas of Dakota County, Minnesota (1990), the surficial geology of the Plant Site consists of organic deposits and floodplain alluvium (Dakota County Maps and Mapping Services, 1990). These are comprised of peat and organic-rich silt and clay; poorly bedded and moderately sorted sediments; and clayey silt soils in the Minnesota River valley. The bedrock in the area is part of the Prairie Du Chien Group, which is comprised of Dolostone of the Shakopee Formation and Oneota Dolomite. The upper layer is commonly thin bedded and sandy or oolitic; the lower part is massive to thick bedded and not sandy or oolitic (Dakota County, 1990). Depth to bedrock in the area is typically less than 100 feet.

Based on the Soil Survey of Dakota County (U.S. Department of Agriculture ("USDA"), 1980), the most predominant soils in the area include the following (*see* Appendix A, Figure A-10):

Urban Land (1039): Characterized by level to gently sloping land along the Mississippi and Minnesota Rivers that is covered with buildings, asphalt, concrete, or other impervious surfaces on more than 90 percent of its surface. Identification of original soils is not possible because the soils have been altered by construction activities. Also characterized by high rain runoff potential and, if not properly channeled, severe erosion is common. This is the primary soil series within the existing Plant Site.

Udorthents, wet (1027): Consists of 80 percent earthy fill material and 20 percent industrial waste, such as bricks, trash, wire, metal, boards, and pieces of concrete and stones, placed on poorly and very poorly drained mineral or organic soils. Typically associated with man-made building, road, recreation, or other use sites. Fill material is two feet or more thick, consisting of a mixture of organic and inorganic waste and sandy, gravelly, loamy, and silty soil material. This soil series exists primarily along the strip of narrow land hosting the Xcel Energy railroad spur between the Black Dog Lake sections.

Colo silt clay loam (98): Characterized as poorly drained, with moderate permeability found on flats and swales on flood plains. Typically associated with croplands or hayfields. Within the Plant Site, this soil series exists along the west side of the existing transmission lines indicated as the area where the lines will be rebuilt near Black Dog Lake.

Kalmarville sandy loam (465): consists of very deep, poorly drained and very poorly drained soils that formed in recent floodplain alluvium on floodplains. These soils are characterized as having moderate permeability, where flooding is common. Typically associated with bottomland deciduous forest or are used for hay or cultivated crops. Within the Plant Site, this soil series exists along the east side of the existing section of the transmission lines that will be rebuilt.

4.7.2 Water Bodies

The majority of the Plant Site is located in a Zone A20, or 100 year, floodplain (FEMA, 1977). A small portion of the railroad spur is located in a Zone B, or 500 year, floodplain.

The Plant Site is located in the Black Dog Lake – Minnesota River watershed (USDA, 2011) (*see* Appendix A, Figure A-11). A watershed is defined as the entire physical area or basin drained by a distinct stream or riverine system, physically separated from other watersheds by ridgetop boundaries (MnDNR, 2011).

As part of the Metropolitan Surface Water Management Act, the Black Dog Watershed Management Organization ("BDWMO") was formed (BDWMO, 2011). Watershed management overseen by the BDWMO covers northwestern Dakota County and a portion of northeastern Scott County, Minnesota. The BDWMO contains portions of the cities of Apple Valley, Burnsville, Eagan, Lakeville, and Savage. Surface water in the BDWMO ultimately discharges to the Minnesota River.

The Plant Site is surrounded by several significant surface water features that include the Minnesota River and Black Dog Lake. Some of these water bodies are also classified by the MnDNR as Minnesota public water basins and watercourses that meet the criteria set forth in Minnesota Statutes Section 103G.005, subdivision 15 and are identified on Public Water Inventory ("PWI") maps authorized by Minnesota Statutes, Section 103G. Per the NPDES permit, Black Dog Lake is referred to as a lotic system cooling lake for thermal discharges only.

As previously mentioned, Xcel Energy is currently determining specific engineering details for the transmission lines such as structure placement locations and may require placing one or more structures in Black Dog Lake. If work activities are needed to take place in the lake, the Project could require approvals from the USACE, MnDNR, and/or the City of Burnsville. These agencies administer regulatory programs of the federal Clean Water Act and Rivers and Harbors Act, the Minnesota Public Water Resources Act and Utility Crossing Licenses, and the Minnesota Wetland Conservation Act.

Xcel Energy will design the transmission lines to minimize direct and indirect (e.g., erosion runoff) impacts on public waters to the greatest extent possible. Xcel Energy will apply erosion control measures identified in the MPCA Storm Water Best Management Practices Manual, such as using silt fence to minimize impacts to adjacent water resources. During construction, Xcel Energy will control operations to minimize and prevent material discharge to surface waters. Disturbed surface soils will be stabilized at the completion of the construction process to minimize the potential for subsequent effects on surface water quality.

If Project activities are altered such that work in surface waters is planned, Xcel Energy will obtain permits, licenses, letters of no jurisdiction, and/or exemptions from the USACE and MnDNR Division of Waters. After coordination and application submission, authorization from the USACE would likely fall under a Letter of Permission (LOP-05-MN) or the utility line discharge provision of a Regional General Permit (RGP-3-MN). The MnDNR Division of Waters requires a Public Waters Work Permit for any alteration of the course, current, or cross-section below the ordinary high water level of a Public Water or Watercourse.

If structures are needed in the lake, we will install the pile foundations using a coffer dam. Piles will be driven down into the bed of the lake with a concrete pile cap poured to extend above the water line. Construction equipment will access the work site via a modular barge. The modular barge will support excavation, drilling, coffer dam installation, and concrete placement. Equipment and workers will be located on sections of barges tied together after they are placed into the water. The single pole structures will be assembled in sections using equipment staged on the barge. No grading will be required unless it is necessary to provide a level area for construction access and related activities.

4.7.3 Land Cover and Vegetation

The Plant Site is located within the Minnesota and Northeast Iowa Morainal Section (222M), a section within the biogeographic province known as the Eastern Broadleaf Forest Province under the Ecological Classification System ("ECS") developed by the MnDNR and the U.S. Forest Service (MnDNR, 2011a). The Plant Site is further located on the border of the Anoka Sand Plain and the St. Paul Baldwin Plains and Moraines subsections of the Minnesota and Northeast Iowa Morainal Section. The Plant Site is primarily surrounded by wetland and riparian habitat and provides habitat for many species of plants and animals.

Historically, this area was primarily floodplain and terrace forests of silver maple, cottonwood, box-elder, green ash and elm within and along the terrace forests river valley (MnDNR, 2011b). Wetland complexes associated with the Minnesota River Valley system are present throughout the Plant Site.

Current USGS Landuse/Landcover database information characterizes the Plant Site as consisting of primarily Developed and Barren land with Open Water overlaying the Plant ponds and intermittent strips of Deciduous Forest

outlying the Plant's southern boundary and along the Xcel Energy railroad spur. Additional Open Water areas would be affected should some transmission line structures need to be placed in Black Dog Lake (*see* Section 4.7.7).

Based on an interpretation of aerial photographs, land use is primarily developed commercial/industrial at the Plant Site with sparse woodland along each side of the Xcel Energy railroad spur, and open and scattered woodland south of Black Dog Lake where the two double circuit proposed 345 kV transmission lines will connect with the existing 345 kV transmission lines and where the existing 115 kV transmission line would be rebuilt. Outlining the Plant boundaries to the north is the Minnesota River, and west and east of the proposed transmission line along the Union Pacific Railroad is Black Dog Lake. The Plant is within the City of Burnsville, east of the City of Eagan, and within the Minnesota Valley National Wildlife Refuge (*see* Appendix A, Figure A-12).

Agriculture

The Plant is not located in an agricultural area. Based on recent aerial photographs, the nearest significant tracts of land with evidence of agriculture are south of the City of Apple Valley, approximately six miles from the Plant Site.

Forest

Based on property parcel data, there are no forested areas where species are harvested within the Plant Site. The entire Plant Site is owned by Xcel Energy, and the primary tree cover in the area is associated with waterways and along the Xcel Energy railroad spur. No economically significant forestry resources are located along the proposed route for the new transmission lines.

Mining

According to the MnDOT county pit map for Dakota County and USGS topographic maps, there are no active gravel pits, rock quarries, or commercial aggregate sources in the vicinity of the Plant (MnDOT, 2001). Unknown resources that may exist in the Plant area would be situated in close proximity to existing utility and roadway rights-of-way, making development unlikely.

Commercial and Residential

The area for the most part is separated from commercial and residential areas by Black Dog Lake, the Union Pacific Railroad and Xcel Energy railroad spur, and Black Dog Park. The closest structure is a residence, which is about 670 feet south of the proposed transmission line's termination and connection with

the existing 345 kV transmission lines as indicated on Figure A-4 in Appendix A. The closest commercial business to the Project Area is located over one half mile away. Impacts will be limited to areas previously disturbed and/or used for commercial/industrial purposes. Because no new impacts will occur outside of areas used for commercial/industrial and residential purposes, no mitigative measures are proposed.

4.7.4 Television and Radio Interference

The Project is not expected to cause radio and television interference. Corona from transmission line conductors can generate electromagnetic "noise" at the same frequencies that radio and television signals are transmitted. This noise can cause interference with the reception of these signals depending on the frequency and strength of the radio and television signal. Tightening loose hardware on the transmission line usually resolves the problem.

If radio interference from transmission line corona does occur, satisfactory reception from AM radio stations previously providing good reception can be restored by appropriate modification of (or addition to) the receiving antenna system. AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly within the right-of-way to either side.

FM radio receivers usually do not pick up interference from transmission lines because corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88-108 Megahertz) and the excellent interference rejection properties inherent in FM radio systems make them virtually immune to amplitude type disturbances

A two-way mobile radio located immediately adjacent to and behind a large metallic structure (such as a steel tower) may experience interference because of signal-blocking effects. Movement of either mobile unit so that the metallic structure is not immediately between the two units should restore communications. This would generally require a movement of less than 50 feet by the mobile unit adjacent to a metallic tower.

Television interference is rare but may occur when a large transmission structure is aligned between the receiver and a weak distant signal, creating a shadow effect. Loose and/or damaged hardware may also cause television interference. If television or radio interference is caused by or from the operation of the proposed facilities in those areas where good reception is presently obtained, the Company will inspect and repair any loose or damaged

hardware in the transmission line, or take other necessary action to restore reception to the present level, including the appropriate modification of receiving antenna systems if deemed necessary.

If radio or television interference occurs due to the Project, the Company will work with the affected landowner to restore reception to pre-Project quality.

4.7.5 Electric and Magnetic Field

This subsection addresses the requirements of Minnesota Rule 7850.1900, Subparts 2(J) and 3(B). No adverse impacts from electric and magnetic fields associated with the Project transmission lines are expected.

The term electromagnetic field ("EMF") refers to electric and magnetic fields that are coupled together such as in high frequency radiating fields. For the lower frequencies associated with power lines (referred to as "extremely low frequencies" ("ELF")), EMF should be separated into electric fields ("EFs") and magnetic fields ("MFs"), measured in kilovolts per meter ("kV/m") and milligauss ("mG"), respectively. These fields are dependent on the voltage of a transmission line (EFs) and current carried by a transmission line (MFs). The intensity of the EF is proportional to the voltage of the line, and the intensity of the MF is proportional to the current flow through the conductors. Transmission lines operate at a power frequency of 60 hertz (cycles per second).

Electric Fields

There is no federal standard for transmission line EFs. The Commission, however, has imposed a maximum EF limit of 8 kV/meter measured at one meter above the ground. *In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, Order Granting Route Permit (adopting ALJ Findings of Fact, Conclusions and Recommendation at Finding 194 (April 22, 2010 and amended April 30, 2010)) (September 14, 2010).

The maximum EF, measured at one meter above ground, associated with the Project is calculated to be 4.32 kV/m. The calculated EFs for the Project are provided in Table 4-9.

Table 4-9: Calculated Electric Fields (KV/M) For Proposed 345 KV Transmission Line Designs (One meter above ground)

Structure Type	Maximum Operating Voltage (kV)	Distance to Proposed Centerline										
		-300'	-200'	-100'	-50'	-25	0'	25	50'	100'	200'	300'
345Kv Steel Pole Double Circuit Suspension Type	362	0.09	0.20	0.76	3.60	4.02	4.32	4.02	3.60	0.76	0.20	0.09

Magnetic Fields

There are presently no Minnesota regulations pertaining to MF exposure. The MF profiles around the proposed transmission line structures and conductor configuration proposed for the Project are shown in Table 4-10. MFs are calculated for the Project under two system conditions: the expected peak and average current flows as projected for the year 2016. The peak MF values are calculated at a point directly under the transmission line and where the conductor is closest to the ground. The same method is used to calculate the MF at the edge of the right-of-way. The calculated MFs show that fields decrease rapidly as the distance from the centerline increases (proportional to the inverse square of the distance from source).

The MF produced by the transmission line is dependent on the current flowing on its conductors. Therefore, the actual MFs when the Project is placed in service are typically less than shown in Table 4-10. This is because the table represents the MF with current flow at expected normal peak based on projected regional load growth through 2015, the maximum load projection timeline available. Actual current flow on the line will vary with system conditions, so MFs would be less than peak levels during most hours of the year.

Table 4-10: Calculated Magnetic Flux Density (milligauss) for Proposed 345 kV Transmission Line Design (One meter above ground)

Segment	System Condition	Current (Amps)	Distance to Proposed Centerline										
			-300'	-200'	-100'	-50'	-25	0'	25	50'	100'	200'	300'
345kV Steel Pole Double Circuit Suspension Type BDS-IVH& BDS-BLL	Peak	787/336	1.83	4.03	14.59	40.42	68.23	96.62	109.96	76.27	24.10	5.70	2.46
	Average	472/202	1.10	2.42	8.76	24.28	40.97	57.98	65.96	45.75	14.46	3.42	1.48

Considerable research has been conducted throughout the past three decades to determine whether exposure to power-frequency (60 hertz) MFs causes biological responses and health effects. Epidemiological and toxicological studies have shown no statistically significant or weak associations between MF exposure and health risks. The possible impact of exposure to EMFs upon human health has also been investigated by public health professionals for the past several decades. While the general consensus is that EFs pose no risk to humans, the question of whether exposure to MFs can cause biological responses or health effects continues to be debated.

In 1999, the National Institute of Environmental Health Sciences ("NIEHS") issued its final report on "Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields" in response to the Energy Policy Act of 1992. The NIEHS concluded that the scientific evidence linking MF exposure with health risks is weak and that this finding does not warrant aggressive regulatory concern. However, because of the weak scientific evidence that supports some association between MFs and health effects, passive regulatory action, such as providing public education on reducing exposures, is warranted.

In 2007, the World Health Organization ("WHO") concluded a review of the health implications of electromagnetic fields. In this report, WHO stated:

> Uncertainties in the hazard assessment [of epidemiological studies] include the role that control

> selection bias and exposure misclassification might have on the observed relationship between magnetic fields and childhood leukemia. In addition, virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level [extremely low frequency] magnetic fields and changes in biological function or disease status. Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern. (WHO, 2007 at p. 12).

Also, regarding disease outcomes, aside from childhood leukemia, WHO stated:

> A number of other diseases have been investigated for possible association with ELF magnetic field exposure. These include cancers in children and adults, depression suicide, reproductive dysfunction, developmental disorders, immunological modifications and neurological disease. The scientific evidence supporting a linkage between ELF magnetic fields and any of these diseases is much weaker than for childhood leukemia and in some cases (for example, for cardiovascular disease or breast cancer) the evidence is sufficient to give confidence that magnetic fields do not cause the disease. (*Id.* at p. 12.)

Furthermore, in its "Summary and Recommendations for Further Study" WHO emphasized that: "The limit values in [ELF-MF] exposure guidelines [should not] be reduced to some arbitrary level in the name of precaution. Such practice undermines the scientific foundation on which the limits are based and is likely to be an expensive and not necessarily effective way of providing protection." (*Id.* at p. 12).

Although WHO recognized epidemiological studies indicate an association on the range of three to four mG, WHO did not recommend these levels as an exposure limit but instead provided: "The best source of guidance for both exposure levels and the principles of scientific review are international guidelines." *Id.* at pp. 12- 13. The international guidelines referred to by WHO are the International Commission on Non-Ionizing Radiation Protection ("ICNIRP") and the Institute of Electrical and Electronic Engineers ("IEEE") exposure limit guidelines to protect against acute effects. *Id.* at p. 12. The

ICNIRP-1998 continuous general public exposure guideline is 833 mG and the IEEE continuous general public exposure guideline in 9,040 mG. ICNIRP recently increased the continuous general public exposure guideline to 2,000 mG. In addition, WHO determined that "the evidence for a causal relationship [between ELF-MF and childhood leukemia] is limited, therefore exposure limits based on epidemiological evidence is not recommended, but some precautionary measures are warranted." *Id.* at 355-56.

WHO concluded that:

> given the weakness of the evidence for a link between exposure to ELF magnetic fields and childhood leukemia, and the limited impact on public health, the benefits of exposure reduction on health are unclear and thus, the costs of precautionary measures should be very low… Provided that the health, social and economic benefits of electric power are not compromised, implementing very low-cost precautionary procedures to reduce exposure is reasonable and warranted. (*Id.* at p. 372).

Wisconsin, Minnesota, and California have all conducted literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group ("Working Group") to evaluate the body of research and develop policy recommendations to protect the public health from any potential problems resulting from HVTL EMF effects. The Working Group consisted of staff from various state agencies and published its findings in a White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options in September 2002, (Minnesota Department of Health, 2002). The report summarized the findings of the Working Group as follows:

> Research on the health effects of [MF] has been carried out since the 1970s. Epidemiological studies have mixed results – some have shown no statistically significant association between exposure to [MF] and health effects, some have shown a weak association. More recently, laboratory studies have failed to show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer. A number of scientific panels convened by national and international health agencies and the United States Congress have reviewed the research carried out to date. Most researchers concluded that there is insufficient

> evidence to prove an association between [MF] and health effects; however, many of them also concluded that there is insufficient evidence to prove that [MF] exposure is safe. (*Id.* at p. 1.)

The Public Service Commission of Wisconsin ("PSCW") has periodically reviewed the science on MFs since 1989 and held hearings to consider the topic of MF and human health effects. The most recent hearings on MF were held in July 1998. In January 2008, the PSC published a fact sheet regarding MFs. In this fact sheet the PSC noted that:

> Many scientists believe the potential for health risks for exposure to [MFs] is very small. This is supported, in part, by weak epidemiological evidence and the lack of a plausible biological mechanism that explains how exposure to [MFs] could cause disease. The [MFs] produced by electricity are weak and do not have enough energy to break chemical bonds or to cause mutations in DNA. Without a mechanism, scientists have no idea what kind of exposure, if any, might be harmful. In addition, whole animal studies investigating long-term exposure to power frequency [MF] have shown no connection between exposure and cancer of any kind. (PSC, 2008).

The Commission, based on the Working Group and World Health Organization findings, has repeatedly found that "there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects." *In the Matter of the Application of Xcel Energy for a Route Permit for the Lake Yankton to Marshall Transmission Line Project in Lyon County*, Docket No. E-002/TL-07-1407, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Xcel Energy for the Lake Yankton to Marshall Transmission Project at p. 7-8 (Aug. 29, 2008); *See also*, *In the Matter of the Application for a HVTL Route Permit for the Tower Transmission Line Project*, Docket No. ET-2, E015/TL-06-1624, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Minnesota Power and Great River Energy for the Tower Transmission Line Project and Associated Facilities at p. 23 (Aug. 1, 2007) ("Currently, there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects.").

The Commission again confirmed its conclusion regarding health effects and MFs in the Brookings County – Hampton 345 kV Route Permit proceeding

("Brookings Project"). In the Brookings Project Route Permit proceeding, Applicants Great River Energy and Xcel Energy and one of the intervening parties provided expert evidence on the potential impacts of electric and magnetic fields on human health. The Administrative Law Judge in that proceeding evaluated written submissions and a day-and-half of testimony from these two expert witnesses. The Administrative Law Judge concluded: "there is no demonstrated impact on human health and safety that is not adequately addressed by the existing State standards for [EF or MF] exposure." *In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, ALJ Findings of Fact, Conclusions and Recommendation at Finding 216 (April 22, 2010 and amended April 30, 2010).

The Commission adopted this finding on July 15, 2010. *In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08- 1474, Order Granting Route Permit (September 14, 2010).

4.7.6 Wildlife

The water bodies, open areas, and scattered woodlands in the area provide habitat for a variety of wildlife. The largest mammal typically found in the area is the white-tailed deer. Other mammals include coyotes, fox, raccoons, beaver, opossum, woodchucks, squirrels, and muskrats. Reptiles near the Plant Site include snapping turtles, map turtles, softshell turtles, painted turtles, gopher snakes, fox snakes, and northern water snakes. Amphibians include leopard frogs, pickerel frogs, spring peeper, and American toads. Fish species vary depending on the water body. The most commonly distributed fish species in the water bodies surrounding the Plant area include largemouth bass, sunfish, crappies, northern pike, and multiple species of rough fish such as carp and suckers. Bird species include eagles, turkeys, hawks, pheasants, ducks, gulls, herons, and numerous species of song birds.

As previously discussed (*see* Section 4.6.5), the Project is located within the Minnesota Valley National Wildlife Refuge, which provides habitat for a large number of migratory waterfowl, fish, and other wildlife species (FWS, 2010).

Because the Project is located within an urban area, the fauna generally present within the area are adapted to high levels of anthropogenic disturbance. Although areas surrounding the Black Dog Plant are used by numerous types

of wildlife, the Project will have minimal impact on the habitat in those areas. Therefore, it is unlikely that the construction, operation, and maintenance of the Project would have an effect on fauna present in the area. Wildlife that inhabit trees that may be removed for the transmission lines will likely be temporarily displaced. Comparable habitat is near the route, and it is likely that these organisms would only be displaced a short distance.

Wildlife that will be affected by construction of the new transmission lines will be temporarily displaced to adjacent habitats during the construction process. The majority of construction will be limited to upland areas and therefore, it is anticipated that impacts on fish and mollusks that inhabit the local water bodies will be limited to the construction phase of the new transmission lines where one or more structures may be installed in Black Dog Lake.

The transmission lines may affect raptors, waterfowl, and other bird species. Birds have the potential to collide with all elevated structures, including power lines. Avian collisions with transmission lines can occur in proximity to agricultural fields that serve as feeding areas, wetlands and water features, and along riparian corridors that may be used during migration.

The electrocution of large birds, such as raptors, is more commonly associated with small distribution lines than large transmission lines. Electrocution occurs when birds with large wingspans come in contact with two conductors or a conductor and a grounding device. Xcel Energy transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution and will minimize potential avian impacts of the proposed Project.

It is anticipated that most wildlife displacement and habitat impacts will be temporary. Consequently, no wildlife population mitigation measures are proposed.

Xcel Energy has been working with various state and federal agencies for over 20 years to address avian issues as quickly and efficiently as possible. In 2002, Xcel Energy entered into a voluntary Memorandum of Understanding ("MOU") with the FWS to work together to address avian issues throughout all service territories. The MOU sets forth standard reporting methods and the development of Avian Protection Plans ("APP") for each state that Xcel Energy serves. APPs include designs and other measures aimed at preventing avian electrocutions, as described in guidance provided by the Avian Power Line Interaction Committee ("APLIC" 2006) and the guidelines for developing APPs (APLIC and FWS, 2005). The APP for the Minnesota Territory is complete and retrofit actions for areas with potential avian impacts are

underway across the territory. Xcel Energy also addresses avian issues related to transmission projects by:

> Working with resource agencies such as the MnDNR and the FWS to identify areas that may be appropriate for marking transmission line shield wires with bird diverters; and
>
> Attempting to avoid areas known as primary migration corridors or migratory resting areas.

The conductors on the proposed transmission line will be designed to be located in a horizontal configuration instead of a vertical configuration. This design will help mitigate potential avian collisions with the conductors. Additional mitigation measures will be considered in the placement of the transmission lines. Instead of crossing Black Dog Lake directly south of the proposed substation, the lines and majority of structures will be placed along the road between the protective cover of trees. Swan Flight Diverters will be placed on the overhead static lines of the transmission line.

4.7.7 Wetlands

The National Wetlands Inventory ("NWI") was reviewed to assess which wetlands may be present within the Project Area. Note that the NWI has not been field verified and sometimes contains inaccuracies; however, it is a good tool for initial wetland identification and assessment. Based on NWI data, the Project Area is surrounded by various wetland types including Palustrine Emergent ("PEM"), Palustrine Scrub Shrub ("PSS"), and Palustrine Unconsolidated Bottom ("PUB"). The other wetland types within the Project Area are Lacustrine ("L2"), which are associated with lakes. Appendix A, Figure A-13 shows the wetlands within the Plant Site.

The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens (Cowardin et al. 1979). Of those wetlands, the majority contains emergent vegetation with some displaying a mixture of shrubs and herbaceous vegetation, while a few have no vegetation and contain unconsolidated bottoms. Lacustrine wetland systems are found in the shallow protected areas of lakes with water depth in the deepest part of the wetland basin greater than 6.6 feet. The areas intersected by the proposed route do not appear to be as deep as 6.6 feet, but they are included as part of the same basin.

Approximately 9.0 acres of PEM, 5.6 acres of PSS, 10.1 acres of PUB, and 4.0 acres of L2 wetlands are located within the Project area. The PEM and PSS wetlands are primarily associated with the Project area's borders. The PUB wetlands are associated with existing on-site ponds. The L2 wetlands are associated with Black Dog Lake and, although within the area studied, will likely not be affected unless transmission structures are placed within the water body.

The NWI also identifies protected wetlands, of which three are shown to surround the Project Area: the Minnesota River and both segments of Black Dog Lake (*see* Appendix A, Figure A-13).

Xcel Energy will design the Project to avoid direct wetland impacts to the extent possible. Xcel Energy will also minimize indirect (e.g., erosion runoff) wetland impacts by applying erosion control measures identified in the MPCA Storm Water Best Management Practices Manual, such as using silt fencing to minimize impacts to adjacent water resources. During construction, Xcel Energy will control operations to minimize and prevent material discharge to wetlands. If materials do enter wetlands, they will be promptly removed and properly disposed of to the extent feasible.

Disturbed surface soils will be stabilized at the completion of the construction process to minimize the potential for subsequent effects on wetland quality. Xcel Energy will minimize impacts on public water wetlands to the greatest extent possible. By maximizing the typical span length in these areas, permanent impacts to these areas can be minimized.

Xcel Energy is currently determining specific engineering details such as transmission structure placement locations. If any structures need to be placed in Black Dog Lake, Xcel Energy will work to obtain the necessary permits and approvals from the USACE, MnDNR, and/or the City of Burnsville. Impacts to Black Dog Lake will be minimized through the implementation of mitigation practices during construction as required by the permits and approvals.

Minnesota Statutes Section 84.415 requires Xcel Energy to obtain a license from the MnDNR Division of Lands and Minerals for the passage of any utility over, under, or across any state land or public waters. Therefore, Xcel Energy will either confirm the applicability of existing licenses for these crossings or obtain new utility crossing licenses prior to construction.

4.7.8 Rare, Unique or Ecologically Sensitive Resources

EPA

We have sent a letter to the EPA (*see* Appendix E) requesting an Endangered Species Act consultation for the air emissions associated with the Project. The consultation is required because the Project will be subject to PSD for a pollutant. EPA subsequently requested data on Project emissions, which also has been provided. An EPA determination on whether or not air emissions for the Project would be expected to affect federally listed endangered species has not yet been made.

U.S. Fish and Wildlife Service

The FWS's website was reviewed for a list of species covered under the ESA that may be present within Dakota County. According to the website, the following two federally listed species are known to occur within the county: Higgins eye pearlymussel (*Lampsilis higginsii*) and prairie bush-clover (*Lespedeza leptostachya*).

The Higgins eye pearlymussel is listed as endangered and occurs only within the Mississippi River and the lower portion of some of its larger tributaries. The Project will not be located at the Mississippi River or any of its tributaries. Therefore, it was determined that the Project will have no effect on the Higgins eye pearly mussel or its habitats.

The prairie bush-clover is listed as threatened and occurs within native dry mesic-prairies where the soils are well-drained with high sand or gravel content. The Project is confined to an existing power plant site and along an existing active railroad corridor that is surrounded by a very large wetland complex where only poorly-drained soils exist (*see* Section 4.7.1). Therefore, it has been determined the Project will have no effect on the prairie bush-clover or its habitat.

State of Minnesota

A request for a MnDNR Natural Heritage Information System search and comments regarding rare species and natural communities for the Project Area was submitted to the MnDNR on January 11, 2011. The MnDNR responded in a letter dated March 8, 2011 (MnDNR, 2011c). The results of the Natural Heritage Database Search and the MnDNR response letter are included in Appendix D. Also refer to Appendix A, Figure A-14 which shows the general location of MnDNR protected species, species of concern, etc. within the vicinity of the Project.

As discussed in Appendix D, the MnDNR stated that provided the transmission foundations are located in upland areas as proposed, the Project is not expected to directly impact the Bulrush Marsh native plant communities. However, as recommended by the MnDNR (2011c), Xcel Energy will attempt to mitigate for surface runoff or the spread of invasive species into this community during construction. Mitigation measures may include use of best management practices such as installation of erosion control devices to prevent runoff into the waterbody and use of clean equipment to prevent the transfer of noxious weeds to the construction site.

While not afforded protection by the State of Minnesota as a threatened or endangered species, Xcel Energy has committed to mitigating adverse impacts on the Bullrush Marsh communities to the extent possible. Should the Project require work outside of upland areas (e.g., in Black Dog Lake), Xcel Energy will reinitiate consultations with the MnDNR to discuss mitigation measures to avoid adversely impacting the communities.

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