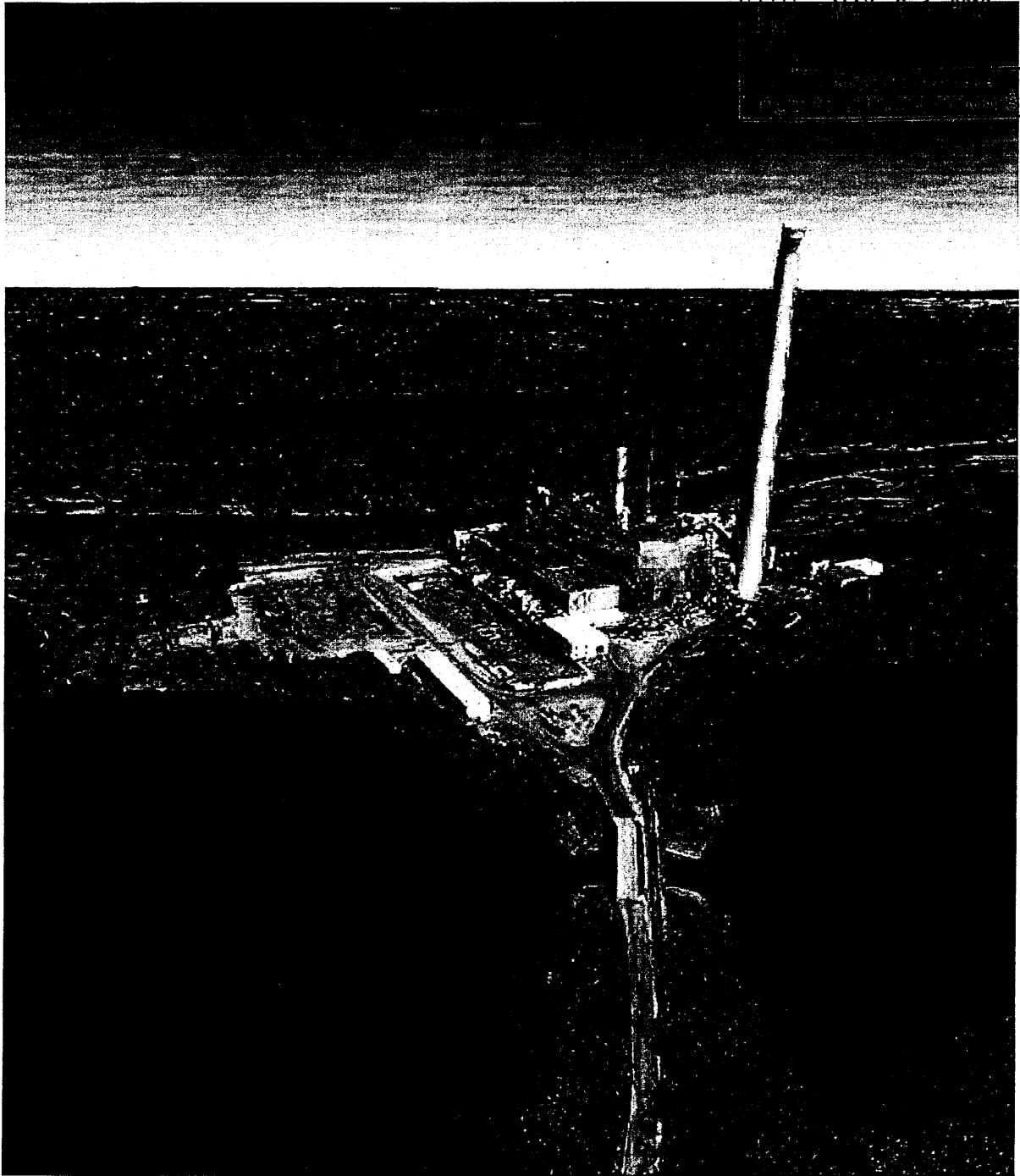


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Black Dog Unit Six Project
eDockets No. E002/GS-15-834

Environmental Assessment

May 25, 2016

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Abstract

Under the Minnesota Power Plant Siting Act a site permit from the Minnesota Public Utilities Commission (Commission) is required to construct a large electric power generating plant. Xcel Energy (applicant) filed an application with the Commission for a site permit to construct a 215 megawatt (MW) natural gas-fired combustion turbine unit (Unit 6) at its existing Black Dog Generating Plant in the city of Burnsville, Minnesota.

The applicant submitted its site permit application on October 15, 2015. The application was filed pursuant to the alternative review process outlined in Minnesota Statute 216E.04 and Minnesota Rules 7850.2800–3900. On December 10, 2015, the Commission accepted the application as complete.

Energy Environmental Review and Analysis (EERA) staff within the Minnesota Department of Commerce (Commerce) is responsible for conducting environmental review for site permit applications submitted to the Commission. Accordingly, EERA held a scoping meeting in Burnsville on January 28, 2015, and prepared this environmental assessment (EA), which addresses the issues required in Minnesota Rules 7850.3700, subpart 4, and those identified in the February 23, 2016, scoping decision issued by the Deputy Commissioner of Commerce.

Following release of this EA a public hearing will be held in the project area. The hearing will be presided over by an administrative law judge (ALJ) from the Office of Administrative Hearings. Upon completion of the environmental review and hearing process the ALJ will compile a record of the public hearing and public comments received and present it to the Commission for a final permit decision. This decision is anticipated in summer 2016.

Persons interested in this project can place their name on the project mailing list by contacting Bret Eknes, the Commission's acting public advisor, by email, consumer.puc@state.mn.us, or by phone at (651) 296-0406 or toll free (800) 657-3782.

Additional documents and information can be found on the EERA website at <http://mn.gov/commerce/energyfacilities/Docket.html?Id=34314> or the Minnesota eDockets website at <https://www.edockets.state.mn.us/EFiling/search.jsp> by selecting "15" for year and "834" for number.

Prepared by:

Andrew Levi, EERA Environmental Review Specialist
William Cole Storm, EERA Environmental Review Manager

Acronyms, Abbreviations and Definitions

AADT	average annual daily traffic
AERA	air emissions risk analysis
ALJ	administrative law judge
Applicant	Xcel Energy
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_{2e}	carbon dioxide equivalent
Commerce	Minnesota Department of Commerce
Commission	Minnesota Public Utilities Commission
dBA	A-weighted sound level recorded in units of decibels
DNR	Minnesota Department of Natural Resources
EA	environmental assessment
EERA	Energy Environmental Review and Analysis
EMF	electric and magnetic fields
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
generating plant	Black Dog Generating Plant
gpm	gallons per minute
HRSG	heat recovery steam generator
I-35W	Interstate Highway 35 West
kV	kilovolt or 1,000 volts
kW	kilowatt or 1,000 watts
MAAQS	Minnesota Ambient Air Quality Standards
Minn. R.	Minnesota Rule
Minn. Stat.	Minnesota Statute
MN-77	Minnesota State Highway 77
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MW	megawatt or 1,000 kW
NAAQS	National Ambient Air Quality Standards
NAC	noise area classification
NHIS	Natural Heritage Information System
NPDES/SDS	National Pollutant Discharge Elimination System / State Disposal System

- NERC** North American Electric Reliability Corporation
- NESC** National Electrical Safety Code
- NO_x** Nitrogen Oxide
- PM** particulate matter
- proposed project** Black Dog Unit 6 Project
- PSD** prevention of significant deterioration
- RGU** responsible governmental unit
- RO** reverse osmosis
- ROI** region of influence
- ROW** right-of-way
- subd.** subdivision (Minnesota Statute)
- subp.** subpart (Minnesota Rule)
- substation** existing Black Dog Substation
- VOC** volatile organic compound
- USACE** United States Army Corps of Engineers
- USFWS** United States Fish and Wildlife Service

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1 Introduction

Xcel Energy (applicant) filed an application with the Minnesota Public Utilities Commission (Commission) for a site permit to expand the existing Black Dog Generating Plant (generating plant) in the city of Burnsville, Minnesota. The applicant intends to construct a 215 megawatt (MW) natural gas-fired combustion turbine unit and associated facilities (proposed project).¹ The application was filed pursuant to the alternative review process outlined in Minnesota Statute 216E.04 and Minnesota Rules 7850.2800–3900. The Commission docket number for this project is E002/GS-15-834.

The Energy Environmental Review and Analysis (EERA) unit within the Minnesota Department of Commerce (Commerce) is responsible for conducting environmental review on applications for site permits before the Commission.² The intent of the environmental review process is to inform the public, decision-makers, local governments, state and federal agencies, and applicants of potential impacts to human and environmental resources and possible mitigation measures associated with the proposed project.

This document is an environmental assessment (EA). It addresses the issues required in Minnesota Rule 7850.3700, subpart 4, and those identified in the February 23, 2016, scoping decision issued by the Deputy Commissioner of Commerce (**Appendix A**). The EA facilitates the legislative goal—as stated in the Minnesota Power Plant Siting Act—to “minimize adverse human and environmental impact while insuring continuing electric power system reliability and integrity and insuring that electric energy needs are met and fulfilled in an orderly and timely fashion,”³ and is organized as follows:

Section 1 provides an overview of this document and the proposed project.

Section 2 explains the regulatory framework associated with the proposed project, including the site permitting process and other required permits and approvals.

Section 3 describes the proposed project as submitted by the applicant.

Section 4 details potential impacts to both human and natural resources; identifies measures to avoid, minimize or mitigate adverse impacts; and summarizes the cumulative potential effects of the proposed project and other projects.

Section 5 applies the information and data available in the site permit application and the EA to the siting factors listed in Minnesota Rule 7850.4100.

¹ Xcel Energy (October 15, 2015) *Application to the Minnesota Public Utilities Commission for a Site Permit for the Black Dog Unit 6 Project*, eDockets No. [201510-114858-01](https://www.dockets.mn.gov/eDockets/201510-114858-01) (hereinafter “Application”); A copy of the application, along with other relevant documents, can also be found on the EERA website at: <http://mn.gov/commerce/energyfacilities/Docket.html?Id=34314>.

² Minnesota Statute [216E.04](#), subdivision 5; see also Minnesota Rule 4410.4300, subpart 3.

³ Minn. Stat. [216E.02](#), subd. 1.

1.1 Project Purpose

The proposed project was selected by the Commission as part of a competitive resource acquisition process to provide additional electrical power sources to meet the projected electrical needs of the applicant's customers (E002/CN-12-1240).⁴ The project is designed to provide 115 kilovolt (kV) electrical power supply to the Twin Cities metropolitan area using existing transmission infrastructure to serve existing distribution substations.

If approved and constructed, the proposed project will operate as a "peaking" facility. This means it is expected to operate only during times of high electric demand, for example, hot summer afternoons, or to offset fluctuations in intermittent or variable generation sources, such as solar and wind.

1.2 Project Description

The applicant proposes to construct a 215 MW simple-cycle natural gas-fired combustion turbine unit (Unit 6) and associated facilities at the existing generating plant in the city of Burnsville, Minnesota. Unit 6 will increase the generating plant's overall electric generating capacity to 498 MW. Its service life is expected to exceed 35 years.

The applicant proposes to use existing infrastructure at the generating plant to the greatest extent practicable. This includes the existing powerhouse building and 115 kV substation. Unit 6 will use natural gas as a fuel source. Improvements to natural gas infrastructure and any associated approvals are the responsibility of the gas supplier and are not a part of this proceeding.

1.3 Project Location

The proposed project is approximately 12 miles south of Minneapolis, and is located entirely in Dakota County, Minnesota, within the city of Burnsville. **Table 1** summarizes the project location. **Figure 1** illustrates the project location on a map.

Table 1 Project Location

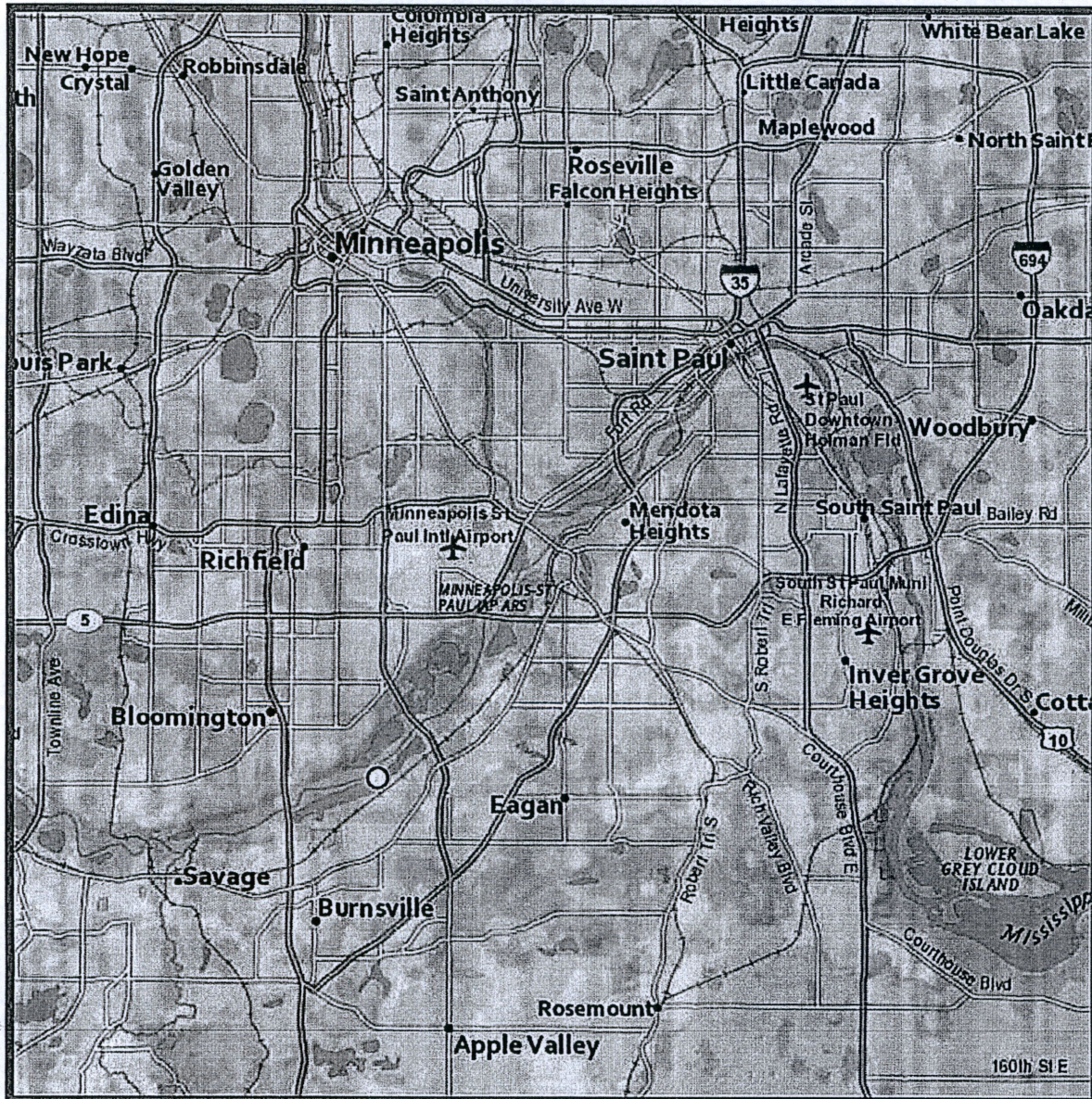
Township	Range	Section	County
27N	24W	23, 24	Dakota

⁴ Minnesota Public Utilities Commission (February 5, 2015) *Order Approving Power Purchase Agreement with Calpine, Approving Power Purchase Agreement with Geronimo, and Approving Price Terms with Xcel*, February 5, 2015, eDockets No. [20152-107070-01](#) (hereinafter E002/CN-12-1240 Order).

1.4 Sources

Much of the information used in this EA comes from the site permit application filed by the applicant. Additional sources include new information provided by the applicant, as well as information from relevant environmental review documents for similar projects, spatial data, state agencies, and other sources. Information was also gathered at a site visit.

Figure 1 Project Location



Source: Energy Environmental Review and Analysis.

2 Regulatory Framework

In order to construct the proposed project, the applicant must obtain a site permit from the Commission. Additional approvals from other state and federal agencies with permitting authority for actions related to the project might also be required.

2.1 Site Permit

In Minnesota, no person may construct a large electric power generating plant without a site permit from the Commission.⁵ A large electric power generating plant is defined as “electric power generating equipment and associated facilities designed for or capable of operation at a capacity of 50,000 kilowatts [kW] or more.”⁶ Fifty-thousand kW is equivalent to 50 MW.

Unit 6 will have an electric generating capacity of 215 MW;⁷ therefore, the proposed project requires a site permit from the Commission. Because Unit 6 will be fueled solely by natural gas,⁸ the proposed project qualifies under the Commission’s alternative review process.⁹

The applicant filed its site permit application on October 15, 2015.¹⁰ The application was filed pursuant to the alternative review process outlined in Minnesota Statute 216E.04 and Minnesota Rules 7850.2800–3900. The Commission considered the completeness of the application at its December 3, 2015, agenda meeting.¹¹ On December 10, 2015, the Commission issued an order accepting the application as complete.¹²

2.2 Certificate of Need

In Minnesota, no person¹³ may construct a large energy facility without first obtaining a Certificate of Need from the Commission.¹⁴ A large electric power generating plant is considered a large energy facility if it, or combination of plants at a single site, has a combined generating capacity of 50,000 kW or more.¹⁵ Unit 6 will have an electric

⁵ Minn. Stat. 216E.03, subd. 1; Minn. R. 7850.1300, subp. 1.

⁶ Minn. Stat. 216E.01, subd. 5.

⁷ Application.

⁸ Application.

⁹ Minn. Stat. 216E.04, subd. 2(2).

¹⁰ Application.

¹¹ See Minnesota Public Utilities Commission (November 20, 2015) *Notice of Commission Meeting*, eDockets No. 201511-115833-04; see also Minnesota Public Utilities Commission (January 29, 2016) *Minutes – December 3, 2015*, eDockets No. 20161-117815-01.

¹² Minnesota Public Utilities Commission (December 10, 2015) *Order Finding Application Complete, Requesting Summary Report, and Granting Variance*, eDockets No. 201512-116357-01. (hereinafter “Order”)

¹³ See Minn. Stat. 216E.01 (“person” shall mean an individual, partnership, joint venture, private or public corporation, association, firm, public service company, cooperative, political subdivision, municipal corporation, government agency, public utility district, or any other entity, public or private, however organized).

¹⁴ Minn. Stat. 216B.243.

¹⁵ Minn. Stat. 216B.2421, subd. 2.

generating capacity of 215 MW;¹⁶ therefore, the proposed project is a large energy facility. A Certificate of Need is not required in this instance, however, because the proposed project was selected in a bidding process established by the Commission.¹⁷

2.3 Environmental Review

Site permit applications are subject to environmental review, which is conducted by EERA staff under Minnesota Rule 7850.3700. In preparing environmental review documents, EERA functions as the responsible governmental unit (RGU) under the Minnesota Environmental Policy Act and associated regulations. In addition to preparing environmental review documents, EERA performs related tasks, including conducting scoping meetings and managing public comment periods.

The alternative review process requires preparation of an EA.¹⁸ An EA is a written document that contains an overview of potential human and environmental impacts and possible mitigation measures associated with the proposed project.¹⁹ It also summarizes the cumulative potential effects of the proposed project and other projects where these effects coincide. This EA is the only state environmental review document required for the proposed project.²⁰ After the EA is complete and made publically available, a public hearing will occur in the project area.

Scoping

The first step in the preparation of an EA is scoping. The scoping process has three primary purposes: (1) to ensure that the public has a chance to participate in the development of the EA; (2) to focus the content of the EA on impacts and issues important to a reasoned site permit decision; and (3) to identify possible mitigation measures—including alternative sites—that mitigate potential impacts.

EERA conducts scoping meetings in conjunction with a comment period to allow the public an opportunity to participate in the development of the scope of the EA.²¹ The commissioner of Commerce or his designee determines the scope of the EA.²² The scope may include alternative sites suggested during the scoping process if it is determined the alternatives

¹⁶ Application.

¹⁷ Minn. Stat. 216B.2422, subd. 5(b) (Notwithstanding any other provision of this section, if an electric power generating plant, as described in section 216B.2421, subdivision 2, clause (1), is selected in a bidding process approved or established by the commission, a certificate of need proceeding under section 216B.243 is not required); see E002/CN-12-1240 Order.

¹⁸ Minn. Stat. 216E.04, subd. 5; Minn. R. 7850.3700, subp. 1.

¹⁹ Minn. Stat. 216E.04, subd. 5; Minn. R. 7850.3700, subp. 4.

²⁰ Minn. Stat. 216E.04, subd. 5.

²¹ Minn. R. 7850.3700, subp. 1.

²² Minn. R. 7850.3700, subp. 3.

would aid the Commission in making a permit decision.²³ Applicants are provided the opportunity to respond to each request that an alternative be included in the EA.²⁴

Scoping Process

On January 6, 2016, Commission staff sent notice of the place, date and time of a joint scoping and public information meeting²⁵ to those persons on the project contact list and agency technical representative list, as well as local government units.²⁶ Notice was published in *The Burnsville/Eagan Sun* the week of January 15, 2016,²⁷ and on the Commission and EERA websites.

Public Meeting

Commission and EERA staff held the joint public information and scoping meeting as noticed on January 28, 2015, at Burnsville City Hall in the city of Burnsville. The purpose of this meeting was to provide information to the public about the proposed project and permitting process, to answer questions about the proposed project and permitting process, and to allow the public an opportunity to suggest impacts, mitigative measures, and alternatives that should be considered in the EA. A court reporter was present to document oral statements.²⁸

Public Comments

A public comment period, ending February 11, 2016, provided the opportunity to submit written comments to EERA. The purpose of this comment period was to allow interested persons to suggest impacts, mitigative measures, and alternatives that should be considered in the EA.

Written comments were received from the Minnesota Department of Natural Resources (DNR),²⁹ the Minnesota Department of Transportation (MnDOT)³⁰, and the United States Army Corps of Engineers (USACE).³¹ DNR discussed issues regarding an active peregrine falcon (*Falco peregrinus*) nest box mounted on an existing exhaust stack located at the

²³ Minn. R. 7850.3700, subp. 2.

²⁴ Minn. R. 7850.3700, subp. 2.

²⁵ See Minn. R. 7850.3500 (requiring a public meeting be held in the project area to provide information to the public about the proposed project and to answer questions. This meeting satisfies the requirement to hold a scoping meeting, that is, two separate meetings are not required).

²⁶ Minnesota Public Utilities Commission and Minnesota Department of Commerce (January 6, 2016) *Notice of Public Information and Environmental Assessment Scoping Meeting*, eDockets Nos. 20161-117009-01, 20161-117009-02.

²⁷ Xcel Energy (February 17, 2016) *Affidavit of Publication*, eDockets No. 20162-118389-01.

²⁸ Minnesota Department of Commerce (February 18, 2015) *Public Meeting Summary*, eDockets No. 20162-118622-01.

²⁹ Minnesota Department of Natural Resources (February 11, 2016) *DNR ERDB No. 20160127: Scoping Comments*, eDockets No. 20162-118212-01.

³⁰ Minnesota Department of Transportation (February 10, 2016) *Scoping Comments*, eDockets No. 20162-118146-01.

³¹ U.S. Corps of Engineers (December 2, 2015) *Comments on Black Dog 6*, eDockets No. 201512-116124-01.

generating plant. MnDOT directed the applicant to coordinate shipment of oversized loads on interregional corridors with the agency. MnDOT also requested the applicant coordinate any construction work or materials delivery with potential to affect its right-of-way (ROW). USACE indicated that, as proposed, it is unlikely that the proposed project would require a permit under the Clean Water Act. USACE requested that should material discharge into waters of the United States become necessary, the applicant submit a permit application to the agency.

Scoping Decision

After considering public comments and recommendations from EERA staff, the Deputy Commissioner of Commerce issued a scoping decision on February 24, 2016 (**Appendix A**).³² The scoping decision identified the issues and sites to be evaluated in this EA. EERA staff provided notice of the scoping decision to those persons on the project mailing list and posted the notice to the EERA website.³³

2.4 Public Hearing

Minnesota Rule 7850.3800, subpart 1, requires the Commission to hold a public hearing once the EA is complete and made publically available. In this instance, the hearing will be presided over by an administrative law judge (ALJ) from the Office of Administrative Hearings. Interested persons will have the opportunity to speak at the hearing, present evidence, ask questions, and submit comments. The ALJ will provide a written report to the Commission summarizing the public hearing and any spoken or written comments received. Comments received on the EA during the public hearing become part of the record in the proceeding. EERA staff will respond to questions and comments about the EA at the public hearing; however, staff is not required to revise or supplement the document.³⁴

2.5 Permit Decision

The Minnesota Legislature directed the Commission to select sites for large electric power generating plants that minimize adverse human and environmental impacts while insuring continuing electric power system reliability and integrity.³⁵ A site must also be compatible with the legislative goals of environmental preservation and the efficient use of resources while insuring electric energy needs are met and fulfilled in an orderly and timely fashion.³⁶

³² Minnesota Department of Commerce (February 25, 2016(a)) *Environmental Assessment Scoping Decision*, eDockets No. 20162-118622-01, (hereinafter "Scoping Decision")

³³ Minnesota Department of Commerce (February 25, 2016(b)) *Notice of Environmental Assessment Scoping Decision*, 2015, eDockets No. 20162-118647-01.

³⁴ Minn. R. 7850.3800, subp. 5.

³⁵ Minn. Stat. 216E.02, subd. 1.

³⁶ Minn. Stat. 216E.02, subd. 1.

Site permits issued by the Commission designate where a large electric power generating plant can be built, and outline construction and operation standards. A generic site permit template is included in **Appendix B**.

Minnesota Statute 216E.03, subdivision 7(b) identifies 12 considerations the Commission must consider when making its permit decision. These considerations are further clarified and expanded upon by Minnesota Rule 7850.4100, which identifies 14 factors the Commission must consider. These factors include:

- A. effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services;
- B. effects on public health and safety;
- C. effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;
- D. effects on archaeological and historic resources;
- E. effects on the natural environment, including effects on air and water quality resources and flora and fauna;
- F. effects on rare and unique natural resources;
- G. application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity;
- H. use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries;
- I. use of existing large electric power generating plant sites;
- J. use of existing transportation, pipeline, and electrical transmission systems or rights-of-way;
- K. electrical system reliability;
- L. costs of constructing, operating, and maintaining the facility which are dependent on design and site;
- M. adverse human and natural environmental effects which cannot be avoided; and
- N. irreversible and irretrievable commitments of resources.

The analysis in Section 4 addresses each of these factors by evaluating the potential impacts to individual components or “elements” of each factor. For example, impacts to human settlement (Factor A) are assessed by evaluating nine different elements including aesthetics, cultural values, displacement, floodplains, land use and zoning, noise, property values, public services, recreation, and socioeconomics. For each element, “indicators” are analyzed. An indicator is a way to measure an element. For example, proximity to residences is used as an indicator of potential displacement.

At the time the Commission makes a final permit decision, it must determine whether the EA and the record created at the public hearing address the issues identified in the scoping decision.³⁷ This permit decision must occur within 60 days after receipt of the ALJ report³⁸ and be made within six months of the Commission's determination the application is complete. This time limit may be extended up to three months for just cause or upon agreement of the applicant.³⁹ A Commission permit decision is anticipated in summer 2016.

2.6 Other Permits and Approvals

A site permit from the Commission is the only state permit required for siting the proposed project; however, should the Commission issue a site permit, other permits might be required. These subsequent permits are commonly referred to as "downstream" permits and must be obtained by the applicant prior to construction of the proposed project. **Table 2** identifies potential permits, approvals, and notifications.

A site permit from the Commission supersedes local zoning, building or land use rules.⁴⁰ Though zoning and land use rules are superseded, the Commission's site permit decision must be guided, in part, by impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts."⁴¹

A site permit also binds state agencies. Minnesota Statute 216E.10, subdivision 3, requires state agency participation in the permitting process to identify whether proposed projects—if constructed—would be "in compliance with state agency standards, rules, or policies."

Federal

Title 10, Section 503.2 of the Code of Federal Regulations (CFR) prohibits the construction of a new electric power plant without the capability to use coal or another alternate fuel as a primary energy source unless an exemption has been granted by the Department of Energy under 10 CFR 503 Subparts C or D.

The Federal Aviation Administration (FAA) requires that it be notified of certain construction activities. "Notification allows the FAA to identify potential aeronautical hazards in advance thus preventing or minimizing adverse impacts to the safe and efficient use of navigable airspace."⁴²

³⁷ Minn. R. 7850.3900, subp. 2.

³⁸ Minn. R. 7850.3900, subp. 1.

³⁹ Minn. R. 7850.3900, subp. 1.

⁴⁰ Minn. Stat. 216E.10, subd. 1.

⁴¹ Minn. Stat. 216E.03, subd. 7.

⁴² Federal Aviation Administration (September 23, 2014) *Notification of Proposed Construction or Alteration on Airport Part 77: Central Region*, Retrieved March 21, 2016, from:
<http://www.faa.gov/airports/central/engineering/part77/#who>.

Table 2 Potential Permits and Approvals

Federal	
Department of Energy	Exemption to Allow Burning Natural Gas
Federal Aviation Administration	Notice of Proposed Construction of Alteration
Federal Energy Regulatory Commission	Exempt Wholesale Generator Self-Certification
	Market-Based Rate Authorization
United States Army Corps of Engineers	Section 404 of the Federal Clean Water Act
	Section 10 of the Rivers and Harbors Act
United States Environmental Protection Agency	Acid Rain Permit
	Risk Management Plan
	Hazardous Waste Generation
United States Fish and Wildlife Service	Threatened and Endangered Species Consultation
State of Minnesota	
Department of Natural Resources	Endangered Species Consultation
Department of Transportation	Road Crossing Permits
	Special Hauling Permit
Pollution Control Agency	Air Emission Facility Permit
	Clean Water Act Section 401 Water Quality Certification or waiver (if USACE Section 404 Permit is required)
	Hazardous Waste Generator Permit
	National Pollutant Discharge Elimination System/ State Disposal System Permit
	Storage Tank Registration and Permitting
Local	
County, City	Road Crossing and Right-of-Way, Land and Building, Overwidth Load, and Driveway and Access Permits

The United States Federal Energy Commission (FERC) “regulates the transmission and wholesale sales of electricity” in the interstate market and “protects the reliability of the high voltage interstate transmission system through mandatory reliability standards.”⁴³

The United States Army Corps of Engineers (USACE) “regulates the discharge of dredged or fill material into waters of the United States, including wetlands.”⁴⁴ Dredged or fill material could impact water quality. A permit is required from USACE if the potential for significant adverse impacts exists. At this time, USACE does not anticipate the need for a permit.

The United States Environmental Protection Agency (EPA) regulates potential impacts to human health and the environment through a variety of permits and approvals.⁴⁵ EPA’s authority extends to multiple activities including emissions to air and water and the handling of hazardous wastes.

A permit is required from the United States Fish and Wildlife Service (USFWS) for the incidental “taking”⁴⁶ of any endangered species. As a result, USFWS encourages project proposers to consult with the agency to determine if a project has the potential to impact federally-listed threatened and endangered species. Additionally, consultation can lead to the identification of general mitigation measures for potential impacts associated with a proposed project.

State

Construction projects that disturb one or more acres of land require a general National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) construction stormwater permit from the Minnesota Pollution Control Agency (MPCA). This permit is issued to “construction site owners and their operators to prevent stormwater pollution during and after construction.”⁴⁷ The NPDES/SDS permit requires (1) use of best management practices; (2) development of a Stormwater Pollution Prevention Plan; and (3) adequate stormwater treatment capacity once the project is complete. An air permit is required for regulated facilities to ensure compliance with a variety of state and federal air quality requirements. Additionally, MPCA regulates generation, handling, and storage of hazardous wastes.

⁴³ U.S. Federal Energy Regulatory Commission (June 17, 2015) *What FERC Does*, Retrieved March 22, 2016, from: <https://www.ferc.gov/about/ferc-does.asp>.

⁴⁴ U.S. Environmental Protection Agency (October 27, 2015) *Section 404 Permit Program*, Retrieved December 9, 2015, from: <http://www.epa.gov/cwa-404/section-404-permit-program>.

⁴⁵ U.S. Environmental Protection Agency (September 29, 2015) *Our Mission and What We Do*, Retrieved March 22, 2016, from: <https://www.epa.gov/aboutepa/our-mission-and-what-we-do>.

⁴⁶ See *U.S. Code* § 1532(19) (defining “take” to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct).

⁴⁷ Minnesota Pollution Control Agency (November 19, 2015) *Stormwater Program for Construction Activity*, Retrieved December 9, 2015, from: <http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/construction-stormwater/index.html>.

Potential impacts to state lands and waters, as well as fish and wildlife resources are regulated by DNR. Not unlike the USFWS, DNR encourages project proposers to consult with the agency to determine if a project has the potential to impact state-listed threatened or endangered species. Additionally, consultation can lead to the identification of general mitigation measures for potential impacts associated with a proposed project.

A permit from MnDOT is required for the transport and delivery of equipment that is oversize or overweight.⁴⁸

Local

The Commission's site permit supersedes local planning and zoning regulations and ordinances; however, applicants must obtain local approvals necessary for proper local government functioning, for example, local building permits as agreed to by the applicant and the city of Burnsville.⁴⁹

2.7 Applicable Codes

The proposed project must meet requirements of the National Electrical Safety Code (NESC).⁵⁰ NESC standards are designed to safeguard human health "from hazards arising from the installation, operation, or maintenance of conductors and equipment in electric supply stations."⁵¹ They also ensure that projects are constructed using materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided routine operational maintenance is performed.

Utilities must also comply with North American Electric Reliability Corporation (NERC) standards.⁵² NERC standards define the reliability requirements for planning and operating the electrical transmission grid in North America.⁵³

⁴⁸ Minnesota Department of Transportation (n.d.) *Overdimension Permits*, Retrieved March 22, 2016, from: http://www.dot.state.mn.us/cvo/oversize/order_a_permit.html.

⁴⁹ Application, Appendix B.

⁵⁰ See Minn. Stat. 326B.35; Minn. R. 7826.0300, subp. 1 (requiring utilities to comply with the most recent edition of the NESC when constructing new facilities or reinvesting capital in existing facilities); see also Generic Site Permit Template, Section 4.4.1 (requiring compliance with NESC standards).

⁵¹ IEEE Standards Association (n.d.) *C2-2002 – National Electrical Safety Code 2002 Edition*, Retrieved March 9, 2016, from: <http://standards.ieee.org/findstds/standard/C2-2002.html>.

⁵² See Generic Site Permit Template, Section 4.3.1 (requiring compliance with NERC standards).

⁵³ North American Electric Reliability Corporation (n.d.) *Standards*, Retrieved December 8, 2015, from: <http://www.nerc.com/pa/stand/Pages/default.aspx>.

2.8 Issues Outside the Scope of the EA

Consistent with the scoping decision (**Appendix A**), this EA does not address:

- Any alternatives not identified in the scoping decision, including a no-build alternative.
- Issues related to project need, size, type, or timing.
- Issues related to necessary improvements to natural gas pipeline(s).

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3 Proposed Project

Section 3 describes the proposed project. Unless otherwise noted, the source of information for this section is the site permit application⁵⁴ or the applicant's November 13, 2015, letter to the Commission.⁵⁵

The applicant proposes to construct a simple-cycle natural gas-fired turbine and associated facilities at the existing generating plant in the city of Burnsville, Minnesota. Electricity generated by the project will be transmitted to the existing 115 kV Black Dog substation (substation) located on-site. The applicant proposes to use existing infrastructure to the greatest extent practicable. This includes the powerhouse building and substation.

3.1 Proposed Site Location

The proposed project will be constructed at the existing generating plant in the city of Burnsville, Minnesota, approximately 12 miles south of Minneapolis (**Figure 1**). The city of Burnsville is in Dakota County.

Construction of the existing generating plant was completed in 1960. As originally designed, the generating plant housed two coal-fired boilers with steam turbines (Units 1 and 2), and two dual-fuel boilers with steam turbines (Units 3 and 4). These units are no longer in operation. More information regarding the retirement of these units, as well as associated remediation activities is discussed in Section 4.8.

In 2002, a combined cycle natural gas-fired power block (Unit 5/2) replaced Units 1 and 2. Unit 5/2 generates electricity through a natural gas-fired combustion turbine, which is connected to a heat recovery steam generator (HRSG). The exhaust heat from the combustion turbine generates steam within the HRSG that is used to turn the existing Unit 2 steam turbine. The HRSG generates electric power without the need for additional fuel consumption. Unit 5/2 is housed within the north-end of the powerhouse building. It can generate 283 MW of electricity at peak capacity.

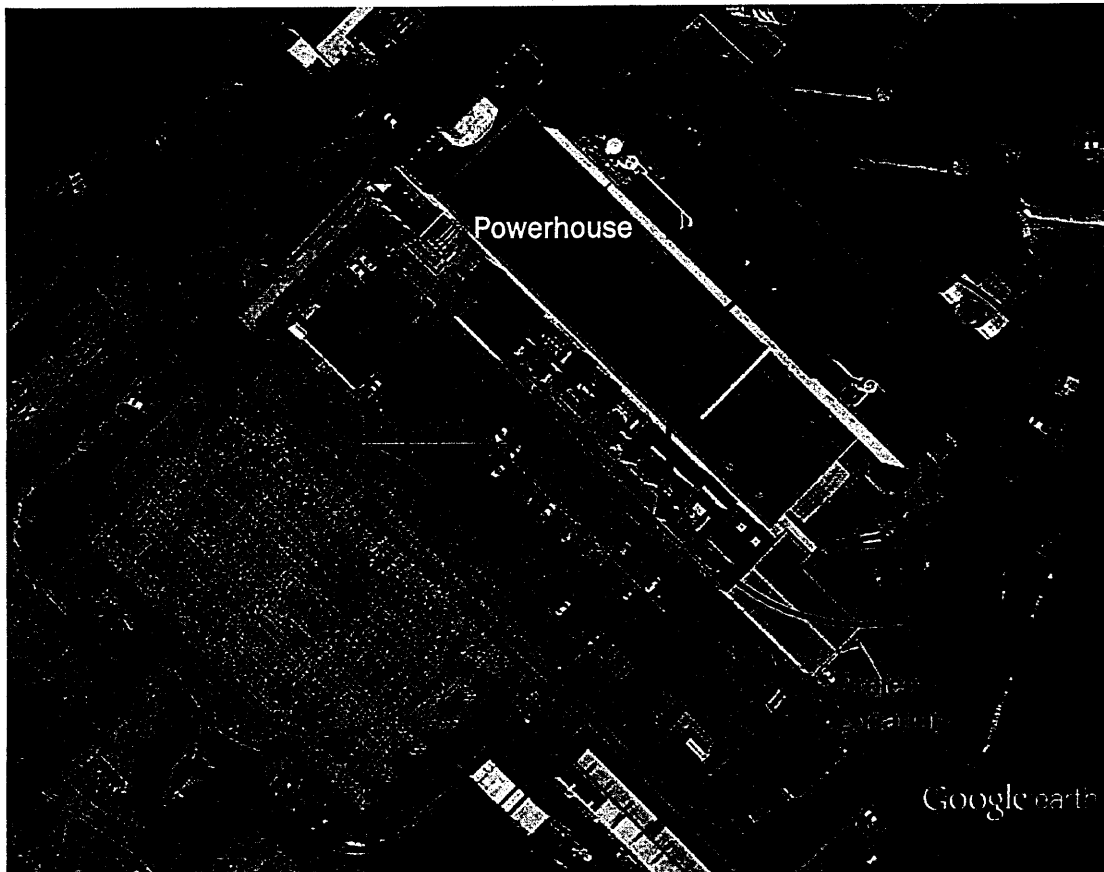
Unit 6 will replace Unit 4 within the south-end of the powerhouse building. Unit 3 will not be replaced. Several project components will be located outside or attached directly to the powerhouse building. These components are discussed in Section 3.2. The powerhouse building is within the existing generating plant boundary. The generating plant occupies 80-acres, which, in addition to the powerhouse, includes a coal yard, substation, and settling ponds. The generating plant is located on an approximately 1,900 acre parcel owned by the applicant. Approximately 500 of these acres are covered by Black Dog Lake. The remaining 1,250 acres are leased to the USFWS for recreational and wildlife uses.

Figure 2 depicts the location of the proposed project within the existing powerhouse.

⁵⁴ Application.

⁵⁵ Xcel Energy (November 13, 2015) *Reply Comments*, eDockets No. [201511-115705-01](#).

Figure 2 Existing Powerhouse and Substation



Source: Google, Inc.

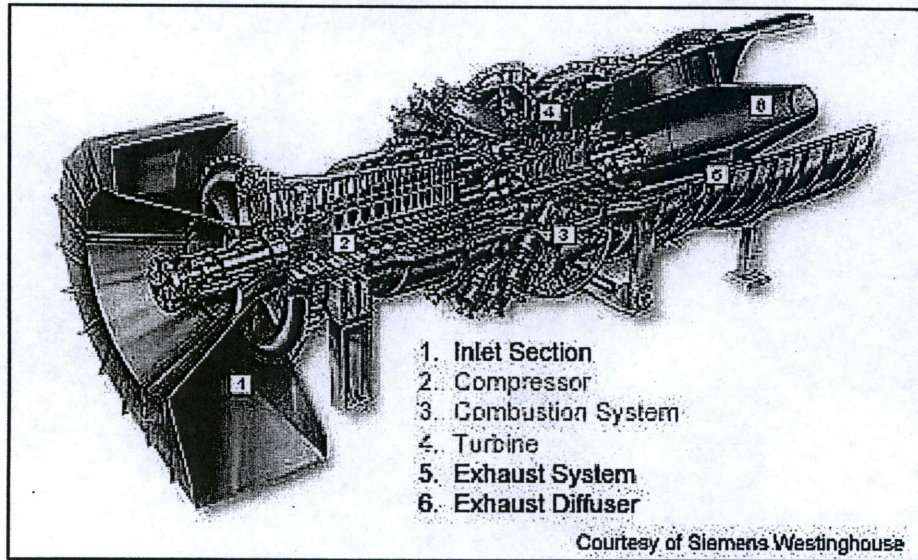
3.2 Project Description

The proposed project is a large electric power generating plant fueled solely by natural gas. The applicant intends to use a General Electric 7F.05 Series simple-cycle natural gas-fired combustion turbine. In addition to good combustion techniques, Unit 6 will be equipped with low-nitrogen oxide (NO_x) burners to limit the creation of pollutants. The turbine will be housed within the existing powerhouse.

As depicted in **Figure 3** and **Figure 4**, a natural gas-fired combustion turbine works by first compressing outside air in a compressor. The compressed air is fed into a combustion chamber at high speeds. Fuel injectors within the combustion system inject high-pressure natural gas, which burns at temperatures over 2,000 degrees Fahrenheit. This high-temperature air expands through a turbine spinning rotating blades. These rotating blades,

in addition to drawing in more high-temperature air, are connected to a shaft that turns a generator to produce electricity.⁵⁶

Figure 3 How a Natural Gas Turbine Works



Source: U.S. Department of Energy⁵⁷

In addition to the turbine, the following associated facilities will be constructed as part of the proposed project:

Inlet Air Filter. The inlet air filter cleans the air prior to it entering the turbine. It will be located outside, and attached to the south side of the powerhouse building. The applicant anticipates this filter will not be taller than the existing building.

Evaporative Cooler. The evaporative cooler lowers the temperature of the air entering the turbine when needed. Cooling incoming air increases operating efficiency on hot days. The evaporative cooler is a component of the inlet air filter.

Exhaust Stack. The exhaust stack directs turbine exhaust into the atmosphere. It will exit the powerhouse near the rear of the turbine, and extend 65-feet above the roof. The stack will be constructed out of a steel alloy rated for the appropriate temperature and insulated for the majority of its height.⁵⁸

⁵⁶ U.S. Department of Energy (n.d.) *How Gas Turbine Power Plants Work*, Retrieved March 3, 2016, from: <http://energy.gov/fe/how-gas-turbine-power-plants-work>.

⁵⁷ U.S. Department of Energy (n.d.).

⁵⁸ Xcel Energy (April 7, 2016).

Main Generator. The main generator converts the rotational energy of the turbine into electrical energy. It is connected directly to the turbine via a rotating shaft. The generator will produce electricity at 18,000 volts or 18 kV.⁵⁹

Main Generator Step-up Transformer. The main step-up transformer increases the electrical voltage from 18 kV to 115 kV for use on the existing 115 kV electric transmission system. The transformer will be located outside on the west side of the powerhouse in the same location as the step-up transformer used for Unit 4.

Auxiliary Transformer. The auxiliary transformer provides power to the turbine for start-up and operation. It will be located outside next the main step-up transformer.

Equipment Fin Fan Cooler. The fin fan cooler ensures the turbine does not overheat. The cooler consists of a closed-loop system that uses ethylene glycol and water to carry heat away from the turbine. Fans move air across air heat exchangers cooling the solution. This process is similar to an automobile radiator. The fin fan cooler will be located outside directly south of the powerhouse building. It will be an elevated on steel columns mounted on underground footings.⁶⁰

On-site Natural Gas Pipeline. The natural gas pipeline carries high pressure natural gas from the on-site natural gas delivery point to Unit 6. The pipeline will be buried for the majority of its length. It will enter the powerhouse building above ground. The on-site delivery point is anticipated to be located east of the powerhouse building.⁶¹

Gas-Conditioning Station. The gas-conditioning station removes moisture and other impurities from the natural gas. The station will not regulate pressure. It will be located within the powerhouse building.

Natural Gas Fuel Supply

The proposed project will be fueled solely by natural gas. The project will not have a back-up fuel source. The proposed project will increase natural gas needs at the generating plant. As a result, a new pipeline will be constructed to provide fuel for Unit 6. The gas supplier will be responsible for obtaining necessary permits and approvals to construct the pipeline.

A contract for supplying the natural gas for the proposed project was competitively bid and awarded to Northern States Power Gas.⁶² The applicant is currently evaluating routing options, gathering input from stakeholders such as the cities of Burnsville and Eagan, the USFWS, and DNR.⁶³ The applicant anticipates filing a route permit application with the

⁵⁹ Xcel Energy (March 17, 2016).

⁶⁰ Xcel Energy (April 7, 2016).

⁶¹ Xcel Energy (May 4, 2016).

⁶² Xcel Energy (May 4, 2016).

⁶³ Xcel Energy (May 4, 2016).

Commission in June 2016.⁶⁴ As a result, the natural gas pipeline portion of the project will undergo independent environmental analysis, and, consistent with the scoping decision, is not evaluated as a part of this EA.⁶⁵

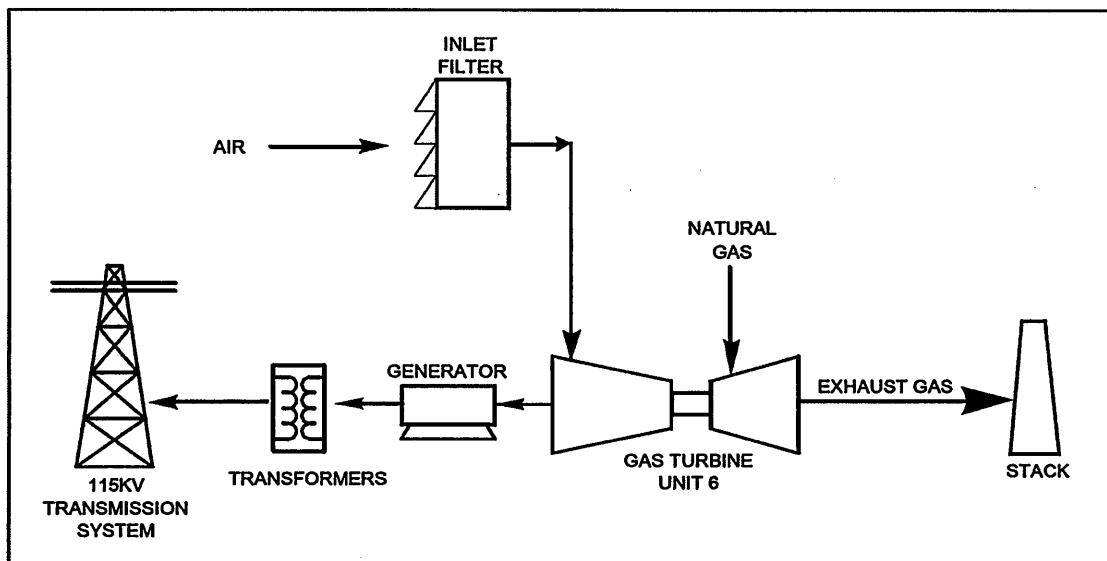
Water Supply

The proposed project will use groundwater to cool both the turbine itself and the air entering the turbine. Equipment will be cooled by the fin fan cooler described above. A mixture of 45 percent water and 55 percent ethylene glycol solution will be used in a closed-loop system.⁶⁶ Groundwater will be used to fill the system initially, and as needed as water is lost to maintenance activities.⁶⁷

The evaporative cooler will use groundwater to lower the temperature of the air entering the turbine on hot days. The applicant anticipates the evaporative cooler will be used approximately 20 percent of the time while Unit 6 is in operation. Use of the evaporative cooler will increase the efficiency of the turbine by approximately 5 to 10 percent depending upon the relative humidity.

Groundwater will also be used for domestic uses, fire suppression, and miscellaneous uses.

Figure 4 Electrical Generation Process



Source: Xcel Energy.

⁶⁴ Xcel Energy (May 4, 2016).

⁶⁵ Minnesota Department of Commerce (February 25, 2016(a)).

⁶⁶ Xcel Energy (March 17, 2016).

⁶⁷ Xcel Energy (April 27, 2016).

Electrical Interconnection

The proposed project will interconnect directly to the existing substation located on-site. This will require minor modifications to the substation, but major upgrades will not be required.

Electricity generated by Unit 6 will flow to a step-up transformer where the voltage will be increased to 115 kV. The proposed project will interconnect with the substation at the breaker location previously used by Unit 4. Minor modifications to the substation include the addition of a motor-operated 115 kV disconnect and minor buswork between the generator breaker at the substation and the high voltage transmission lines coming from the step-up transformer.⁶⁸

3.3 Construction

Construction of the proposed project would not begin until all approvals have been obtained. Decommissioning, demolition, and removal of the Unit 4 turbine, generator, boiler, and other equipment will be completed prior to construction of the proposed project and is currently in progress.

Construction of Unit 6 will begin by pouring foundations for the turbine and generator. Once completed, the combustion turbine and generator will be delivered by rail and installed inside the powerhouse. Next to be delivered and installed will be turbine accessory and inlet air modules and the exhaust stack. This equipment will be delivered by truck. The exhaust stack will be bolted or welded together and craned into place.⁶⁹ The main transformer will be delivered by rail and installed. Lastly, the on-site gas pipeline and gas-conditioning system will be installed.

The south-side of the generating plant will be used as a staging and delivery area, and, if necessary, may extend east into the former coal yard.

Figure 5 depicts the generating plant after the proposed project is constructed.

3.4 Operation and Maintenance

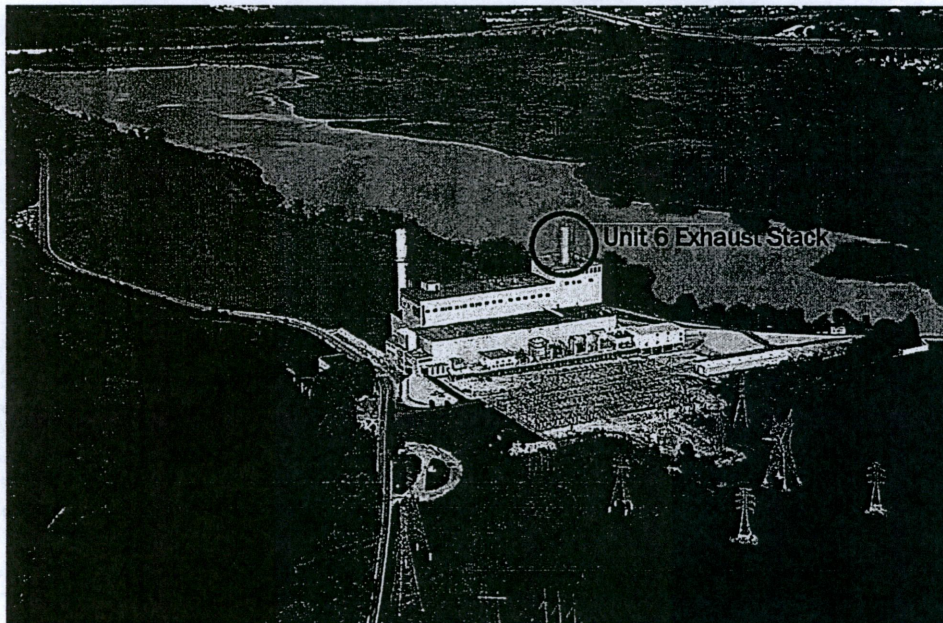
Once constructed, Unit 6 will not operate continually. Rather, it is designed as a "peaking" facility, meaning it is only expected to operate at times of high electric demand, for example, hot summer afternoons, or to offset fluctuations in intermittent or variable generation sources, such as solar and wind. The proposed project has the capability to load follow, and have the ability to ramp at approximately 13 to 15 MW per minute. Unit 6 will be able to provide 150 MW of electrical power within 10 minutes notice.

⁶⁸ Xcel Energy (March 17, 2016).

⁶⁹ Xcel Energy (April 7, 2016).

Routine maintenance activities would occur as necessary. Additionally, the turbine requires periodic overhaul. Two types of overhauls will be performed: hot gas path and major maintenance. These overhauls would alternate, and begin with the hot gas path overhaul. A hot gas path overhaul "consists of refurbishment of the combustion turbine combustion system and turbine blades. A hot gas path overhaul requires approximately one week."⁷⁰ A major maintenance overhaul includes a hot gas path overhaul, but also includes an overhaul of the compressor section of the combustion turbine and an inspection of the generator.⁷¹ Major maintenance overhauls generally require two to three weeks.

Figure 5 Black Dog Generating Plant, anticipated 2020



Source: Application.

3.5 Cost

The proposed project is anticipated to cost approximately \$100,000,000. **Table 3** provides an approximate cost break-down.

3.6 Schedule

Assuming all permits are acquired, the applicant indicates that construction will begin in summer of 2016 and continue through 2017. Project commission and start-up is anticipated in November of 2017, with commercial operation beginning in March 2018.

⁷⁰ Xcel Energy (November 13, 2015).

⁷¹ Xcel Energy (November 13, 2015).

Table 3 Estimated Costs

Project Component	Estimated Cost
Planning / Permitting / Design	\$7,000,000
Procurement	\$60,000,000
Construction	\$33,000,000
Close Out	Included Above
Total	\$100,000,000

Source: Xcel Energy.⁷²

⁷² Xcel Energy (March 10, 2016).

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4 Potential Impacts and Mitigation Measures

Section 4 provides an overview of the environmental setting, affected resources, potential impacts, and mitigation measures associated with the proposed project. Section 4 also discusses cumulative potential effects.

Analysis Background

A potential impact is the anticipated change to an existing condition caused either directly or indirectly by the construction and operation of a proposed project. Potential impacts can be positive or negative, short- or long-term, and, in certain circumstances, can accumulate incrementally. Impacts vary in duration and size, by resource, and across locations.

Direct impacts are caused by the proposed action and occur at the same time and place as the proposed action. An **indirect impact** is caused by the proposed action, but is further removed in distance or occurs later in time. Both direct and indirect impacts must be reasonably foreseeable, which means a reasonable person would anticipate or predict the impact. **Cumulative potential effects** are the result of the incremental effects of the proposed action in addition to other projects in the environmentally relevant area.

Potential Impacts and Mitigation

Sections 4.2 through 4.7 explain the potential direct and indirect impacts to various resources caused by the proposed project. The following terms and concepts are used to describe and analyze potential impacts, that is, to put impacts into a consistent context:

Duration Impacts vary over time. Short-term impacts are generally associated with project construction. Long-term impacts are associated with the operational life of the project and usually end with project decommissioning and reclamation. Permanent impacts extend beyond the decommissioning stage of the project.

Size Impacts vary by size. Size is a measure of how big something is. To the extent possible, potential impacts are described quantitatively, for example, the number of impacted acres or the percentage of affected individuals in a population.

Location Impacts are location dependent. For example, noise impacts decrease as distance from the source increases, or common resources in one location might be uncommon in another.

Uniqueness Resources are different. Common resources occur frequently, while uncommon resources are not ordinarily encountered.

The context of an impact—in combination with its anticipated on-the-ground effect—is used to determine an impact intensity level, which can range from highly beneficial to highly harmful. Impact intensity levels are described using a qualitative scale, which is explained below. These terms are not intended to be value judgments, but rather a means to ensure a common understanding among readers and to compare impacts between alternatives.

Negligible impacts do not alter an existing resource function, and are generally not noticeable to an average observer. These short-term impacts affect common resources.

Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts might, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short-term.

Moderate impacts alter an existing resource condition or function, and are generally noticeable or predictable to the average observer. Effects might be spread out over a large area making them difficult to observe, but can be estimated by modeling. Moderate impacts might be long-term or permanent to common resources, but generally short- to long-term to uncommon resources.

Significant impacts alter an existing resource condition or function to the extent that the resource is impaired or cannot function. Significant impacts are likely noticeable or predictable to the average observer. Effects might be spread out over a large area making them difficult to observe, but can be estimated by modeling. Significant impacts can be of any duration, and affect common or uncommon resources.

In instances where the potential effects of other projects coincide with the potential effects of the proposed project in the environmentally relevant area, these effects are cumulative. Cumulative potential effects may or may not change the impact intensity level. Section 4.8 discusses cumulative potential effects in detail.

Sections 4.2 through 4.7 discuss opportunities to avoid, minimize, or mitigate an impact. These actions are collectively referred to as *mitigation*.

To **avoid** an impact means it is eliminated altogether, for example, by not undertaking parts or all of a project, or relocating the project.

To **minimize** an impact means to limit its intensity, for example, by reducing a project's size or moving a portion of the project.

To **mitigate** an impact means fixing it by repairing, rehabilitating or restoring the affected resource, or compensating for it by replacing it or providing a substitute resource elsewhere. Mitigating an impact is often used when it cannot be avoided or further minimized.

Some impacts can be avoided or minimized; some might be unavoidable but can be minimized; others might be unavoidable and unable to be minimized, but can be mitigated.

Regions of Influence

Potential impacts to human and environmental resources are analyzed in this EA within specific spatial bounds or regions of influence (ROI). The ROI is the geographic area within

which construction and operation of a project may impact a specific resource. Impacts to resources may extend beyond this distance, but would diminish quickly and result in negligible to minimal impacts. ROIs vary between resources, and can change across projects.

This EA uses the following ROIs to assess potential impacts to resources:

The **site location** is the area within the generating plant boundary where the majority of construction activities will occur. This includes the existing powerhouse building, coal yard and ash ponds. Buffer distances of **1,600 feet** and **one-mile** from the site location boundary are used as ROIs. The **project area** ROI focusses on the city of Burnsville, but also includes the cities of Bloomington and Eagan, and more generally Dakota and Hennepin County.

As necessary, this EA will discuss resources, potential impacts and mitigation measures beyond the identified ROI to provide appropriate context.

Table 4 summarizes the ROIs used in this EA. **Figure 6** illustrates the site location and 1,600 feet ROIs.

Figure 6 Selected Regions of Influence



Source: Energy Environmental Review and Analysis.

4.1 Environmental Setting

The existing generating plant is within the Minnesota River Valley. The valley was formed 11,600 to 9,200 years ago as River Warren drained glacial Lake Agassiz through the Minnesota River Valley.⁷³ Today, the river valley within the vicinity of the proposed project

⁷³ Minnesota River Basin Data Center (November 15, 2004) *Minnesota River Valley Formation*, Retrieved April 19, 2016, from: http://mrbdc.mnsu.edu/mnbasin/fact_sheets/valley_formation.

contains wetlands and floodplain forests of maple, cottonwood, and ash.⁷⁴ The generating plant is sited on a natural isthmus with open, grassed areas and pockets of forested areas between Black Dog Lake and the Minnesota River.

Table 4 Regions of Influence

Type of Resource	Element	Region of Influence
Human Settlement	Displacement, Land Use and Zoning, Interference	Site Location
	Noise, Property Values	1,600 Feet
	Aesthetics, Recreation, Public Utilities	One-mile
	Socioeconomics, Cultural Values	Project Area
Public Services	Airports, Roads, Emergency Services, Utilities	Project Area
Public Health and Safety	Electric and Magnetic Fields, Electrical Interference, Public and Worker Safety, Fire and Electrocutation	Site Location
Land-based Economies	Agriculture, Forestry, Mining	Site Location
	Tourism	Project Area
Archaeological and Historic Resources	—	One-mile
Natural Environment	Geology, Soils, Vegetation, Water Resources, Wetlands, Wildlife, Wildlife Habitat	Site Location
	Rare and Unique Resources	One-mile
	Air Quality	Project Area

The proposed project will be constructed within or adjacent to an existing powerhouse building, which is part of the existing generating plant. The generating plant covers approximately 80 acres, and includes the powerhouse building, coal yard, ash ponds, and substation.⁷⁵ The generating plant is within a 1,900 acre facility boundary owned by the

⁷⁴ U.S. Fish and Wildlife Service (October 21, 2015) *Minnesota Valley: Wildlife and Habitat*, Retrieved April 19, 2016, from: http://www.fws.gov/refuge/Minnesota_Valley/wildlife_and_habitat/index.html.

⁷⁵ Application, page 3.

applicant. Of this, approximately 500 acres is covered by Black Dog Lake.⁷⁶ The remaining acres are managed as part of the Minnesota Valley National Wildlife Refuge by the USFWS under a long-term lease agreement. This lease was initiated in 1982.⁷⁷

The generating plant is located in the city of Burnsville, Minnesota, within the Minneapolis–St. Paul–Bloomington metropolitan statistical area. Approximately 3,524,583⁷⁸ people live in this urbanized environment that covers approximately 8,120 square miles.⁷⁹

4.2 Impacts to Human Settlement

Construction and operation of a new large electric power generating plant has the potential to impact human settlement. These impacts might be short-term, for example, an influx of construction jobs, or long-term, for example, changes to land use.

Potential impacts to aesthetics and recreation will be minimal. Noise impacts will be minimal. Impacts to cultural values, floodplains, land use and zoning, and property values are not anticipated. Displacement will not occur. Socioeconomic impacts are positive.

4.2.1 Aesthetics

Aesthetics refers to the visual quality of an area as perceived by the viewer, and forms the overall impression an observer has of an area. Aesthetics are subjective, meaning their relative value depends upon the perception and philosophical or psychological responses unique to individual viewers. Impacts to aesthetics are equally subjective, and depend upon the sensitivity and exposure of an individual. The relative value of aesthetics, as well as perceived impacts to visual resources, can vary greatly between individuals.

A viewshed includes the natural landscape and built features visible from a specific location. Natural landscapes can include wetlands, surface waters, distinctive landforms, and vegetation patterns. Buildings, roads, bridges and transmission lines are examples of built features on the landscape. Generally, a harmonious viewshed is considered by many to be more aesthetically pleasing.

Viewer sensitivity is an individual's interest or concern for the quality of a viewshed and varies depending upon the activities viewers are engaged in, their values and expectations related to the viewshed, and their level of concern for potential changes to the viewshed.

⁷⁶ Application, page 3.

⁷⁷ Application, page 3.

⁷⁸ U.S. Census Bureau (March 2016) *Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015 - United States – Metropolitan and Micropolitan Statistical Area; and for Puerto Rico*, Retrieved April 20, 2016, from:
<http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkml>.

⁷⁹ Metropolitan Council (September 2014) *Metro Stats – Prosperity Imbalanced: The Twin Cities Metropolitan Area in 2013*, Retrieved April 20, 2016, from:
<http://metro council.org/getattachment/3f92bc2f-f244-438e-b714-a7a95028daca/.aspx>.

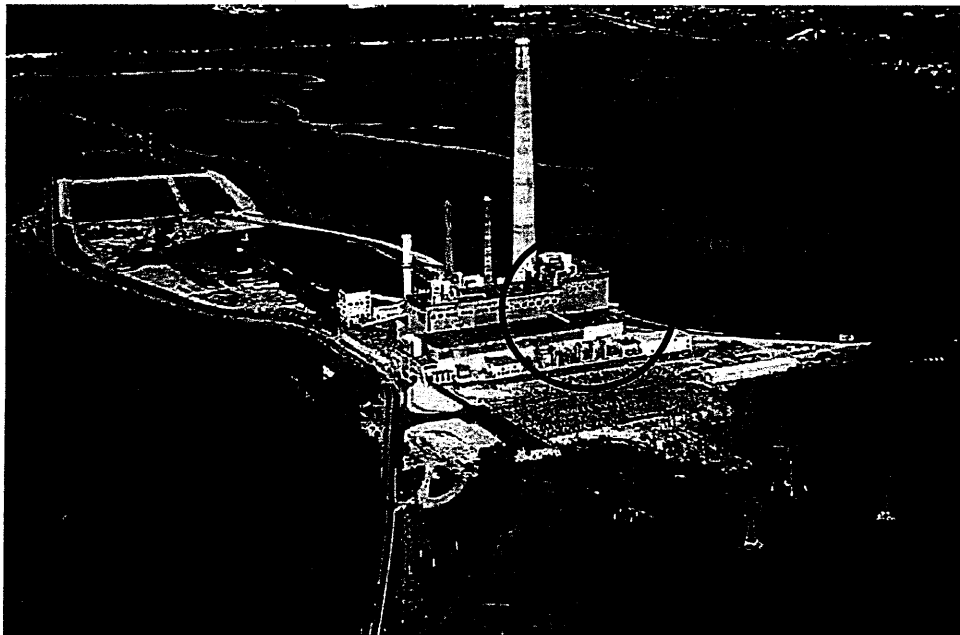
High viewer sensitivity is generally associated with individuals engaged in recreational activities; traveling scenic sites for pleasure and to or from recreational, protected, natural, cultural or historic areas; or experiencing viewsheds from resorts, road-side pull-outs, or residences. Low viewer sensitivity is generally associated with individuals working or commuting.

Viewer exposure refers to variables associated with observing a viewshed, and can include the number of viewers, frequency and duration of views, and view location. For example, a high exposure viewshed would be observed frequently by large numbers of people for long periods. These variables, as well as other factors such as viewing angle or time of day, affect the overall aesthetic impact.

Potential Impacts

The proposed project will be located within the existing powerhouse building (**Figure 7**). Portions of the project will be outside, either attached to the building or located within a short distance. The majority of this outdoor equipment will only be visible from the west or south. The powerhouse is part of the existing generating plant, which is surrounded by wildlife and recreational areas, as well as roads, railway, and extensive electrical transmission infrastructure.

Figure 7 Generating Plant 2015



Source: Application.

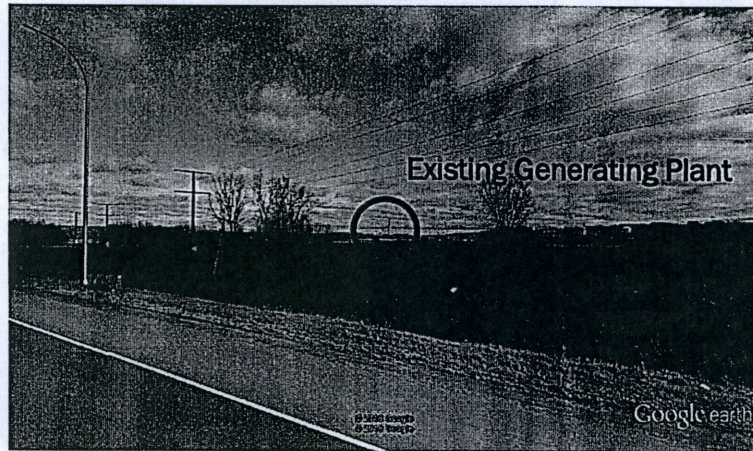
The generating plant is located in the Minnesota River Valley. Residences on nearby bluffs overlook the proposed project. Interstate Highway 35 West (I-35W) (**Figure 8**) and Minnesota State Highway 77 (MN-77) (**Figure 9**) are approximately 2.20 miles to the west and 1.40 miles to the east, respectively.

Views of the proposed project will primarily be from neighboring residences and I-35W and MN-77. The nearest residence is approximately three-tenths of a mile from the powerhouse building. Desktop analysis reveals that the majority of residences within one-mile of the proposed project are screened by vegetation in the summer months. When viewed from residences, both viewer sensitivity and exposure would be considered high. When viewed from I-35W and MN-77, viewer sensitivity is low as most individuals use this highway for commuting to and from work or traveling across the Twin Cities metropolitan area and beyond. Viewer exposure is also considered to be low. While the proposed project will be viewed by a high number of people, viewing time is from a distance, of a short period of time and—for most viewers—repetitious.

The air inlet filter, main transformer, and auxiliary transformer will be located outside. This equipment will be attached directly to the powerhouse building. The fin fan cooler will be immediately adjacent to the south-side of the powerhouse. The exhaust stack will protrude from the roof of the building and extend approximately 200 feet.⁸⁰ This is shorter than the existing Unit 5/2 stack by 15 feet.⁸¹

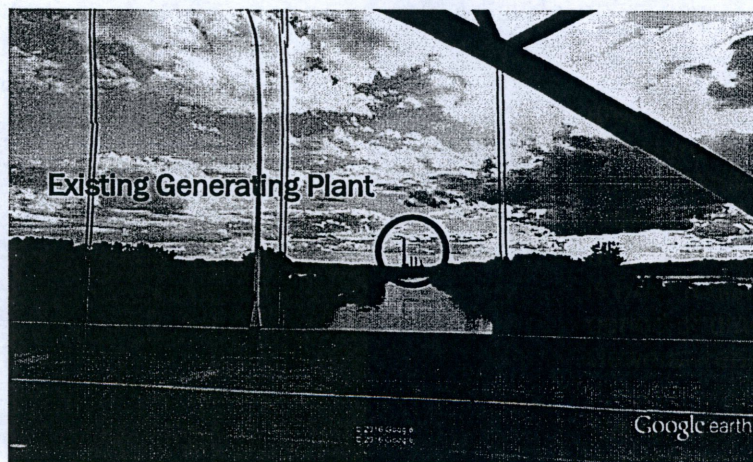
Unit 5/2 uses an aqueous solution of ammonia to control NO_x emissions, which may produce a visible water vapor plume. Whether or not this plume is visible depends upon

Figure 9 Current Viewshed from I-35W



Source: Google, Inc.

Figure 8 Current Viewshed from MN-77



Source: Google, Inc.

⁸⁰ Application, page 38.

⁸¹ Application, page 38.

multiple factors, such as weather conditions, time of year, and operating load. Unit 6 will not use an aqueous solution of ammonia to control NOx emissions. As a result, "the most likely visible evidence of a plume will be a transparent heat 'shimmer' directly above the outlet."⁸²

Direct Impacts

Aesthetics impacts are anticipated to be long-term and minimal. Impacts are of a relative small size compared to the generating plant as a whole. The presence of the existing generating plant prevents the occurrence of a natural viewshed. The ROI for aesthetics is one mile.

The proposed project will be co-located with an existing large electric power generating plant within an existing powerhouse. The powerhouse is located in an area with extensive electrical transmission infrastructure. The introduction of a second exhaust stack protruding from the roof of the powerhouse will increase aesthetic impacts; however, this increase will be incremental and minimal. The Unit 6 exhaust stack will be shorter than the Unit 5/2 stack and, unlike the Unit 5/2 stack, is not expected to create a water vapor plume. The proposed project is not anticipated to be visible from I-35W or MN-77.

Indirect Impacts

Direct aesthetic impacts can cause indirect impacts to property values and recreational opportunities. Because direct aesthetic impacts are anticipated to be minimal, indirect impacts are anticipated to be negligible.

Mitigative Measures

Potential impacts to aesthetics can be minimized by choosing sites that are, to the extent practicable, consistent with the existing viewshed or reduce viewer exposure. Constructing Unit 6 within an existing powerhouse building is consistent with these measures. No mitigation is proposed.

4.2.2 Cultural Values

Cultural values are learned community beliefs and attitudes. These values provide a framework for individual and community thought and action. Cultural values are informed, in part, by ethnic heritage. Residents of Burnsville self-reported as having primarily American, Czech, English, French, German, Irish, Italian, Norwegian, Polish, Sub-Saharan African, and Swedish ancestry.⁸³ At 31 percent, German ancestry was reported most often.

Cultural values are also informed by work and leisure pursuits. Local events are tied to ethnic heritage, geographic features, national holidays, and other seasonal and municipal

⁸² Application, page 38.

⁸³ U.S. Census Bureau, (n.d.(a)) *2010-2014 American Community Survey 5-year Estimates: DP02 Selected Social Characteristics in the United States*, Available from:
<http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t#> (listing includes ancestry totaling greater than 1,000 individuals).

activities. "The City of Burnsville has a rich history of celebrations and community events ... such as the International Festival of Burnsville, Art and All That Jazz Festival, and the Burnsville Fire Muster. Other events include concerts, movies and other entertainment."⁸⁴

Potential Impacts

Impacts to cultural resources are not anticipated. The proposed project will not interfere with the work or leisure pursuits of residents in a way that interferes with their cultural values. No mitigation is proposed.

4.2.3 Displacement

Displacement is the forced removal of a residence or building to facilitate the construction and operation of the proposed project.⁸⁵ The applicant owns the proposed site location; therefore, displacement will not occur. Mitigation is not proposed.

4.2.4 Floodplain

The proposed project is located within an area mapped as "Zone AE" by the Federal Emergency Management Agency.⁸⁶ Areas within this designation are "subject to inundation by the 1-percent-annual-chance flood event."⁸⁷ The 100-year flood level is approximately 715 feet above mean sea level.⁸⁸

Impacts to the 100-year floodplain are not anticipated. No mitigation is proposed. All outdoor equipment, including the equipment fin fan cooler, and on-site natural gas pipeline, will be located above 720 feet mean sea level.⁸⁹ This exceeds the 100-year flood level. The remaining facilities will be within or upon the existing powerhouse. Construction activities will not result in placement of fill or alterations to the floodplain.

4.2.5 Land Use and Zoning

Land use is the use of land by humans, such as residential, commercial or agricultural uses, and often refers to zoning. Zoning is a regulatory tool used by local governments (cities, counties, and some townships) to promote or restrict certain land uses within specific

⁸⁴ City of Burnsville (n.d.(a)) *Community Events and Festivals*, Retrieved March 29, 2016, from: <http://www.ci.burnsville.mn.us/index.aspx?NID=416>.

⁸⁵ American Heritage Dictionary of the English Language, Fifth Edition (2011) *displacing*, Retrieved December 22, 2015, from: <http://www.thefreedictionary.com/displacing> (defining "displace" as "to move, shift, or force from the usual place or position" and "to force to leave a place of residence").

⁸⁶ Minnesota Department of Natural Resources (n.d.(a)) *FEMA Floodplain Maps - Flood Insurance Rate Maps (FIRMs)*, Retrieved April 6, 2016, from: http://www.dnr.state.mn.us/waters/watermgmt_section/floodplain/fema_firms.html.

⁸⁷ Application, page 37.

⁸⁸ Application, page 37.

⁸⁹ Xcel Energy (April 8, 2016).

geographic areas. Electric generating facilities have the potential to impede current and future land use.

A site permit from the Commission supersedes local zoning, building or land use rules.⁹⁰ Though zoning and land use rules are superseded, the Commission's site permit decision must be guided, in part, by impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts."⁹¹

Potential Impacts

Direct impacts are anticipated to be long-term and of a small size. Unique resources will not be impacted. The overall impact intensity level is anticipated to be minimal.

Unit 6 will be constructed within an existing powerhouse building. Outdoor construction activities will be limited to industrial areas on the site location. On-site staging and storage of equipment will also be limited to these areas. As a result, impacts to land use are not anticipated. No mitigation is proposed.

The existing generating plant is located in an area of Burnsville zoned as Conservancy District.⁹² Utility uses and the expansion of nonconforming existing uses may be allowed.⁹³ Unless approved through a conditional use permit, no structure is to exceed 35 feet in height.⁹⁴ The powerhouses building and the exhaust stack for Unit 5/2 are over 35 feet in height. The exhaust stack for Unit 6 will be 200 feet tall. This is approximately 15-feet shorter than the existing Unit 5/2 exhaust stack.

The proposed project is within the Shoreland Overlay District⁹⁵ and the Floodway District⁹⁶. General setback requirements for sewerer properties within the Shoreland Overlay District are 50 feet from the ordinary high water mark to the closest point of the structure (10-8-10). The powerhouse building is approximately 200-feet from Black Dog Lake. The fin fan cooler is also expected to exceed the 50 foot setback.

Mitigation

Potential impacts to current and future land use can be mitigated by selecting sites that are compatible with current and future land use and zoning. To the extent practicable, the proposed project is consistent with these measures.

⁹⁰ Minn. Stat. 216E.10, subd. 1.

⁹¹ Minn. Stat. 216E.03, subd. 7.

⁹² City of Burnsville (November 24, 2015) *City of Burnsville Zoning Map*, Retrieved March 29, 2016, from: <http://www.burnsville.org/DocumentCenter/Home/View/534>.

⁹³ Sterling Codifiers (December 22, 2015) *Burnsville, Minnesota: City Code*, Retrieved March 29, 2016, from: http://www.sterlingcodifiers.com/codebook/index.php?book_id=468, see 10-28-2.

⁹⁴ Sterling Codifiers (December 22, 2015), see 10-28-6.

⁹⁵ City of Burnsville (November 24, 2015).

⁹⁶ City of Burnsville (n.d.(b)) *Zoning and Flood Zones Viewer*, Retrieved March 29, 2016, from: <http://www.ci.burnsville.mn.us/index.aspx?NID=884>.

4.2.6 Noise

Noise can be defined as any undesired sound.⁹⁷ It is measured in units of decibels on a logarithmic scale. The A-weighted scale (dBA) is used to duplicate the sensitivity of the human ear.⁹⁸ A three dBA change in sound is barely detectable to average human hearing, whereas a five dBA change is clearly noticeable. A 10 dBA change is perceived as a sound doubling in loudness.

Minnesota’s noise standards are based on noise area classifications (NAC), which correspond to the location of the listener (often referred to as a “receptor”). These classifications are not necessarily synonymous with local zoning classifications. NACs are assigned to areas based on the type of land use activity occurring at that location. For example, residences, designated camping and picnicking areas, resorts and group camps are assigned to NAC 1; retail and other trades, airports, and bus stops are assigned to NAC 2; manufacturing and other industrial type activities are assigned to NAC 3. A complete list is available at Minnesota Rule 7030.0050.

Table 5 Noise Area Classifications (dBA)

Noise Area Classification (NAC)	Daytime (7:00 a.m. to 10:00 p.m.)		Nighttime (10:00 p.m. to 7:00 a.m.)	
	L ₁₀	L ₅₀	L ₁₀	L ₅₀
1	65	60	55	50
2	70	65	70	65
3	80	75	80	75

Source: Minnesota Pollution Control Agency (2015).

Noise standards are expressed as a range of permissible dBA over a one-hour time period. L₁₀ may be exceeded 10 percent of the time, or six minutes per hour, while L₅₀ may be exceeded 50 percent of the time, or 30 minutes per hour. Standards vary between daytime and nighttime hours. There is no limit to the maximum loudness of a noise.⁹⁹ **Table 5** provides current Minnesota noise standards.

The proposed project is located in an urban area. Ambient noise levels in these locations are generally between 45 and 55 dBA during daytime hours.¹⁰⁰ Noise levels will vary throughout the day due to vehicle traffic, emergency vehicles (sirens), or passing aircraft, among other factors.

⁹⁷ Minnesota Pollution Control Agency (n.d.(a)) *Noise Program*, Retrieved December 28, 2015, from: <https://www.pca.state.mn.us/air/noise-program>.

⁹⁸ Minnesota Pollution Control Agency (November 2015) *A Guide to Noise Control in Minnesota*, Retrieved December 28, 2015, from: <https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf>.

⁹⁹ Minnesota Pollution Control Agency (November 2015), page 2.

¹⁰⁰ Minnesota Pollution Control Agency (n.d.(a)).

There are no residences or other structures within 1,600 feet of the proposed natural gas-fired turbine. Land use within 1,600 feet of the proposed project includes Black Dog Road, a railway, and the Black Dog Preserve Unit of the Minnesota Valley National Wildlife Refuge. These land use activities are assigned to NAC 3 and NAC 1, respectively.

Potential Impacts

Noise impacts will be associated with construction and operation of the proposed project. The ROI for noise impacts is 1,600 feet. As depicted in **Figure 6**, several residences are within 1,600 feet of the site location. The closest residence to the existing powerhouse is approximately 1,850 feet to the south. This residence is approximately 1,800 feet from the proposed location of the fin fan cooler.

Construction

Noise impacts related to construction will be intermittent and short-term. The size of the impact will vary depending upon the distance between the source and the receptor. This distance is expected to exceed 1,600 feet. The overall impact intensity level is expected to be minimal. These impacts may or may not surpass MPCA noise standards. Impacts are unavoidable, but can be minimized.

Commission site permits require that construction be limited to daytime hours.¹⁰¹ The majority of construction will occur inside the existing powerhouse. Outdoor construction activities will include installation of the fin fan cooler, step-up transformer, exhaust stack, and on-site natural gas pipeline. Noise from heavy equipment, such as, cranes and excavating equipment, and increased vehicle traffic will be intermittent and occur during daytime hours.

Noise associated with heavy equipment can range between 80 and 90 dBA at full power 50 feet from the source.¹⁰² Heavy equipment generally runs at full power up to 50 percent of the time.¹⁰³ Point source sounds decrease six dBA at each doubling of distance.¹⁰⁴ This means an 80 dBA sound at 50 feet is perceived as a 50 dBA sound at 1,600 feet. Any exceedance of noise standards would be short-term and confined to daytime hours.

Operation

Noise surveys conducted by the applicant in 2011 while the generating plant was not operational provide information regarding background noise levels. Noise levels within one-mile of the proposed project did not exceed state noise standards. Monitoring equipment 3,500 feet from the powerhouse recorded daytime L₁₀ noise levels of 55.7 dBA and L₅₀ of

¹⁰¹ Generic Site Permit Template, Section 4.2.4.

¹⁰² Federal Highway Administration (November 30, 2015) *Highway Traffic Noise: Construction Noise Handbook*, Retrieved December 29, 2015, from:
https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm.

¹⁰³ Federal Highway Administration (November 30, 2015).

¹⁰⁴ Minnesota Pollution Control Agency (November 2015), page 10.

45.1 dBA. Monitoring equipment 2,100 feet from the powerhouse recorded daytime L₁₀ noise levels of 49.1 dBA and L₅₀ of 43.1 dBA.¹⁰⁵

The proposed project will produce noise during operation. The turbine is rated at 85 dBA at a distance of three feet.¹⁰⁶ The turbine will be located within the existing powerhouse. Noise surveys conducted in 2002 while Unit 3 (coal-fired), Unit 4 (coal-fired), and Unit 5/2 (natural gas-fired) were all in operation ranged from daytime L₁₀ of 48 dBA and L₅₀ of 47 to L₁₀ noise levels of 47 dBA and L₅₀ of 46 dBA.¹⁰⁷ Locations ranged from 1,800 feet to 3,300 feet from the existing powerhouse, respectively. Noise impacts from the Unit 6 turbine are expected to be similar or less than noise measured during the 2002 survey.¹⁰⁸

The fin fan cooler will produce noise not to exceed 85 dBA at one meter.¹⁰⁹ As stated previously, point source sounds decrease six dBA at each doubling of distance. This means an 85 dBA sound at three feet is perceived as a 31 dBA sound at 1,600 feet from the source. This does not exceed background noise levels.

Mitigation

Construction noise is not anticipated to exceed state noise standards; however, intermittent noise impacts may occur from construction related activities. Commission site permits require compliance with state noise standards, and also require that construction be limited to daytime hours.¹¹⁰ Operational noise impacts are mitigated by locating the turbine within an existing powerhouse. Noise impacts are also mitigated by the fact that a coal-fired generating plant had been in operation for over 50 years at this location, including rail shipments of coal, and resident expectations regarding ambient noise levels are established and include electric power generating equipment.

4.2.7 Property Values

Potential impacts to property values are not anticipated. No mitigation is proposed.

Unit 6 will be constructed within an existing powerhouse building. Aesthetic impacts are minimal. Outdoor construction activities will be within the boundary of the existing generating plant. As a result, the proposed project will not encumber future land use. No human health related impacts are anticipated.

¹⁰⁵ Application, page 34.

¹⁰⁶ Application, page 34.

¹⁰⁷ Application, page 33.

¹⁰⁸ Application, page 34.

¹⁰⁹ Xcel Energy (April 8, 2016).

¹¹⁰ Generic Site Permit Template, Section 4.2.4.

4.2.8 Recreation

Large electric power generating plants have the potential to impact recreation by interfering with the natural or built resources that provide for recreational opportunities. For example, a generating plant might change the aesthetic of a recreational destination in a way that reduces visitor use.

At its closes point, Black Dog Park is located approximately 1,900 feet from the existing powerhouse (**Figure 10**). Black Dog park is operated by the city of Burnsville and consists of three softball/baseball diamonds and a soccer/football field. The park has a parking lot accessible form Territorial Drive and a picnic area.

The Black Dog Preserve Unit of the Minnesota Valley National Wildlife Refuge is an approximately 1,250-acre area managed as a portion of the USFWS refuge system under a cooperative agreement with the applicant.¹¹¹ The applicant owns the underlying land and leases it to the USFWS. The lease allows for wildlife habitat enhancement and recreational activities.¹¹² Visitor services include a wildlife observation deck and associated 0.1-mile access trail and the 1.9-mile Black Dog Trail (**Figure 11**). Refuge visitors are required to remain on designated trails when visiting the Unit.¹¹³ The refuge borders the north side of the Minnesota River in this area as well.

Figure 10 Black Dog Park



Source: Google, Inc.

In July 2015, construction began on the “Black Dog Greenway” portion of the Minnesota River Greenway Project.¹¹⁴ This paved, multi-use recreational trail will be a part of the larger Dakota County trail network. The trail is expected to be completed in fall of 2016. The trail “will closely follow the Minnesota River through the Minnesota valley national Wildlife Refuge, roughly following the Black Dog Road alignment.”¹¹⁵ The trail will be constructed to withstand the frequent flooding in the Black Dog Lake area.¹¹⁶

¹¹¹ Application, page 43.

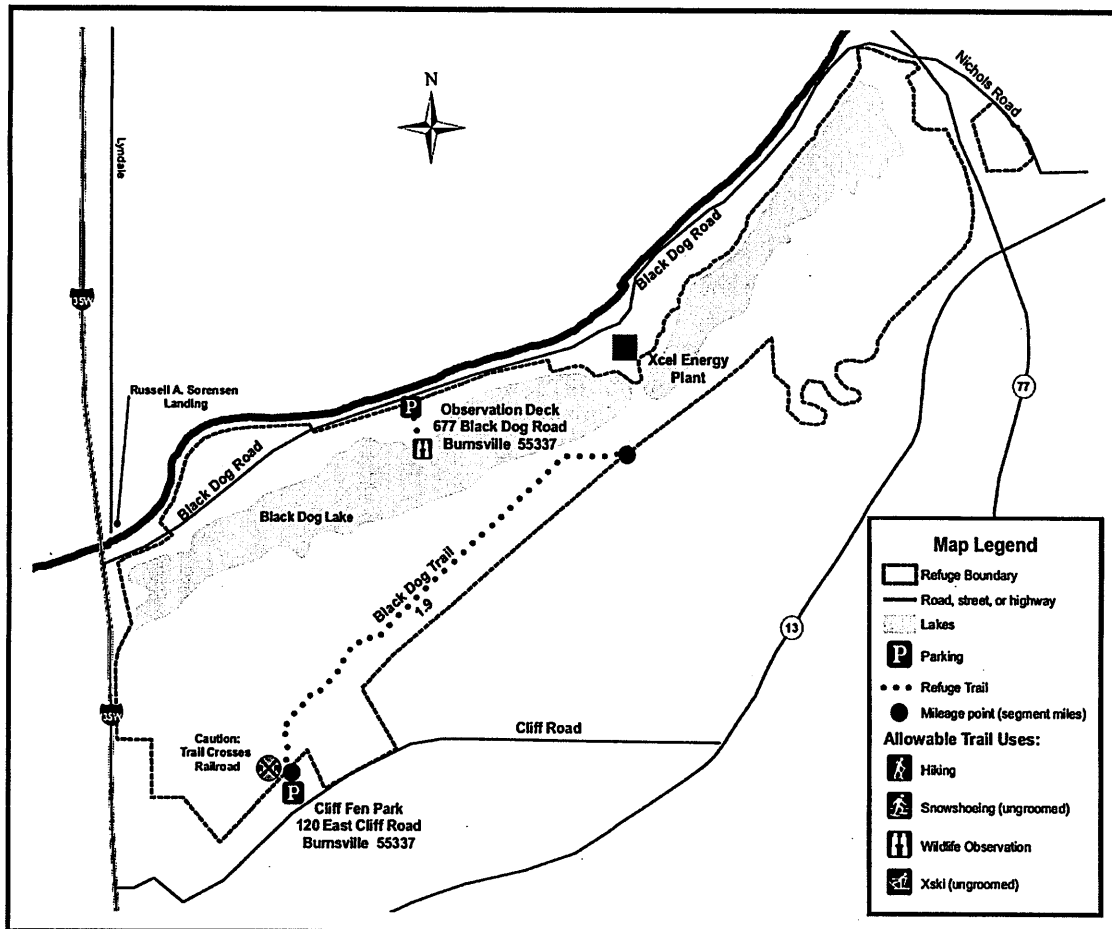
¹¹² Application, page 43.

¹¹³ U.S. Fish and Wildlife Service (n.d.) *Minnesota Valley National Wildlife Refuge Black Dog Preserve Trail Map*, Retrieved March 28, 2016, from: <http://www.fws.gov/uploadedFiles/Black%20Dog%20Trail%20Map.pdf#c>.

¹¹⁴ City of Burnsville (July 9, 2014) *Most of Black Dog Road in Burnsville to Permanently Close to Public Traffic, Slated to Become Greenway Trail*, Retrieved March 28, 2016, from: <http://www.burnsville.org/DocumentCenter/View/9323>.

¹¹⁵ Dakota County (January 25, 2012) *Minnesota River Greenway Master Plan*, Retrieved March 28, 2016, from:

Figure 11 Black Dog Preserve Trail Map



Source: U.S. Fish and Wildlife Service.

Fort Snelling State Park is approximately 1.5-miles to the northeast of the existing powerhouse building.

Potential Impacts

Impacts to recreation are anticipated to be minimal. No mitigation is proposed.

Unit 6 will be constructed within an existing powerhouse building. Outdoor construction activities will be limited to industrial areas at the site location. Direct impacts to recreation can cause indirect impacts to tourism. Because impacts to recreation are anticipated to be minimal, indirect impacts to tourism are not anticipated.

<https://www.co.dakota.mn.us/parks/Planning/Greenways/Documents/MinnesotaRiverMasterPlan.pdf>
 116 Dakota County (January 25, 2012), page 11.

4.2.9 Socioeconomics

The proposed project is located in the Twin Cities metropolitan area in close proximity to major population centers. United States Census data was used to develop **Table 6**, which provides information regarding total population and household income, and percentage of minority population and individuals below the poverty level. The median household income in the project area is higher than Minnesota as a whole. The percentage of individuals living below the poverty level is lower than the state as a whole. Minority groups make up a larger percentage of the total population than Minnesota as a whole.

Table 6 Population and Economic Profile

Location	Total Population*	Percent Minority Population*‡	Median Household Income**	Percentage of Individuals Below Poverty Level**
Minnesota	5,303,925	14.7%	\$60,828	11.5%
Dakota County	398,552	14.8%	\$74,995	7.8%
Hennepin County	1,152,425	25.6%	\$65,033	12.9%
Burnsville	60,306	22.5%	\$63,997	11.2%
Bloomington	82,893	20.3%	\$63,053	9.0%
Eagan	64,206	18.5%	\$80,247	7.1%

* Source: U.S. Census Bureau, 2010 Census.

‡ Minority population includes all persons excluding those who self-identified as white.

** Source: U.S. Census Bureau, 2010-2014 American Community Survey 5-year Estimates.

The proposed project will take between 18 and 24 months to construct.¹¹⁷ During this time high-skilled workers including “pipefitters, iron workers, millwrights, boilermakers, carpenters, electricians and other trades” will be employed.¹¹⁸ Once constructed, the proposed project will require workers for day-to-day operations and routine maintenance activities. Once operational, the applicant anticipates paying approximately \$2.2 million annually in local property taxes.¹¹⁹ These taxes will be paid to Dakota County, the city of Burnsville, and the Burnsville School District.¹²⁰

Potential Impacts

Potential impacts are both short- and long-term. In both cases, impacts are positive.

¹¹⁷ Application, page 44.

¹¹⁸ Application, page 44.

¹¹⁹ Application, page 45.

¹²⁰ Application, page 45.

Direct Impacts

Short-term impacts are associated with project construction. Impacts will be positive. Nearby communities and businesses can expect a short-term increase in revenues, for example, food and fuel purchases. Construction will not disrupt these communities and businesses. Construction will provide employment for high-skilled workers. The applicant indicates that some materials may be purchased locally. Long-term, positive impacts are associated with wages and increased tax revenues.

Hennepin County has a higher number of residents living below the poverty level than the state average. Dakota County and Hennepin County and the cities of Burnsville, Bloomington, and Eagan have, as a percentage of the total population, minority populations greater than the state average. The proposed project will not displace any of these individuals. As a result, disproportionate negative impacts to minority or low-income populations are not expected.

Indirect Impacts

Wages and increased local expenditures can facilitate additional local purchases, thereby supporting local and regional economies. Tax revenues provide for a variety of public services depending upon how the revenues are allocated. Examples include education, infrastructure and emergency services.

Mitigation

Adverse impacts are not expected. No mitigation is proposed.

4.3 Human Health and Safety

Construction and operation of a large electric power generating plant has the potential to impact human health and safety. Potential impacts to worker and visitor safety are minimal. Impacts from electrocution and fire are minimal. Neither impacts from electric and magnetic fields (EMF) nor impacts resulting in electronic interference are anticipated.

4.3.1 Worker and Visitor Safety

Much like any large construction project, there are risks associated with construction of a large electric power generating plant. These include the potential for injury from falls and equipment use.

The applicant is bound by federal and state Occupational Safety and Health Administration requirements for worker safety, and follows internal site safety requirements.¹²¹ The applicant indicates that qualified workers will be trained in specific tasks, including safety procedures and equipment training, to reduce the likelihood of injury.¹²² The construction

¹²¹ Xcel Energy (May 4, 2016).

¹²² Xcel Energy (May 4, 2016).

area “will be restricted to those that have direct activities in the area.”¹²³ Visitors will only be allowed onsite with an escort and may be restricted from entering certain areas.¹²⁴ With the use of standard construction practices, potential impacts to worker and visitor safety are not anticipated. No mitigation is proposed.

4.3.2 *Fire and Electrocutation*

“The power generation equipment at the Black Dog plant and the equipment proposed for the Unit 6 project combust natural gas at high pressure and temperature and convert this heat energy to electrical power. As a result, there is a risk of fire or explosion and a risk of electrocution.¹²⁵

“Potential impacts due to safety risks at the plant are minimized by a number of controls at the site including training, personal protective equipment, and signage. All plant employees participate in on-going safety training. All employees, contractors, and visitors are required to use appropriate personal protection equipment, for example, hard hats, safety glasses, fall protection. Employees assigned to specific tasks are trained in the proper use of safety equipment required for the task. The powerhouse is equipped with a security system and a fire suppression system. The city of Burnsville provides any fire, police, or rescue services needed at the plant.¹²⁶

“The proposed project will utilize step-up transformers and electrical switchgear to commute the electrical power generated at site to the adjacent substation. The switchgear includes circuit breakers and relays that de-energize electrical equipment should a structure or conductor fall to the ground or should electrical equipment otherwise fail.¹²⁷

Potential Impacts

Potential impacts are minimized by the systems and controls in place at the generating plant. Additionally, access is controlled and the generating plant is of a relative far distance (three-tenths of one mile) from the closest residence. As a result, potential impacts to human health and safety from fire and electrocution are anticipated to be minimal. No mitigation is proposed.

4.3.3 *Electric and Magnetic Fields*

EMF are invisible forces that result from the presence of electricity. EMF occurs naturally and is caused by weather or the geomagnetic field. EMF is also caused by all electrical devices and is found wherever people use electricity.

¹²³ Xcel Energy (May 4, 2016).

¹²⁴ Xcel Energy (May 4, 2016).

¹²⁵ Xcel Energy (May 4, 2016).

¹²⁶ Xcel Energy (May 4, 2016).

¹²⁷ Xcel Energy (May 4, 2016).

EMF are characterized and distinguished by their frequency, that is, the rate at which the field changes direction each second. Electrical lines in the United States have a frequency of 60 cycles per second or 60 hertz. EMF at this frequency level is known as extremely low frequency EMF (ELF-EMF).

Voltage on a conductor creates an electric field that surrounds and extends from the wire. Using a garden hose as an analogy, voltage is equivalent to the pressure of the water moving through the hose. The strength of the electric field produced is associated with the voltage of the transmission line and is measured in kilovolts per meter. The strength of an electric field decreases rapidly as it travels from the conductor, and is easily shielded or weakened by most objects and materials, such as trees and buildings.

Current moving through a conductor creates a magnetic field that surrounds and extends from the wire. Using the same analogy, current is equivalent to the amount of water moving through the garden hose. The strength of a magnetic field produced is associated with the current moving through the transmission line and is measured in milliGauss. Similar to electric fields, the strength of a magnetic field decreases rapidly as the distance from the source increases; however, unlike electric fields, magnetic fields are not easily shielded or weakened by objects or materials.

The effects of EMF on human health have been studied for over 30 years. Of particular concern is the link between EMF exposure and an increased incidence of cancer. "Currently, researchers conclude that there is little evidence that exposure to ELF-EMFs from power lines causes leukemia, brain tumors, or any other cancers in children."¹²⁸ "Additionally, the few studies that have been conducted on adults show no evidence of a link between EMF exposure and adult cancers, such as leukemia, brain cancer, and breast cancer."¹²⁹

Potential Impacts

The proposed project will not result in the construction and operation of new transmission lines. As a result, impacts related to EMF are not anticipated. No mitigation is proposed.

4.3.4 Electronic Interference

The proposed project will not result in the construction and operation of new transmission lines. As a result, impacts related to electronic interference are not anticipated. No mitigation is proposed.

¹²⁸ National Cancer Institute (November 3, 2014) *Magnetic Field Exposure and Cancer*, Retrieved December 23, 2015, from: <http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet>.

¹²⁹ National Institute of Environmental Health Sciences (September 18, 2014) *Electric and Magnetic Fields*, Retrieved December 23, 2015, from: <http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm>.

4.4 Public Services

Large electric power generating plants have the potential to impact public services, such as roads or airports. These impacts can be long-term if they change the area in a way that precludes or limits public services. No impacts to airport operations are anticipated. Impacts to local utilities are minimal. During construction minimal impacts to roads and highways may occur, negligible impacts to emergency services might occur. Once operational, impacts to roads and highways and emergency services are not anticipated.

4.4.1 Airports

Airports have different safety zones, which are based on several characteristics, including runway dimensions, the type of aircraft intended to use the runway, and the type of approach procedures used by the aircraft.¹³⁰ The Minneapolis – St. Paul International Airport (MSP) is approximately four miles northeast of the proposed site. This is the busiest airport in Minnesota. Based on the height of the exhaust stack (925 feet above mean sea level) structures and, more importantly, the distance from the airport, no impacts to airport operations are anticipated.¹³¹ No mitigation is proposed.

4.4.2 Emergency Services

Large electric power generating plants have the potential to impact access to emergency services by interfering with electronic communication systems or delaying emergency vehicles. The proposed project is not anticipated to impact emergency communication systems. The existing generating plant is accessed by a private road. No other businesses or residences are serviced by this road. During project construction traffic delays may occur. These delays are expected to be negligible if they occur.

Impacts to emergency services, if they occur, will happen during project construction. These impacts are anticipated to be negligible. Impacts are not anticipated during operation of the proposed project. No mitigation is proposed.

4.4.3 Roads and Highways

Two access roads serve the generating plant. Primary access is from Black Dog Road. In July of 2014, the applicant took ownership of Black Dog Road from the West Black Dog Road Bridge east to the generating plant as part of an agreement with the city of Burnsville.¹³² The road had “proven to be a maintenance challenge for the City with its frequent flooding

¹³⁰ See generally Minn. R. 8800.

¹³¹ See Metropolitan Airports Commission (July 26, 2010) Minneapolis – St. Paul International Airport 2030 Long Term Comprehensive Plan Update, Retrieved March 25, 2016, from: https://mspairport.com/about-msp/airport-improvements/ltcp_final_document.aspx, page 167.

¹³² Application, page 39.

and inaccessibility.”¹³³ “The portion of Black Dog road east of the generating plant has been removed and is being replaced with a private service road for the applicant.”¹³⁴ A second road exists south of the generating plan adjacent to the railway. This road is also a restricted use road, and is only used by generating plant staff when Black Dog Road is impassible.¹³⁵

Highways in the project area include I-35W, State Highway 13, and MN-77. The average annual daily traffic (AADT) is depicted in **Figure 12**. “AADT is a theoretical estimate of the total number of vehicles using a specific segment of roadway (in both directions) on any given day of the year.”¹³⁶

Potential Impacts

Impacts to highways and local roads during construction will be short-term and intermittent. Overall impacts are expected to be minimal. Long-term impacts will not occur. Traffic delays may occur along Black Dog Road. These delays would be associated with material delivery and worker transportation.¹³⁷ These impacts will not impact local traffic because Black Dog Road is a private road. Some material deliveries may require oversized load permits. The turbine and other large components will be delivered by rail. The proposed project will not impact a state trunk highway.¹³⁸

Mitigation

Impacts to roads and vehicular traffic can be mitigated through coordination with appropriate state and local authorities. This includes obtaining all necessary load permits and following all permit stipulations. MnDOT also request the applicant coordinate with their agency to ensure highway construction activities are incorporated into oversized/overweight route planning.

4.4.4 Utilities

Large electric power generating plants have the potential to damage or interfere with public utilities. The presence of a generating plant could also preclude construction and operation of new utility infrastructure.

¹³³ City of Burnsville (July 9, 2014).

¹³⁴ Application, page 39.

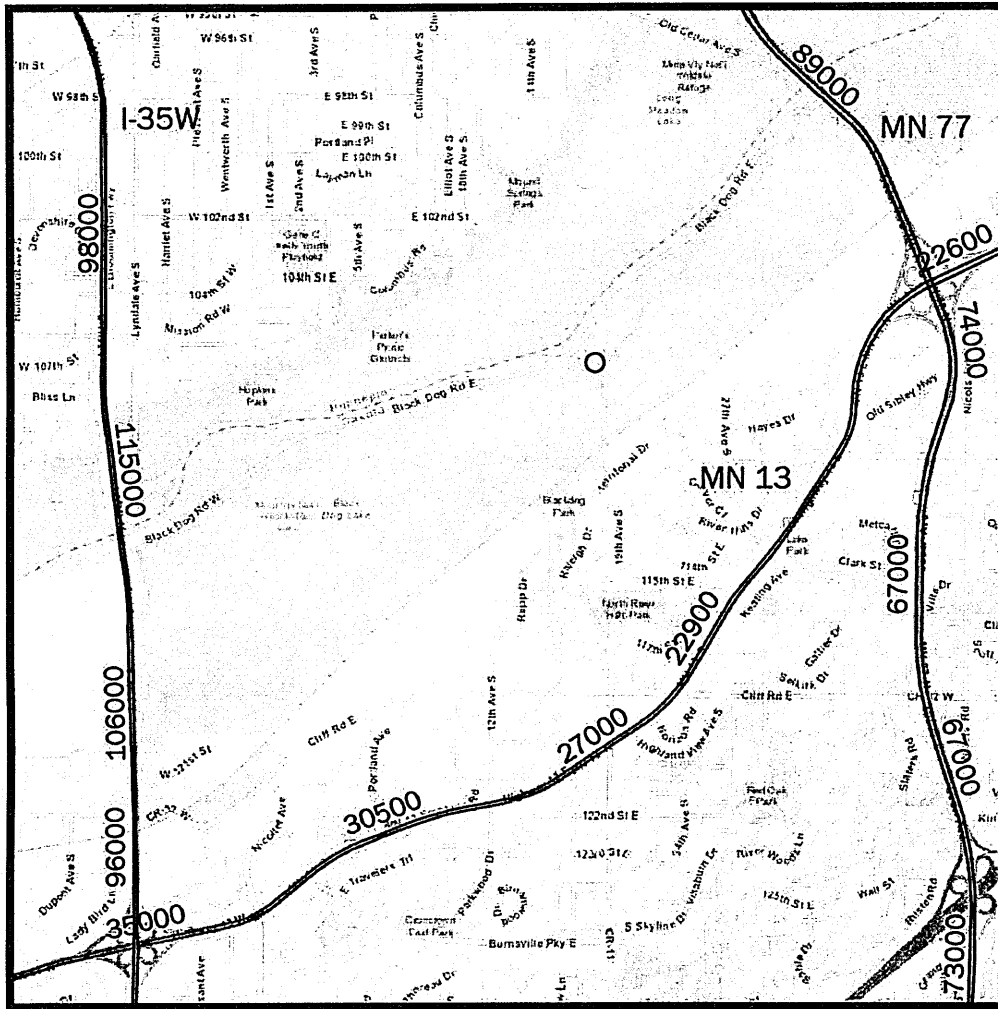
¹³⁵ Application, page 39.

¹³⁶ Minnesota Geospatial Commons (n.d.) *Annual Average Daily Traffic, Traffic Segments, Minnesota, 2013*, Retrieved April 19, 2016, from: <https://gisdata.mn.gov/dataset/trans-aadt-traffic-segments>.

¹³⁷ Application, 39.

¹³⁸ Minnesota Department of Transportation (February 10, 2016).

Figure 12 Annual Average Daily Traffic, 2014



Source: Minnesota Department of Transportation.

Water Utilities

The proposed project is within the city of Burnsville water and sewer service area. The generating plant uses city sewer service, but does not use city water.¹³⁹ The generating plant instead utilizes an on-site well for domestic water uses. Domestic wastewater, that is, sanitary sewage, flows “to a lift station that ties into the Metropolitan Council Environmental Services main sewer line, and eventually flows to the Seneca Wastewater Treatment Plant.”¹⁴⁰ Construction of the proposed project will not result in an increase to sanitary

¹³⁹ Application, page 40.

¹⁴⁰ Application, page 15.

sewer flows beyond current levels.¹⁴¹ In addition, plant operations will result in the discharge of wastewater through the wastewater system.

Impacts to water utilities are not anticipated. No mitigation is proposed.

Electric Utilities

The proposed project will provide additional electrical generation for the existing 115 kV transmission system in Twin Cities Metropolitan Area. Electrical power will be used in the project area or elsewhere in the region. No impacts to electrical services are anticipated. No mitigation is proposed.

Natural Gas Utilities

The proposed project will use natural gas as a fuel source. The proposed project will use a dedicated natural gas source. No impacts to natural gas service in the project area will occur. No mitigation is proposed.

4.5 Land-Based Economies

Large electric power generating plants have the potential to impact land-based economies by precluding or limiting land use for other purposes.

Agricultural, forestry and mining operations do not occur on the site location; therefore, direct or indirect impacts will not occur. The proposed project is located in an industrial area and will not preclude public recreation. Impacts to recreation are anticipated to be minimal. As a result, impacts to tourism-type activities are not anticipated. No mitigation is proposed.

4.6 Archeological and Historic Resources

Archeological resources are locations where objects or other evidence of archaeological interest exist, and can include aboriginal mounds and earthworks, ancient burial grounds, prehistoric ruins, or historical remains.¹⁴² Historic resources are sites, buildings, structures or other antiquities of state or national significance.¹⁴³ Large electric power generating plants have the potential to impact these resources. Project construction can disrupt or remove archeological resources. Construction near historic resources has the potential to impair or decrease their value.

There is one archeological site and two historic properties within one-mile of the proposed project.¹⁴⁴ The archeological site—a mound burial site—was “completely destroyed by

¹⁴¹ Application, page 40.

¹⁴² See Minn. Stat. 138.31, subd. 14.

¹⁴³ See Minn. Stat. 138.51.

¹⁴⁴ Application, page 42.

development in the 1960s.”¹⁴⁵ Historic properties include the Union Pacific Railroad and the existing generating plant. The railway meets the eligibility requirements to be listed on the National Register of Historic Places and is potentially eligible for designation. The existing generating plant was evaluated for eligibility in 2015. It was determined ineligible.¹⁴⁶

Potential Impacts

Impacts to archaeological or historic resources are not anticipated.¹⁴⁷ No mitigation is proposed. Unit 6 will be constructed within an existing powerhouse building. Outdoor construction activities and on-site material storage will be limited to a previously impacted industrial area at the site location.

4.7 Natural Resources

Large electric power generating plants have the potential to impact the natural environment. These impacts are dependent upon many factors, such as how the facility is designed and constructed. Other factors, for example, the environmental setting, must be considered. Impacts can and do vary significantly both within, and across, projects.

With mitigation, emissions are anticipated to be within all state and federal standards. The proposed project is anticipated to facilitate an overall reduction in greenhouse gas emissions statewide. Impacts to air quality are anticipated to be minimal. Impacts to groundwater and rare and unique resources are also minimal. Soil, surface water, vegetation, and wildlife impacts are negligible. Impacts to wetlands and wildlife habitat are not anticipated.

4.7.1 Air Quality

Air emissions from the combustion of natural gas to produce electrical power have the potential to impact human health and the environment. Health impacts can range from minor to severe.¹⁴⁸ To avoid and minimize impacts to human health and the environment, the United States Environmental Protection Agency (EPA) promulgated National Ambient Air Quality Standards (NAAQS).¹⁴⁹ In Minnesota, the MPCA designs and implements a state implementation plan to meet these standards.¹⁵⁰

¹⁴⁵ Application, page 42.

¹⁴⁶ Application, page 42.

¹⁴⁷ See State Historic Preservation Office (November 24, 2015) *Comments*, eDockets No. [20165-120972-01](#); stating “there are no properties listed in the National or State Registers of Historic Places, and no known or suspected archaeological properties in the area that will be affected by this project”.

¹⁴⁸ Minnesota Pollution Control Agency (January 2015) *Air Quality in Minnesota*, Retrieved April 14, 2016, from: <https://www.pca.state.mn.us/sites/default/files/Iraq-1sy15.pdf>, page 5.

¹⁴⁹ Minnesota Pollution Control Agency (December 2003) *Facts About Federal Air Quality Regulations*, Retrieved April 14, 2016, from: <https://www.pca.state.mn.us/sites/default/files/aq4-02.pdf>.

¹⁵⁰ Minnesota Pollution Control Agency (n.d.(b)) *Minnesota State Implementation Plan (SIP)*, Retrieved April 15, 2016, from: <https://www.pca.state.mn.us/air/minnesota-state-implementation-plan-sip>.

As a part of this implementation strategy, the MPCA requires that certain major new stationary sources of air emissions or modifications at existing sources of air emissions obtain a prevention of significant deterioration (PSD) permit.¹⁵¹ A PSD permit may allow certain air pollutants to increase in an area or “PSD increment,” but “protects public health and welfare; ... insures that economic growth will occur in a manner consistent with the preservation of existing clean air resources; and assure[s] that any decision to permit increased air pollution ... is made only after careful evaluation of all the consequences of such a decision and after adequate procedural opportunities for informed public participation in the decision making process.”¹⁵²

The PSD process requires “installation of the ‘Best Available Control Technology’; an air quality analysis; an additional impacts analysis; and public involvement.”¹⁵³ “The main purpose of the air quality analysis is to demonstrate that new emissions emitted from a proposed major stationary source or major modification, in conjunction with other applicable emissions increases and decreases from existing sources, will not cause or contribute to a violation of any applicable NAAQS or PSD increment.”¹⁵⁴

In addition to meeting NAAQS and PSD standards, certain new facilities must also assess through an air emissions risk analysis (AERA) the potential health risks associated with air emissions from the facility.¹⁵⁵ An AERA is not required for the proposed project because it will not generate 250 tons or more per year of any single criteria pollutant and does not result in a net increase of carbon dioxide equivalent (CO₂e) by more than 100,000 tons.¹⁵⁶

A portion of the city of Eagan bounded by Lone Oak Road (County Road 26) to the north, County Road 63 to the east, Westcott Road to the south, and Lexington Avenue (County Road 43)¹⁵⁷ to the west is classified as a nonattainment area for lead in ambient air by the EPA.¹⁵⁸ The nonattainment area designation became effective on December 31, 2010.¹⁵⁹ This designation applies to an area around Gopher Resources Corporation, a lead-processing facility,¹⁶⁰ and does not apply to the proposed project.

¹⁵¹ U.S. Environmental Protection Agency (October 21, 2015) *Prevention of Significant Deterioration Basic Information*, Retrieved April 15, 2016, from: <https://www.epa.gov/nsr/prevention-significant-deterioration-basic-information>.

¹⁵² U.S. Environmental Protection Agency (October 21, 2015).

¹⁵³ U.S. Environmental Protection Agency (October 21, 2015).

¹⁵⁴ U.S. Environmental Protection Agency (October 21, 2015).

¹⁵⁵ Minnesota Pollution Control Agency (n.d.(c)) *FAQs About AERA*, Retrieved April 14, 2016, from: <https://www.pca.state.mn.us/air/faqs-about-aera#aeraprocess>; see also Minn. R. 4410.4300, subp. 15.

¹⁵⁶ Xcel Energy (October 2015), page 6-2.

¹⁵⁷ Minnesota Pollution Control Agency (n.d.(d)) *State Implementation Plan for Lead*, Retrieved April 15, 2016, from: <https://www.pca.state.mn.us/air/state-implementation-plan-lead>.

¹⁵⁸ U.S. Environmental Protection Agency (March 25, 2016) *Current Nonattainment Counties for All Criteria Pollutants*, Retrieved April 15, 2016, from: <https://www3.epa.gov/airquality/greenbook/ancl.html>.

¹⁵⁹ Minnesota Pollution Control Agency (n.d.(d)).

¹⁶⁰ Minnesota Pollution Control Agency (November 4, 2009) *MPCA Recommends Lead Nonattainment*

Potential Impacts

The proposed project will be fueled entirely by natural gas. The combustion of natural gas will emit combustion by-products that have the potential to impact air quality. With mitigation, emissions are anticipated to be within all state and federal standards. The proposed project is anticipated to facilitate an overall reduction in greenhouse gas emissions statewide. As a result, potential impacts to air quality are expected to be minimal.

Minnesota Ambient Air Quality Standards and National Ambient Air Quality Standards

The applicant conducted an air dispersion modeling analysis to determine whether “emissions from the proposed project would or would not cause or contribute to a violation of the Minnesota Ambient Air Quality Standards [MAAQS] and National Ambient Air Quality Standards...”¹⁶¹ This was done by modeling whether or not emissions from the proposed project alone would result in any predicted maximum ambient concentrations of criteria pollutants (sulfur dioxide (SO₂), carbon monoxide (CO), particulate matter less than 2.5 microns (PM_{2.5}), particulate matter less than 10 microns (PM₁₀), and Nitrogen Oxide (NO_x)) above a significant ambient impact level.¹⁶² Modeled impacts did not exceed significant impact levels. As a result, exceedance of MAAQS and NAAQS are not anticipated to occur and no further modeling is required.¹⁶³

Prevention of Significant Deterioration

The existing generating plant (Unit 5/2) currently meets the definition of “major emitting facility.” As a result, the proposed project would require PSD review if the emissions increase from the proposed project is greater than the PSD major modification threshold.¹⁶⁴ In addition, “increases and decreases from recent contemporaneous projects can be taken into account to determine if the proposed project is subject to PSD review” when pollutants exceed PSD threshold limits from the proposed project alone.¹⁶⁵ Recent contemporaneous projects at the generating plant include the decommissioning of two dual-fuel boilers (coal-fired with natural gas as back-up or topping fuel): Unit 3 and Unit 4.

The estimated potential of limited annual emissions for Unit 6 and the associated net emissions increase or decrease for the generating plant as a whole is provided in **Table 7**. Unit 6 will emit “limited potential emissions of PM_{2.5}, NO_x, CO, and CO_{2e} that exceed the PSD major modification threshold for each pollutant.”¹⁶⁶ The applicant then “incorporated netting exercises which account for total facility creditable contemporaneous decreases associated with the decommissioning of Unit 3 and Unit 4, and increases associated with

Designation for Area Around Eagan Facility, Retrieved April 15, 2016, from:
<https://www.pca.state.mn.us/news/mpca-recommends-lead-nonattainment-designation-area-around-eagan-facility>.

¹⁶¹ Application, page 24-25.

¹⁶² Application, page 25

¹⁶³ Application, page 26.

¹⁶⁴ Application, page 22.

¹⁶⁵ Application, page 22.

¹⁶⁶ Xcel Energy (October 2015) *Air Emissions Permit Major Amendment Application: Black Dog Generating Plant Unit 6 Combustion Turbine Project*, page 1-1.

the addition of an auxiliary boiler.... Total significant net increases were found to be negative; and, therefore, PSD does not apply to the proposed project.”¹⁶⁷

Table 7 Estimated Potential Annual Air Emissions and PSD Thresholds

Pollutant	Limited Potential to Emit (Tons per Year)	Net Emissions Increase (Tons per Year)	PSD Major Modification Threshold (Tons per Year)
Particulate Matter (PM)	10.26	10.26	25
PM less than 10 Microns (PM ₁₀)	10.26	10.26	15
PM less than 2.5 Microns (PM _{2.5})	10.26	-44.9	10
Nitrogen Oxide (NO _x)	103.5	-6,017	40
Sulfur Dioxide (SO ₂)	10.98	10.98	40
Carbon Monoxide (CO)	177.3	-18.49	100
Volatile Organic Compounds (VOC)	22.02	22.02	40
Lead	0.00158	0.00158	0.6
Carbon Dioxide Equivalent (CO _{2e})	378,000	-1,200,000	75,000
Sulfuric acid Mist	0.00135	0.00135	7

Source: Application, page 23.

Global Climate Change

The accumulation of greenhouse gases in the atmosphere is contributing to the warming of the planet, which is leading to a variety of adverse human and environmental impacts.¹⁶⁸ While a variety of gases contribute to the greenhouse effect, the most prominent greenhouse gas is carbon dioxide.¹⁶⁹

In 2012, approximately 154 million CO_{2e} tons of greenhouse gases were emitted in Minnesota.¹⁷⁰ The electric utility sector emitted approximately 31 percent of this total, or about 48 million CO_{2e} tons.¹⁷¹ This represents a 17 percent decline in electric utility sector emissions since 2005. This decline is attributed to utilities using less greenhouse gas

¹⁶⁷ Xcel Energy (October 2015), page 1-1.

¹⁶⁸ See Minnesota Environmental Quality Board (August 14, 2014) *Minnesota and Climate Change: Our Tomorrow Starts Today*, Retrieved April 15, 2016, from: <https://www.eqb.state.mn.us/sites/default/files/documents/EQB%20Climate%20Change%20Communications.pdf>.

¹⁶⁹ Minnesota Environmental Quality Board (August 14, 2014), page 6.

¹⁷⁰ Minnesota Pollution Control Agency (January 2015) *Greenhouse Gas Emissions Reduction: Biennial report to the Minnesota Legislature*, Retrieved April 15, 2016, from: <https://www.pca.state.mn.us/sites/default/files/lraq-2sy15.pdf>, page 1.

¹⁷¹ Minnesota Pollution Control Agency (January 2015), page 2.

intensive fuels, such as natural gas, and relying more on renewable energy sources, such as solar and wind generation.¹⁷²

The proposed project is a peaking facility and, as a result, will have a capacity factor of no greater than approximately 10 percent, that is, the facility will operate no more than 10 percent of the time. As such, actual greenhouse gas emissions are anticipated to be 378,000 CO₂e tons annually.

The proposed project will increase greenhouse gas emissions in Minnesota.¹⁷³ When considering the proposed project in isolation, these emissions will contribute to global climate change. However, the proposed project will serve several roles in the electric utility sector that will facilitate an overall reduction of greenhouse gas emissions.

First, the proposed project will displace use of more greenhouse gas intensive fuel sources such as coal. Secondly, the proposed project is designed to facilitate use of intermittent or variable renewable generation sources. Renewable energy sources, such as solar and wind, are non-dispatchable. This means that the amount of electricity entering the electrical grid from the facility cannot be controlled short of turning units on or off, that is, disconnecting units from the electrical grid. The proposed project has the capacity to begin generating electricity in 10 minutes. This ability allows grid operators to dispatch, or use, electricity generated by the proposed project to quickly offset losses in electrical power from renewable sources, for example, when the wind stops blowing or the sun sets.

Considering the purposes of the proposed project coupled with overall trends in the electric utility sector, it is anticipated the proposed project will facilitate the reduction of overall greenhouse gas emissions in Minnesota.

Mitigation

Potential impacts to air quality from construction and operation of the proposed project are expected to be minimal; therefore, no mitigation is proposed. Impacts to air quality can be mitigated by technologies and processes that minimize emissions of certain pollutants. Several emission control strategies will be employed by the applicant, including:

- Utilizing current combustion turbine technology.
- Limiting fuel combusted in the turbine to natural gas only.
- Combusted fuel will be of consistent SO₂ composition.
- Equipping the turbine with dry low-NO_x burners to limit NO_x and CO formation.
- Permitted annual capacity factor of less than 33 percent.
- Demonstrating compliance of capacity factor by maintaining monthly records of total annual rolling capacity factor.

¹⁷² Minnesota Pollution Control Agency (January 2015), page 3.

¹⁷³ Natural gas distribution piping will also be a fugitive source of greenhouse gas emissions. See Application, page 21.

4.7.2 Geology

Impacts to geologic resources are not anticipated. No mitigation is proposed. Unit 6 will be constructed within an existing powerhouse building. Outdoor construction activities and on-site material storage will be limited to a previously impacted industrial area at the site location.

4.7.3 Groundwater

Large electric power generating plants have the potential to impact groundwater in multiple ways. Construction related activities could impact groundwater directly. Alternatively, removal or movement of soils can result in erosion and changes to water drainage patterns that directly impact surface waters. These direct impacts to surface waters can indirectly impact groundwater. During operation, groundwater can be used for a variety of purposes, including equipment cooling. Excessive pumping can overdraw an aquifer leading to drying of wells, reduction of water in streams and lakes, deterioration of water quality, land subsidence, and increased pumping costs.¹⁷⁴

DNR regulates groundwater use in Minnesota. With limited exception, a permit is required for all users that withdraw “more than 10,000 gallons of water per day or 1 million gallons per year.”¹⁷⁵ The Water Appropriations Program “exists to balance competing management objectives that include both development and protection of Minnesota’s water resources.”¹⁷⁶ Permit holders are required to submit annual water usage reports.¹⁷⁷ The information provided in these reports is used for a variety of purposes, including impact evaluation and water supply planning.¹⁷⁸

The applicant “currently operates under DNR Water Appropriations Permit No. 1961-0271, which allows withdrawal of up to 50 million gallons per year of well water at a peak of 250 gallons per minute (gpm), with a daily average of 200 gpm to be maintained.”¹⁷⁹ Total groundwater usage at the generating plant over the past five years averaged 38 million gallons per year.¹⁸⁰

Groundwater from the Prairie du Chien/Jordan aquifer is withdrawn from a single on-site well, and is used to supply domestic potable water and raw water to the reverse osmosis

¹⁷⁴ U.S. Geological Service (February 23, 2016) *Groundwater Depletion*, Retrieved April 29, 2016, from: <http://water.usgs.gov/edu/gwdepletion.html>.

¹⁷⁵ Minnesota Department of Natural Resources (n.d.(b)) *Water Use Permits*, Retrieved April 29, 2016, from: http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html.

¹⁷⁶ Minnesota Department of Natural Resources (n.d.(c)) *Water Appropriations Permit Program*, Retrieved April 29, 2016, from:

http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/index.html.

¹⁷⁷ Minnesota Department of Natural Resources (n.d.(c)).

¹⁷⁸ Minnesota Department of Natural Resources (n.d.(c)).

¹⁷⁹ Application, page 27.

¹⁸⁰ Application, page 27.

(RO) and makeup demineralizer systems.¹⁸¹ The proposed project will use groundwater for an initial, one-time filling of the fin fan closed loop cooling system, as well as for system water make-up following necessary maintenance and repairs.¹⁸² Groundwater will also be used to supply the evaporative air inlet cooler, as well as other intermittent miscellaneous uses, for example, an off-line water wash system, fire suppression, and domestic uses.¹⁸³

Potential Impacts

Impacts to groundwater during project construction are not anticipated. Unit 6 will be constructed within an existing powerhouse building. Exterior structures (fin fan cooler support foundations and on-site natural gas pipeline) will not reach groundwater. Direct impacts to surface water are anticipated to be negligible (see Section 4.7.6). As a result, indirect impacts to groundwater are not anticipated.

Groundwater will be used during operation. The applicant anticipates the proposed project will operate without “water inputs over 80 percent of the time.”¹⁸⁴ Groundwater appropriations are regulated by DNR. No amendment to the current water appropriations permit will be required to construct or operate the proposed project. Therefore, while groundwater will be used during operation, potential impacts are anticipated to be minimal.

Evaporative Cooler

An evaporative cooler will be used to cool incoming air. The applicant anticipates it will operate about 20 percent of the time the proposed project is in operation. The evaporative cooler consumes approximately 28,820 gallons of water per day while increasing “power output about 5 to 10 percent depending on the relative humidity during hot summer day operation.”¹⁸⁵ Unit 6 will use a mix of 30 percent softened groundwater and 70 percent RO water.¹⁸⁶

As necessary, groundwater is back flushed through the softener to regenerate the softener by removing minerals from the softener resin. Back flushed water accounts for approximately 3 percent of water that passes through the softener.¹⁸⁷ RO water passes through the softener prior to the RO process. Approximately 25 percent of RO treated water is lost as waste.¹⁸⁸ This means that approximately 36,609 gallons of water is needed to generate the 28,820 gallons of water used by Unit 6 per day at peak capacity.¹⁸⁹

¹⁸¹ Application, page 27.

¹⁸² Xcel Energy (April 27, 2016).

¹⁸³ Xcel Energy (April 27, 2016); Application, page 26.

¹⁸⁴ Application, page 27.

¹⁸⁵ Application, page 27.

¹⁸⁶ Xcel Energy (May 4, 2016).

¹⁸⁷ Xcel Energy (May 4, 2016).

¹⁸⁸ Xcel Energy (May 4, 2016).

¹⁸⁹ Approximately 8,646 gallons of softened water and 20,174 gallons of RO water would be needed.

Accounting for 25 percent waste in the RO treatment process means that 26,898 gallons would be needed. Regeneration for softened and RO water equals approximately 1,065 gallons.

Waste water from softener regeneration, RO treatment, and evaporative cooler blowdown becomes process water, which is combined with process water from Unit 5/2 and moved to the process water pond.¹⁹⁰ From there, wastewater is monitored and discharged to Black Dog Lake under the requirements of the existing NPDES permit.¹⁹¹

Fin Fan Cooler

The fin fan cooler consists of a closed-loop system that uses ethylene glycol and water to carry heat away from the turbine. Fans move air across air heat exchangers cooling the solution. Groundwater will be used for a one-time fill of the system. This will require approximately 10,000 to 20,000 gallons depending upon final specifications.¹⁹² Water will pass through the RO treatment system prior to use meaning an additional 28 percent (approximate) will be needed. Makeup water will be required following maintenance and repairs.¹⁹³

Wastewater from softener regeneration and RO treatment becomes process water, which is combined with process water from Unit 5/2 and moved to the process water pond.¹⁹⁴ From there, wastewater is monitored and discharged to Black Dog Lake under the requirements of the existing NPDES permit.¹⁹⁵ The cooling system will not result in thermal discharge to the Minnesota River.

Off-line Wash System

An off-line wash system will clean the turbine. Cleaning removes contaminants that foul the turbine and is necessary for proper operation and performance. More specifically, regular cleaning restores any lost performance and reduces fuel consumption and operating costs.¹⁹⁶ Washing consists of injecting detergents into the compressor while the turbine is off-line and slowly moving.¹⁹⁷ The turbine is then rinsed with clean water to remove all detergent and impurities. The off-line water wash will use approximately 3,000 gallons per wash, and will occur as necessary to maintain proper turbine operation and performance.¹⁹⁸

Wastewater is collected in a temporary tank where it is tested for contaminants. If contaminants are found, the water is shipped offsite for proper disposal. If contaminants are not found, the water is discharged through the wastewater system.¹⁹⁹

¹⁹⁰ Xcel Energy (May 4, 2016).

¹⁹¹ Xcel Energy (May 4, 2016).

¹⁹² Xcel Energy (April 27, 2016).

¹⁹³ Xcel Energy (April 27, 2016).

¹⁹⁴ Xcel Energy (May 4, 2016).

¹⁹⁵ Xcel Energy (May 4, 2016).

¹⁹⁶ General Electric (2008) *Axial Compressor On/Off-line Washing*, Retrieved April 29, 2016, from:
http://site.ge-energy.com/businesses/ge_oilandgas/en/literature/en/downloads/onoffline_washing.pdf.

¹⁹⁷ General Electric (2008).

¹⁹⁸ Xcel Energy (April 27, 2016).

¹⁹⁹ Xcel Energy (May 4, 2016).

Fire Water Mist Skid

A fire water mist skid will be installed to protect against fire. A fire water mist skid is similar to a sprinkler system commonly used in buildings; however, the mist skid system uses ultra-fine water droplets at high pressures. These water droplets evaporate very quickly, cooling flames and surrounding gases, blocking radiant heat and locally displacing oxygen.²⁰⁰ Systems can be connected to a continuous water supply or a water supply tank. The applicant indicates a water supply tank will be used.²⁰¹ The tank is expected to be less than 5,000 gallons.²⁰² Groundwater use includes initial filling and any re-fill after discharge.²⁰³

Wastewater is collected and passed through an oil/water separator. Once oil is removed, the water is discharged through the wastewater system.²⁰⁴

Mitigation

Groundwater allocation is regulated by DNR. DNR requires annual reports that are used for a variety of purposes, including impact evaluation and water supply planning. Impacts to groundwater during project construction are not anticipated. Should impacts occur, they will be minimal. Indirect impacts to groundwater can be mitigated by avoiding or minimizing impacts to surface waters. Section 5.7.6 discusses surface waters. No additional mitigation is proposed.

4.7.4 Rare and Unique Resources

Construction of a large electric power generating plant has the potential to impact rare and unique natural resources. Examples of adverse impacts include the taking or displacement of individual plants or animals, invasive species introduction, and habitat loss.

The Division of Ecological and Water Resources within DNR manages the Natural Heritage Information System (NHIS). "The NHIS provides information on Minnesota's rare plants, animals, native plant communities, and other rare features. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. Its purpose is to foster better understanding and conservation of these features."²⁰⁵ In some areas surveys have not been conducted extensively or recently making the NHIS database a source of information, but not the sole source for identifying these resources.

²⁰⁰ Kaiser, Lee (n.d.) *Water Mist Fire Protection for a 35 Megawatt Steam Turbine Generator*, ORR Protection Systems.

²⁰¹ Xcel Energy (April 27, 2016).

²⁰² Xcel Energy (April 27, 2016).

²⁰³ Xcel Energy (April 27, 2016).

²⁰⁴ Xcel Energy (May 4, 2016).

²⁰⁵ Minnesota Department of Natural Resources (n.d.(d)) *Natural Heritage Information System*, Retrieved January 21, 2016, from: <http://www.dnr.state.mn.us/nhnrp/nhis.html>.

The Federal Endangered Species Act is intended to “protect and recover imperiled species and the ecosystems upon which they depend.”²⁰⁶ “Under the ESA, species may be listed as either endangered or threatened. ‘Endangered’ means a species is in danger of extinction throughout all or a significant portion of its range. ‘Threatened’ means a species is likely to become endangered within the foreseeable future. All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened.”²⁰⁷

The applicant queried two databases to determine if rare or unique plant and animal species occur within the project area. The Minnesota County Distribution of Federally-listed Threatened, Endangered, Proposed, and Candidate Species lists three species in Dakota County: the endangered Higgins eye pearlymussel (*Lampsilis higginsii*), the threatened Prairie bush clover (*Lespedeza leptostachya*), and the threatened Northern long-eared bat (*Myotis septentrionalis*).²⁰⁸ DNR provided results of a NHIS query within approximately one-mile of the proposed project. The NHIS results include peregrine falcons (*Falco peregrinus*), the Northern long-eared bat (*Myotis septentrionalis*), and several species of state-listed mussels.

Potential Impacts

Impacts to rare and unique resources are anticipated to be minimal. Additional mitigation is proposed.

Higgins Eye Pearlymussel

“The Higgins eye was the first freshwater mussel to receive federal protection, which took effect in 1972. Degradation of the Mississippi River in the form of navigation improvements and pollution severely restricted the range of this species. Today, the lower St. Croix River has one of the largest remaining Higgins eye populations throughout the species' range. It has been extirpated from the Minnesota River, and is rare in the Mississippi River.”²⁰⁹

The proposed project is along the Minnesota River, Higgins Eye Pearlymussels do not occur at this location; therefore, impacts will not occur.

Prairie Brush Clover

“*Lespedeza leptostachya* is a Midwestern endemic, known to occur at scattered locations in Illinois, Iowa, Wisconsin, and Minnesota. The majority of plants occur in and near the Des Moines River valley of southwestern Minnesota and the nearby lakes region of northwestern Iowa. The species was perhaps uncommon even before European settlement, but has

²⁰⁶ U.S. Fish and Wildlife Service (December 8, 2015) *Endangered Species Act | Overview*, Retrieved April 6, 2016, from <http://www.fws.gov/endangered/laws-policies/>.

²⁰⁷ United States Fish and Wildlife Service (December 8, 2015).

²⁰⁸ U.S. Fish and Wildlife Service (April 2016) *Minnesota County Distribution of Federally-listed Threatened, Endangered, Proposed, and Candidate Species*, Retrieved April 6, 2016, from: <http://www.fws.gov/midwest/endangered/lists/pdf/MinnesotaSppListApril2016.pdf>.

²⁰⁹ Minnesota Department of Natural Resources (n.d.(e)) *Species Profile: Higgins Eye*, Retrieved April 19, 2016, from: <http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV21100>.

become extremely rare because of the widespread conversion of its native prairie habitat to agricultural uses. The majority of surviving populations are in remnant prairies on steep slopes or in other isolated prairie habitats where cultivation is not feasible.”²¹⁰

Prairie Brush Clover populations in Minnesota “typically occur on north, northeast, or northwest facing mesic to dry-mesic prairie slopes.”²¹¹ The proposed project is within an industrial area. Soils have been previously disturbed. The Prairie Brush Clover does not occur at the site location; therefore, impacts will not occur.

Northern Long-eared Bat

“The northern long-eared bat is a medium-sized bat with relatively long ears, each with a long, sharply pointed tragus (fleshy projection in the ear). The northern long-eared bat is frequently found hanging with or near groups of little brown bats (*Myotis lucifugus*). Human disturbance in caves occupied by northern long-eared bats may disrupt hibernation during the winter and unnecessarily stress the bats during their active season. Direct injury from human visitors, and more recently, the emergence of white-nose syndrome—a fungal disease that is decimating hibernating bat populations in the eastern United States—pose potential threats. For these reasons, the northern long-eared bat remains listed as a special concern species in Minnesota.”²¹²

There are no known occurrences of Northern long-eared bat roosts or hibernacula within one-mile of the proposed project.²¹³ No tree clearing will occur. As a result, impacts are not anticipated to occur.

Peregrine Falcon

“The peregrine falcon is readily distinguished from most other raptors by its long, pointed wings, narrow tail, and strong direct flight, all typical of falcons. The peregrine falcon is best distinguished from other Minnesota falcons by its large size combined with extensive black facial markings. Adults have dark blue to slate gray upperparts, white throats, and spotted or barred underparts. Immature falcons have the same markings, but are brown or blue-brown. In the past, peregrine falcons in Minnesota nested on cliff ledges along rivers or lakes. Presently, they nest primarily on buildings and bridges in urban settings and use historic eyries on cliffs along Lake Superior and the Mississippi River in southeastern Minnesota. Because peregrine falcons specialize in direct aerial pursuit of avian prey, they prefer open, non-forested areas for hunting.”²¹⁴ Peregrine falcons are protected by the Migratory Bird Treaty Act.²¹⁵

²¹⁰ Minnesota Department of Natural Resources (n.d.(f)) *Species Profile: Prairie Bush Clover*, Retrieved April 19, 2016, from:
<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDFAB27090>.

²¹¹ Minnesota Department of Natural Resources (n.d.(f)).

²¹² Minnesota Department of Natural Resources (n.d.(g)) *Species Profile: Northern Long-eared Bat*, Retrieved April 19, 2016, from:
<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AMACCO1150>.

²¹³ Minnesota Department of Natural Resources (October 19, 2015)

²¹⁴ Minnesota Department of Natural Resources (n.d.(h)) *Species Profile: Peregrine Falcon*, Retrieved

As part of the permitted remediation project, a peregrine falcon nesting box was removed from the existing Unit 3/4 exhaust stack in preparation for demolition of the stack.²¹⁶ Nesting box removal was coordinated with the DNR and USFWS—no permit was needed²¹⁷—and occurred prior to the 2016 nesting season.²¹⁸ The nesting box was not relocated.²¹⁹

A peregrine falcon pair returned to the generating plant in 2016 and may be nesting on the roof of the boiler building. Peregrine falcons have a strong attachment to nesting sites.²²⁰ “The birds do no nest building beyond a ritualized scraping of the nest ledge to create a depression in the sand, gravel or other substrate of the nest site. Scrapes are about 9 inches in diameter and 2 inches deep.”²²¹ Peregrine falcons begin nesting in April or early May.²²² Eggs incubate for approximately one month.²²³ Hatchlings fledge in 42 days, and remain in the nest several more weeks.²²⁴ Young peregrines are independent in approximately six weeks from hatching in mid-May (late-June/early-July).²²⁵

Should peregrines be nesting at the generating plant, chicks will be independent before a permit could be issued for the proposed project. As a result, the proposed project will not impact nesting activities in 2016. Should the pair return in 2017, nesting may be impacted as construction on the roof is not anticipated to begin until April 2017 due to the necessity of retaining heat in the powerhouse building. Potential impacts cannot be determined at this time. Should peregrines return and nesting activities be impacted in 2017, these impacts will not influence the overall peregrine falcon population. As a result, potential impacts are anticipated to be minimal.

Nesting in an industrial area, these peregrines are habituated to anthropomorphic (human) influences. However, should peregrine falcons show signs of stress, for example, flying towards individuals or equipment or display other erratic flying behavior, the applicant should contact the DNR Nongame Program Region Specialist.²²⁶

-
- April 19, 2016, from:
<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNKD06070>.
- ²¹⁵ Minnesota Department of Natural Resources (February 11, 2016).
²¹⁶ Application, page 53.
²¹⁷ Application, page 53.
²¹⁸ Xcel Energy (April 19, 2016).
²¹⁹ Xcel Energy (April 28, 2016).
²²⁰ University of Michigan (2016) *Peregrine Falcon*, Retrieved April 29, 2016, from:
http://www.biokids.umich.edu/critters/Falco_peregrinus/.
²²¹ Cornell Lab of Ornithology (2015) *All About Birds: Peregrine Falcon*, Retrieved April 29, 2016, from:
https://www.allaboutbirds.org/guide/Peregrine_Falcon/lifehistory.
²²² U.S. Fish and Wildlife Service (July 15, 2013) *Frequently Asked Questions Regarding Peregrine Falcons*, Retrieved April 29, 2016, from: <https://www.fws.gov/endangered/what-we-do/peregrine-falcon.html>.
²²³ The Raptor Resource Project (n.d.) *Falcon Facts*, Retrieved April 29, 2016, from:
<https://www.raptorresource.org/facts.htm>.
²²⁴ Minnesota Department of Natural Resources (n.d.(h)).
²²⁵ See Minnesota Department of Natural Resources (n.d.(h)); see also University of Michigan (2016).
²²⁶ Minnesota Department of Natural Resources (February 11, 2016).

4.7.5 Soils

Soil impacts will occur; however, affected soils are previously disturbed. As a result, impacts are negligible. No mitigation is proposed. Unit 6 will be constructed within an existing powerhouse building. Outdoor construction activities and on-site material storage will be limited to a previously impacted industrial area at the site location. Construction of the on-site natural gas pipeline will require open trenching. Soils will be stockpiled, covered, and returned after installation of the pipeline.²²⁷

Disturbed soils may cause indirect impacts to air, water, and wetland resources. These impacts are associated with wind and water erosion. Should indirect impacts occur, they are anticipated to be minimal given the disturbed area is small. Commission site permits require that applicants implement measures to minimize soil erosion and sedimentation by requiring the use of perimeter sediment controls, promptly covering exposed soils, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking.²²⁸

4.7.6 Surface Water

The proposed project will not use surface water during construction or operation,²²⁹ and will not be constructed in surface waters. Indirect impacts to surface waters can result from direct impacts to soils and vegetation through runoff.

Potential Impacts

Potential impacts to surface water, if they occur, would be short-term and occur during project construction. Impacts would be of small size and not impact a unique resource. The overall impact intensity level is anticipated to be negligible.

An established vegetative buffer of tall- and low-growing vegetation between the proposed project and Black Dog Lake would remain throughout project construction (**Figure 13**). This would minimize the potential for soil runoff. On windy days dust might blow from the project site to Black Dog Lake. Standard mitigation practices will reduce this potential.

Mitigation

Potential impacts to surface waters can be minimized by using best management practices to protect top soil and reduce soil erosion. Commission permits require sediment control measures.²³⁰ A large electric power generating plant and associated facilities cannot be located within public waters.²³¹

²²⁷ Xcel Energy (April 8, 2016).

²²⁸ Generic Site Permit Template, 4.2.6.

²²⁹ Xcel Energy (April 27, 2016).

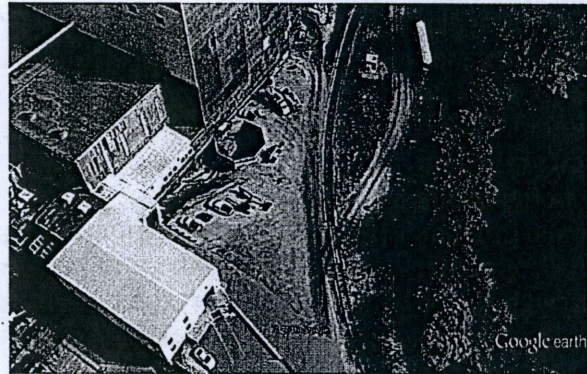
²³⁰ Generic Site Permit Template, Section 4.2.6.

²³¹ Generic Site Permit Template, Section 4.2.8.

4.7.7 Vegetation

Impacts to vegetation will be negligible. No mitigation is proposed. Unit 6 will be constructed within an existing powerhouse building. Outdoor construction activities and on-site material storage will be limited to a previously impacted industrial area at the site location. **Figure 13** illustrates the vegetative cover at the site location. The majority of the area is not vegetated or is covered by minimally maintained turf grass. Construction of the on-site natural gas pipeline may require removal of turf grass. No trees will be removed.

Figure 13 Existing Vegetation



Imagery Date: 08/15 Source: Google Earth.

The area depicted in **Figure 13** will be restored as part of previously permitted remediation activities. This is anticipated to occur after the proposed project is operational.

4.7.8 Wetlands

Impacts to wetlands are not anticipated. No mitigation is proposed. Unit 6 will be constructed within an existing powerhouse building. Outdoor construction activities and on-site material storage will be limited to a previously impacted industrial area at the site location. No construction activities will occur within any floodplain, wetland complex, or waterbody surrounding the generating plant.²³² A large electric power generating plant and associated facilities cannot be located within wetlands.²³³

Indirect impacts from soils, that is, soil erosion and run-off, are not anticipated to impact wetlands. Commission site permits require that applicants implement measures to minimize soil erosion and sedimentation, for example, perimeter sediment controls.²³⁴

4.7.9 Wildlife

Impacts to wildlife are anticipated to be negligible. No mitigation is proposed. Unit 6 will be constructed within an existing powerhouse building. Outdoor construction activities and on-site material storage will be limited to a previously impacted industrial area at the site location. Individual animals may be disturbed or displaced during project construction. Potential impacts are minimized by the urban/industrial location of the proposed project.

²³² Application, page 48-49.

²³³ Generic Site Permit Template, Section 4.2.8.

²³⁴ Generic Site Permit Template, Section 4.2.6.

Potential impacts to Peregrine falcons and other rare and unique wildlife species were previously discussed in Section 4.7.4 Rare and Unique Resources.

4.7.10 Wildlife Habitat

Impacts to wildlife habitat are not anticipated. No mitigation is proposed. Unit 6 will be constructed within an existing powerhouse building. Outdoor construction activities and on-site material storage will be limited to a previously impacted industrial area at the site location.

Indirect impacts from soils, that is, soil erosion and run-off, are not anticipated to impact wildlife habitat. Commission site permits require that applicants implement measures to minimize soil erosion and sedimentation, for example, perimeter sediment controls.²³⁵

4.8 Cumulative Potential Effects

Minnesota Rule 4410.0200, subpart 11a, defines “cumulative potential effects,” in part, as the “effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects ... regardless of what person undertakes the other projects or what jurisdictions have authority over the project.”

The “environmentally relevant area” includes locations where the potential effects of the proposed project coincide with the potential effects of other projects to impact the elements studied in Section 4.2 through Section 4.7. In this instance, the geographic area includes the existing generating plant.

The RGU determines what projects are “reasonably likely to occur.”²³⁶ When making this determination, the RGU considers “whether any applications for permits have been filed with any units of government or whether detailed plans and specifications have been prepared for the project, among other considerations.”²³⁷ A project need not be permitted to be reasonably likely to occur.

Upon retirement of Unit 3 and Unit 4 in April of 2016, “numerous remediation activities at the generating plant [began] and will continue concurrently during the construction and operation of the proposed project.”²³⁸ Remediation activities are aimed at eliminating a “direct contact exposure pathway to legacy coal and legacy coal combustion residual (CCR)”²³⁹ at the generating plant. These activities have been separately approved and

²³⁵ Generic Site Permit Template, Section 4.2.6.

²³⁶ Minn. R. 4410.0200, subp. 11a.

²³⁷ Minn. R. 4410.0200, subp. 11a.

²³⁸ Application, page 3.

²³⁹ Application, page 4.

permitted through the Voluntary Investigation and Cleanup Program administered by the MPCA.²⁴⁰

The following section analyses the cumulative potential effects of the proposed project and the remediation project where potential where potential effects coincide.

Analysis Assumptions

The following assumptions regarding the remediation projects are used for completing this cumulative potential effects analysis:

Remediation work includes decommissioning the existing coal yard and ash ponds, while stabilizing stretches of the Minnesota River bank with riprap and a sheet pile wall and accommodating the construction of a paved recreational trail and future service road.²⁴¹ Other decommissioning activities include removal of the existing exhaust stacks for Units 1, 2, and 3/4. These exhaust stacks are 300 feet, 300 feet, and 600 feet tall, respectively.²⁴² Activities will be ongoing through 2020.²⁴³ This analysis assumes no new electrical generation projects will occur at the generating plant within the operational life of the proposed project.

Additionally, this analysis assumes the proposed project will be in operation for 35 years. The project could be in operation beyond that time. Upon reaching the end of its operational life, it is assumed the Unit 6 turbine and all associated facilities will be removed, but the powerhouse building will remain in place.

Analysis Background

The ROI for cumulative potential effects varies across elements and is consistent with the ROI identified in Section 4.0. The environmentally relevant area includes the proposed project and remediation work, that is, the site location depicted in **Figure 6**. For example, the ROI for aesthetic resources includes a variety of visual vantage points and is the area within one-mile of the generating plant.

Cumulative potential effects—where they coincide—increase or decrease the breadth of the impact to the elements studied in Sections 4.2 through 4.7. This may or may not change the impact intensity level assigned to the element in Sections 4.2 through 4.7.

Sections 4.8.1 through 4.8.6 provide graphics illustrating the potential for cumulative potential effects across the elements studied in Section 4.2 through 4.7. Where cumulative

²⁴⁰ Application, pages 3, 5.




²⁴¹ Application, pages 4-5.

²⁴² Application, page 38.

²⁴³ Application, page 6; For further information regarding the remediation activities see *generally* Application, pages 3-6.

effects are anticipated, a written description is provided. Where cumulative potential effects are not anticipated, no further analysis is provided.

The following graphics are used to illustrate cumulative potential effects:

-  Cumulative potential effects are anticipated.
-  Cumulative potential effects are NOT anticipated.
-  Cumulative potential effects are uncertain.

For the purposes of this EA, actions that have occurred in the past and their associated impacts are considered part of the existing environment and are included in the affected environment described in Section 4 and the analysis conducted in Sections 4.2 through 4.7.

4.8.1 Human Settlement

This section illustrates and describes cumulative potential effects to the human settlement resources discussed in Section 4.2.

Table 8 Cumulative Potential Effects: Human Settlement

Element / Resource	Region of Influence	Potential for Cumulative Effects		
		Short-term	Long-term	Permanent
Aesthetics	One Mile	+	+	+
Cultural Values	Project Area	◆	◆	◆
Displacement	ROW	◆	◆	◆
Land Use	ROW	◆	◆	◆
Noise	1,600 Feet	+	◆	◆
Property Values	1,600 Feet	◆	◆	◆
Recreation	One Mile	+	+	◆
Socioeconomics	Project Area	◆	◆	◆

Aesthetics

The ROI for aesthetics resources is one mile. Short-term temporary impacts include increased construction activities and the presence of related equipment. Long-term impacts include removal of exhaust stacks and decommissioning of the coal yard and ash ponds. Short-term cumulative potential effects are anticipated to be minimal. Long-term cumulative potential effects will be positive.

Noise

The ROI for noise impacts is 1,600 feet. Construction of the proposed project and remediation work will in additive noise impacts. Cumulative potential effects are anticipated to be minimal.

Recreation

The ROI for recreation is one-mile. Construction of the proposed project and remediation work will generate noise along the “Black Dog Greenway” portion of the Minnesota River Greenway Project (anticipated to be constructed in fall 2016). Long-term impacts include positive aesthetic impacts from removal of exhaust stacks and decommissioning of the coal yard and ash ponds. Short-term cumulative potential effects are anticipated to be minimal. Long-term impacts are anticipated to be positive.

4.8.2 Public Health and Safety

This section illustrates cumulative potential effects to human health and safety discussed in Section 4.3.

Table 9 Cumulative Environmental Effects: Public Health and Safety

Element / Resource	Region of Influence	Potential for Cumulative Effects		
		Short-term	Long-term	Permanent
Electric and Magnetic Fields	Site Location	◆	◆	◆
Electronic Interference	Site Location	◆	◆	◆
Public and Worker Safety	Site Location	⊕	◆	◆
Fire and Electrocutation	Site Location	◆	◆	◆

Public and Worker Safety

The ROI for public and worker safety is the Site Location. Construction of the proposed project and remediation work will increase the potential for an accident to occur. Cumulative potential impacts are anticipated to be minimal.

4.8.3 Public Services

This section illustrates and describes cumulative potential effects to the public services discussed in Section 4.4.

Emergency Services

The ROI for emergency services is the project area. Construction of the proposed project and remediation work may increase delays to emergency vehicles. Long-term impacts are not anticipated. Cumulative potential effects are anticipated to be minimal.

Table 10 Cumulative Potential Effects: Public Services

Element / Resource	Region of Influence	Potential for Cumulative Effects		
		Short-term	Long-term	Permanent
Airports	Project Area	◆	◆	◆
Emergency Services	Project Area	+	◆	◆
Roads and Highways	Project Area	+	◆	◆
Utilities	Project Area	◆	◆	◆

Roads and Highways

The ROI for roads and highways is the project area. Construction of the proposed project and remediation work will increase traffic volume, and may cause traffic delays along Black Dog Road. Black Dog Road is not a public road, and, as a result, impacts to public transportation are anticipated to be minimal. Long-term impacts are not anticipated. Cumulative potential effects are anticipated to be minimal.

4.8.4 Land-Based Economies

This section illustrates and describes cumulative potential effects to the land-based economies discussed in Section 4.5.

Table 11 Cumulative Potential Effects: Land-Based Economies

Element / Resource	Region of Influence	Potential for Cumulative Effects		
		Short-term	Long-term	Permanent
Agriculture	Site Location	◆	◆	◆
Forestry	Site Location	◆	◆	◆
Mining	Site Location	◆	◆	◆
Tourism	Project Area	◆	◆	◆

4.8.5 Archeological and Historic Resources

This section illustrates and describes cumulative potential effects to the archeological and historical resources discussed in Section 4.6.

The ROI for archeological and historic resources is one-mile. Cumulative potential effects to archeological and historic resources are not anticipated.

Table 12 Cumulative Potential Effects: Archeological and Historic Resources

Element / Resource	Region of Influence	Potential for Cumulative Effects		
		Short-term	Long-term	Permanent
Archeological Features	One-mile	◆	◆	◆
Historic Features	One-mile	◆	◆	◆

4.8.6 Natural Resources

This section illustrates and describes cumulative potential effects to the natural resources discussed in Section 4.7.

Table 13 Cumulative Potential Effects: Natural Resources

Element / Resource	Region of Influence	Potential for Cumulative Effects		
		Short-term	Long-term	Permanent
Air Quality	Project Area	+	◆	◆
Geology	Site Location	◆	◆	◆
Groundwater	Site Location	◆	◆	◆
Rare and Unique Resources	One-mile	+	+	+
Soils	Site Location	+	◆	◆
Surface Water	Site Location	+	◆	◆
Vegetation	Site Location	◆	◆	◆
Wetlands	Site Location	◆	◆	◆
Wildlife	Site Location	◆	+	+
Wildlife Habitat	Site Location	◆	+	+

Air Quality

The ROI for air resources is the project area. Construction of the proposed project and the remediation work will increase fugitive dust and emissions. Long-term impacts are not anticipated. Short-term cumulative potential effects are anticipated to be minimal.

Rare and Unique Resources

The ROI for rare and unique resources is one mile. Construction of the proposed project and remediation work may displace peregrine falcons, a rare wildlife resource. Removal of exhaust stacks will remove potential nesting locations. Currently, peregrine falcons are nesting on the roof of the powerhouse building—not the exhaust stacks. Cumulative potential effects are anticipated to be minimal.

Soils

The ROI for soils is the Site Location. Construction of the proposed project and remediation work will increase the likelihood for soil erosion. Long-term impacts are anticipated to be positive. Negative cumulative potential effects are not anticipated.

Surface Water

The ROI for surface water is the Site Location. Construction of the proposed project and remediation activities may increase the potential for sedimentation. Long-term impacts are expected to reduce the potential for soils—especially legacy coal combustion residue—from reaching the Minnesota River or Black Dog Lake. Cumulative potential effects are anticipated to be positive.

Wildlife

The ROI for wildlife is the Site Location. Construction of the proposed project and remediation work, while not designed to do so, may increase potential wildlife habitat for birds and other small mammals indirectly benefiting wildlife. Cumulative potential effects are anticipated to be positive and minimal.

Wildlife Habitat

The ROI for wildlife habitat is the Site Location. Construction of the proposed project and remediation work, while not designed to do so, may increase potential wildlife habitat for birds and other small mammals. Cumulative potential effects are anticipated to be positive and minimal.

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5 Siting Factors

The analysis in Section 5 applies the information and data available in the site permit application and the EA to the factors the Commission must consider when making a site permit decision.

The Minnesota Legislature directed the Commission to select sites for large electric power generating plants that minimize adverse human and environmental impacts while insuring continuing electric power system reliability and integrity.²⁴⁴ The site must be compatible with environmental preservation and the efficient use of resources while also insuring electric energy needs are met and fulfilled in an orderly and timely fashion.²⁴⁵

Minnesota Statute 216E.03, subdivision 7(b) identifies 12 considerations that the Commission must take into account when designating a site for a large electric power generating plant. These considerations are further clarified and expanded by Minnesota Rule 7850.4100, which identifies 14 factors the Commission must consider when making a permit decision. These factors are outlined in Section 2.5 of this document.

Analysis Background

The following discussion groups the 14 siting factors into categories. These categories are based upon potential impacts to resources or the legislative intent for efficient design and use of resources.

Factor M (unavoidable impacts) and **Factor N** (irreversible and irretrievable resource commitments) are discussed in Section 5.4 and Section 5.5, respectively.

Three factors are not relevant to the proposed project. **Factor H** (use of existing rights-of-way) and **Factor J** (use of existing infrastructure rights-of-way) apply solely to high voltage transmission lines. **Factor L** (design or route dependent costs) does not apply as the design of the proposed project is the only design under consideration.

5.1 Siting Factors with Minimal Potential Impacts

The following siting factors are anticipated to be minimal with the application of the general conditions outlined in the Commission Generic Site Permit Template.

Factor A: Effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services

Factor B: Effects on public health and safety

Factor C: Effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining

²⁴⁴ Minn. Stat. 216E.02, subd. 1.

²⁴⁵ Minn. Stat. 216E.02, subd. 1.

Factor D: Effects on archaeological and historic resources

Factor E: Effects on the natural environment, including effects on air and water quality resources and flora and fauna

Factor F: Effects on rare and unique natural resources (additional mitigation is proposed; agency notification should peregrine falcons show signs of stress)

5.2 Siting Factors with Moderate Potential Impacts

There are no siting factors for which impacts are anticipated to be moderate with the application of the general conditions found in the Commission's generic site permit template (**Appendix B**). Impacts are avoided or minimized by the location of the project and by permits other than the site permit, for example, the MPCA air permit.

5.3 Siting Factors that are Well Met

Several siting factors indicate the legislative intent for the efficient design and efficient use of resources, particular limited resources. The following factors are well met:

Factor G: Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity

Factor I: Use of existing large electric power generating plant sites

Factor K: Electrical system reliability

5.4 Unavoidable Impacts

Large electric power generating plants are large infrastructure projects that have the potential to cause adverse impacts. These impacts can affect both human and natural environment. As outlined in the EA, the potential impacts associated with the proposed project are anticipated to be negligible to minimal; however, some of these impacts cannot be avoided.

The proposed project will burn natural gas to generate electricity. As a result, air emissions are unavoidable. Although cumulative aesthetic impacts are anticipated to be positive, the exhaust stack and vapor plume are unavoidable. Groundwater use is unavoidable, as is turbine, transformer and fin fan cooler noise. Construction related impacts such as noise and increased traffic are unavoidable.

5.5 Resource Commitments

Resource commitments are irreversible when it is impossible or very difficult to redirect that resource to a different future use. Although within an existing facility, the land required to construct the proposed project is nonetheless an irreversible impact. While it is possible the generating plant could one day be removed and the land restored, this would require substantial resources and development of electrical generating capacity elsewhere. As a result, this is unlikely to happen in the reasonably foreseeable future.

An irretrievable commitment of resources means the resource is not recoverable for later use by future generations. Construction related commitments include steel, concrete, and hydrocarbons, although it is possible that the steel and concrete could be recycled in the future. The natural gas and groundwater used during project operation are irretrievable resource commitments. The commitment of labor and fiscal resources—during construction and operation—is also considered irretrievable.

Appendix A

Scoping Decision



In the Matter of the Application of
Xcel Energy for a Site Permit for
the Black Dog Unit 6 Project
in Dakota County, Minnesota

Environmental Assessment
Scoping Decision

eDockets No. E002/GS-15-834

The above matter has come before the Deputy Commissioner of the Department of Commerce (Commerce) for a decision on the scope of the environmental assessment (EA) to be prepared for the Black Dog Unit 6 Project (project) proposed by Xcel Energy (applicant) in Dakota County, Minnesota.

Project Purpose

The proposed project was selected by the Minnesota Public Utilities Commission (Commission) as part of a competitive resource acquisition process to provide additional electrical power sources to meet the projected needs of the applicant's customers (E002/CN-12-1240).¹ The proposed project will ensure reliable 115 kilovolt (kV) power supply to the Twin Cities metropolitan area by utilizing existing transmission infrastructure that serves distribution substations across the area.

Project Description

The applicant proposes to construct a 215 MW natural gas-fired combustion turbine unit (Unit 6) at its existing Black Dog Generating Plant in the city of Burnsville in Dakota County, Minnesota (**Figure 1**). The proposed combustion turbine will be a simple-cycle unit with dry low-nitrogen oxide burners for emissions control. Use of good combustion practices will also control emissions. No add-on emission controls are anticipated.

The proposed project is a "peaking" facility, meaning it is only expected to operate between 4 and 10 percent of the time. It will be built in an existing powerhouse building. Construction is expected to begin in June 2016. Once constructed, the service life is expected to exceed 35 years.

Minor modifications to an existing 115 kV switchyard will be required to connect Unit 6 to the electric transmission system. No upgrades to the switchyard or transmission system will be required. The proposed project will use natural gas as a fuel source. Any needed improvements to natural gas infrastructure, for example, pipelines, and associated approvals will be the responsibility of the gas supplier and are not a part of this proceeding. It is anticipated that this additional infrastructure will be permitted by the supplier in accordance with the requirements of Minnesota Statutes Section 216G.02 and Minnesota Rules Chapter 7852.

¹ Minnesota Public Utilities Commission, *Order Approving Power Purchase Agreement with Calpine, Approving Power Purchase Agreement with Geronimo, and Approving Price Terms with Xcel*, February 5, 2015, eDockets No. 20152-107070-01 (Hereinafter E002/CN-12-1240 Order).

Initial startup is planned for early 2018, with commercial operation beginning in March 2018. The proposed project is anticipated to cost \$100 million.

Regulatory Background

In Minnesota, no person may construct a large electric power generating plant (LEPGP) without a site permit from the Commission.² A LEPPG is defined as “*electric power generating equipment and associated facilities designed for or capable of operation at a capacity of 50,000 kilowatts [50 MW] or more.*”³ The proposed project will have an electric generating capacity of 215 MW.⁴ As a result, the proposed project requires a site permit from the Commission. Because this project will be fueled solely by natural gas⁵ it qualifies under the Commission’s alternative permitting process.⁶

In addition, an applicant cannot construct a large energy facility in Minnesota without first receiving a Certificate of Need (CN) issued by the Commission,⁷ unless it was selected as part of a competitive resource acquisition process.⁸ As a result, a CN is not required.⁹

On October 15, 2015, the applicant filed a site permit application for the project pursuant to the alternative review process outlined in Minnesota Statute 216E.04 and Minnesota rules 7850.2800-3900.¹⁰ The Commission considered the completeness of the application at its December 3, 2015, agenda meeting. On December 15, 2015, the Commission issued an order accepting the application as complete and authorizing use of the alternative review process.¹¹

Environmental Review

Applications for a site permit are subject to environmental review, which is conducted by Commerce Energy Environmental Review and Analysis (EERA) staff. The alternative permitting process requires preparation of an EA.¹² An EA is a written document that contains an overview of the resources and potential human and environmental impacts and mitigation measures associated with the proposed project.¹³ This is the only state environmental review document required for the project.¹⁴

² Minnesota Statutes 216E.03, subdivision 1., Minnesota Rules 7850.1300, subpart 1.

³ Minn. Stat. 216E.01, subd. 5.

⁴ Xcel Energy, *Application to the Minnesota Public Utilities Commission for a Site Permit for the Black Dog Unit 6 Project*, October 15, 2015, eDockets No. 201510-114858-01 (Hereinafter “Application”).

⁵ Application.

⁶ Minn. Stat. 216E.04, subd. 2(2).

⁷ Minn. Stat. 216B.243, subd. 2.

⁸ E002/CN-12-1240 Order.

⁹ Minn. Stat. 216B.2422, subd. 5(b).

¹⁰ Application.

¹¹ Minnesota Public Utilities Commission (December 10, 2015) *Order Finding Application Complete, Requesting Summary Report, and Granting Variance*, eDockets No. 201512-116357-01 (Hereinafter “PUC Order”).

¹² Minnesota Statute 216E.04, subd. 5; Minnesota Rule 7850.3700, subp. 1.

¹³ Minn. Stat. 216E.04, subd. 5., Minn. R. 7850.3700, subp. 4.

¹⁴ Minn. Stat. 216E.04, subd. 5.

Scoping

The first step in the preparation of an EA is scoping. The scoping process has two primary purposes: (1) to ensure that the public has a chance to participate in determining what issues are studied in the EA, and (2) to help focus the EA on the potential impacts, issues and possible mitigative measures important to a reasoned site permit decision.

EERA conducts public information and scoping meetings in conjunction with a public comment period to allow the public the opportunity to participate in the development of the scope (or content) of the EA.¹⁵ The commissioner of Commerce or his designee determines the scope of the EA.¹⁶ Minnesota Rule 7850.3700, subpart 3, requires Commerce to determine the scope of the EA within 10 days after the close of the public comment period. The Commission extended this timeframe.¹⁷

Scoping Process Summary

In accordance with Minnesota Rule 7850.3700, subpart 2, EERA staff initiated the scoping process for preparation of the EA. On January 6, 2016, Commission staff sent notice of the place, date and time of the public information and scoping meeting to those persons on the project contact list and agency technical representative list, as well as local government units.¹⁸ Notice was published in a local newspaper¹⁹ and provided on both the Commission and EERA webpages.

Public Scoping Meeting

Commission and EERA staff held the public information and scoping meeting, as noticed, on January 28, 2016, at Burnsville City Hall in Burnsville, Minnesota. The purpose of this meeting was to provide information to interested persons about the proposed project and permitting process, to answer questions about the proposed project and permitting process, and to allow the public an opportunity to suggest potential impacts, issues and mitigative measures to be considered in the EA. (The proposed project was selected as part of a competitive resource acquisition process; therefore, alternative site locations are precluded from this proceeding.)

One member of the public and one city of Burnsville staff member attended the public meeting. These individuals were provided with handouts, and afforded the opportunity to ask questions and provide comment. A court reporter was present at the meeting to document oral statements. Neither individual provided comments for the record.

¹⁵ Minn. R. 7850.3700, subp. 1.

¹⁶ Minn. R. 7850.3700, subp. 3.

¹⁷ PUC Order.

¹⁸ Minnesota Public Utilities Commission (January 6, 2016) *Notice of Public Information and Environmental Assessment Scoping Meeting*, eDockets Nos. 20161-117009-01 and 20161-117009-02.

¹⁹ Xcel Energy (February 17, 2016) *Affidavit of Publication*, eDockets No. 20162-118389-01.

Public Comments

A public comment period, ending February 11, 2016, provided the opportunity to submit written comments to EERA on the scope of the EA. The purpose of this comment period was to allow for interested persons to suggest impacts and mitigative measures that should be considered in the EA. Written comments were received from the Minnesota Department of Natural Resources (DNR) and the Minnesota Department of Transportation (MnDOT). DNR discussed issues regarding an active peregrine falcon (*Falco peregrinus*) nest box mounted on an existing smokestack. MnDOT indicated that the applicant would need to coordinate shipment of oversized loads on interregional corridors (I35W/I35E) with the agency. MnDOT also requested that any construction work or materials delivery with potential to affect its right-of-way be coordinated with the agency.

Scoping comments are compiled and available to view or download on the EERA webpage.²⁰

* * * * *

²⁰ Minnesota Department of Commerce, *Public Comments Received on the Scope of the EA*, Retrieved date, from: .

Having reviewed the matter, consulted with Commerce EERA staff, and in accordance with Minnesota Rule 7850.3700, I hereby make the following scoping decision:

MATTERS TO BE ADDRESSED

The issues outlined below will be analyzed in the EA for the proposed project. The EA will describe the proposed project and the human and environmental resources of the project area. It will provide information on the potential impacts of the proposed project as they relate to the topics outlined in this scoping decision, including possible mitigation measures. It will identify impacts that cannot be avoided, irretrievable commitments of resources, and permits from other government entities that may be required.

The EA regarding the proposed project will address and provide information on the following matters:

I. Project Description

- Purpose
- Description
- Location
- Sources of Information

II. Regulatory Framework

- Certificate of Need
- Site Permit
- Scoping Process
- Public Hearing
- Issues outside the EA

III. Proposed Project

- Proposed Facility Location
- Site Requirements
- Project Design
- Project Construction
- Project Operation and Maintenance
- Project Cost

IV. Affected Environment, Potential Impacts, and Mitigative Measures

The EA will include a discussion of the following human and environmental resources potentially impacted by the proposed project. Potential impacts, both positive and negative, of the proposed project will be described. Based on the impacts identified, the EA will describe mitigation measures that could reasonably be implemented to reduce or eliminate identified impacts. The EA will describe any unavoidable impacts resulting from implementation of the proposed project.

Data and analyses in the EA will be commensurate with the importance of potential impacts and the relevance of the information to a reasoned choice among alternatives and to the

consideration of the need for mitigation measures.²² EERA staff will consider the relationship between the cost of data and analyses and the relevance and importance of the information in determining the level of detail to provide in the EA. Less important material may be summarized, consolidated or simply referenced.

If relevant information cannot be obtained within timelines prescribed by statute and rule, the costs of obtaining such information is excessive, or the means to obtain it is not known, EERA staff will include in the EA a statement that such information is incomplete or unavailable and the relevance of the information in evaluating potential impacts or alternatives.²³

The outline below is not intended to serve as a table of contents for the EA document itself, and, as such, the organization, that is, the structure of the document, may not be similar to that appearing here.

Human Settlement

- Aesthetics
- Cultural Values
- Displacement
- Land Use and Zoning
- Noise
- Public Health and Safety (including electromagnetic fields)
- Public Services and Infrastructure (including transportation and traffic)
- Recreation
- Socioeconomics (including property values)

Land Based Economies

- Agriculture
- Forestry
- Mining
- Tourism

Archaeological and Cultural Resources

Natural Environment

- Air
- Geology, Soils and Groundwater
- Rare and Unique Resources
- Surface Water
- Vegetation
- Wetlands
- Wildlife (including the peregrine falcon referenced during scoping)
- Wildlife Habitat

Unavoidable Impacts

²² Minn. R. 4410.2300.

²³ Minn. R. 4410.2500.

Irreversible and Irretrievable Commitments of Resources

V. Alternative Sites to be evaluated in the Environmental Assessment

The EA will evaluate the site proposed by the applicant in their site permit application. No other sites will be evaluated in the EA.

VI. Identification of Permits

The EA will include a list of permits or approvals from governments or other entities that may be required for the proposed project.

ISSUES OUTSIDE THE SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The EA will not consider the following:

- Any alternative not identified in this scoping decision, including a no-build alternative.
- Issues related to project need, size, type or timing.
- Issues related to necessary improvements to natural gas pipeline(s).

SCHEDULE

The EA is anticipated to be completed and available in May 2016. Upon completion of the EA, it will be noticed and made available for review. A public hearing will be held in the project area after the EA has been issued and notice served. Comments on the EA may be submitted into the hearing record.

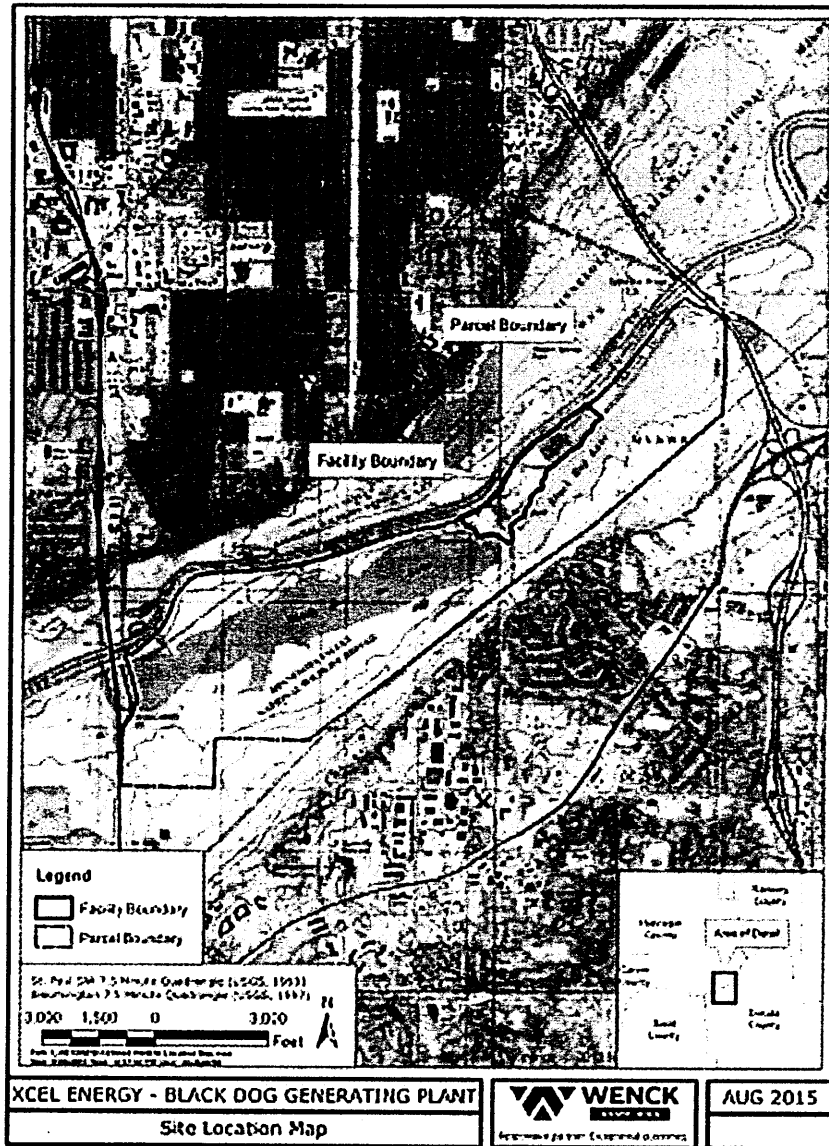
Signed this 23rd day of February, 2016

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE



William Grant, Deputy Commissioner

Figure 1 Project Location



Source: Application.

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Appendix B

Generic Site Permit Template

STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

SITE PERMIT FOR A
LARGE ELECTRIC POWER GENERATING PLANT AND ASSOCIATED FACILITIES

IN
[COUNTY]

ISSUED TO
[PERMITEE]

PUC DOCKET NO. [Docket Number]

In accordance with the requirements of Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850 this site permit is hereby issued to:

[PERMITEE]

The Permittee is authorized by this site permit to construct and operate [Provide a description of the project authorized by the Minnesota Public Utilities Commission].

The large electric power generating plant and associated facilities shall be built within the site identified in this permit and as portrayed in the official site map(s) and in compliance with the conditions specified in this permit.

Approved and adopted this ____ day of [Month, Year]

BY ORDER OF THE COMMISSION

Daniel P. Wolf,
Executive Secretary

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ATTACHMENTS

Complaint Procedures for a Large Electric Generating Plant
 Compliance Filing Procedures for Permitted Energy Facilities

[Project Name and PUC Docket No.]

1.0 SITE PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this site permit to [Permittee Name] (Permittee) pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850. This permit authorizes the [Permittee Name] to construct and operate [Provide a description of the project as authorized by the Minnesota Public Utilities Commission], and as identified in the attached site permit map(s), hereby incorporated into this document.

1.1 Pre-emption

Pursuant to Minn. Stat. § 216E.10, this site permit shall be the sole approval required for the construction of the large electric power generating plant (LEPGP) and associated facilities and this permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

2.0 PROJECT DESCRIPTION

[Provide a description of the project as authorized by the Minnesota Public Utilities Commission]

2.1 Project Location

The project is located in the following:

County	Township Name	Township	Range	Section

2.2 Associated Facilities

3.0 DESIGNATED SITE

The site designated by the Commission in this permit is the site described below and shown on the site permit maps attached to this permit (Attachment [X]).

[As applicable, provide a detailed description of the authorized site.]

The anticipated project layout is shown on the site permit map(s). The anticipated layout represents the approximate location of the LEPPG and associated facilities and seeks to minimize the overall potential human and environmental impacts of the project, which were evaluated in the permitting process. Any modifications to the facility depicted in the anticipated

layout shall be done in such a manner as to have comparable overall human and environmental impacts and shall be specifically identified in the site plan pursuant to Section 8.3.

4.0 GENERAL CONDITIONS

The Permittee shall comply with the following conditions during construction and operation of the energy generating system and associated facilities over the life of this permit.

4.1 Notification

Within 14 days of issuance of this permit, the Permittee shall send a copy of the permit to any regional development commission, county, city, and township in which any part of the site is located.

The Permittee shall provide all affected landowners with a copy of this permit and, as a separate information piece, the complaint procedures at the time of the first contact with the affected landowners after issuance of this permit. The Permittee shall contact landowners prior to entering the property or conducting maintenance within the site, unless otherwise negotiated with the affected landowner.

4.2 Construction and Operation Practices

The Permittee shall follow those specific construction practices, operation practices, and material specifications described in [Permittee Name and Title of Application] to the Commission for a site permit for the [Project Name], dated [Date], and the record of the proceedings unless this permit establishes a different requirement in which case this permit shall prevail.

4.2.1 Field Representative

The Permittee shall designate a field representative responsible for overseeing compliance with the conditions of this permit during construction of the project. This person shall be accessible by telephone or other means during normal business hours throughout site preparation, construction, cleanup, and restoration.

The Permittee shall file with the Commission the name, address, email, phone number, and emergency phone number of the field representative 14 days prior to commencing construction. The Permittee shall provide the field representative's contact information to affected landowners, residents, local government units and other interested persons. The Permittee may change the site manager at any time upon notice to the Commission, affected landowners, residents, local government units and other interested persons.

4.2.2 Employee Training and Education of Permit Terms and Conditions

The Permittee shall inform all employees, contractors, and other persons involved in the construction and ongoing operation of the facility of the terms and conditions of this permit.

4.2.3 Temporary Work Space

Temporary work space and equipment staging areas shall be selected to limit the removal and impacts to vegetation. Temporary work space shall not be sited in wetlands or native prairie as defined in sections 4.2.9 and 4.2.10. Temporary work space shall be sited to comply with standards for development of the shorelands of public waters as defined in Section 4.2.9. Temporary easements outside of the authorized site boundary will be obtained from affected landowners through rental agreements and are not provided for in this permit.

4.2.4 Noise

Construction and routine maintenance activities shall be limited to daytime working hours, as defined in Minn. R. 7030.0020, to ensure nighttime noise level standards will not be exceeded.

4.2.5 Aesthetics

The Permittee shall consider input pertaining to visual impacts from landowners or land management agencies prior to final location of structures with the potential for visual disturbance. To minimize aesthetic impacts, the Permittee shall preserve the natural landscape, minimize vegetation removal, and prevent any unnecessary destruction of the natural surroundings in the vicinity of the Project during construction and maintenance.

4.2.6 Soil Erosion and Sediment Control

The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency (MPCA) Construction Stormwater Program.

The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf

reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions.

In accordance with the MPCA requirements, Permittee shall obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater permit from the MPCA.

4.2.7 Public Lands

In no case shall the generating plant or associated facilities including foundations, access roads, underground cable, and transformers, be located in the public lands identified in Minn. R. 7850.4400, subp. 1, or in federal waterfowl production areas. The generating plant and associated facilities shall not be located in the public lands identified in Minn. R. 7850.4400, subp. 3, unless there is no feasible and prudent alternative.

4.2.8 Wetlands and Shoreland

The generating plant and associated facilities, including access roads, underground cables, and transformers shall not be placed in public waters and public waters wetlands, as shown on the public water inventory maps prescribed by Minnesota Statutes Chapter 103G, except that electric collector or feeder lines may cross or be placed in public waters or public waters wetlands subject to permits and approvals by the Minnesota Department of Natural Resources (DNR) and the United States Army Corps of Engineers (USACE), and local units of government as implementers of the Minnesota Wetlands Conservation Act. The generating plant and associated facilities including foundations, access roads, underground cables, and transformers, shall be located in compliance with the standards for development of the shorelands of public waters as identified in Minn. R. 6120.3300, and as adopted, Minn. R. 6120.2800, unless there is no feasible and prudent alternative.

Construction in wetland areas shall occur during frozen ground conditions to minimize impacts. When construction during winter is not possible, wooden or composite mats shall be used to protect wetland vegetation. Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area. Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts.

Wetland and water resource areas disturbed by construction activities shall be restored to pre-construction conditions. Restoration of the wetlands will be performed by Permittee in accordance with the requirements of applicable state and federal permits or laws and landowner agreements.

4.2.9 Native Prairie

The Permittee shall prepare a prairie protection and management plan in consultation with the DNR if native prairie, as defined in Minn. Stat. § 84.02, subd. 5, is identified within the site boundary. The Permittee shall file the plan 30 days prior to submitting the site plan required by Section 8.3 of this permit. The plan shall address steps that will be taken to avoid impacts to native prairie and mitigation to unavoidable impacts to native prairie by restoration or management of other native prairie areas that are in degraded condition, by conveyance of conservation easements, or by other means agreed to by the Permittee, DNR and the Commission.

The generating plant and associated facilities including foundations, access roads, collector and feeder lines, underground cables, and transformers shall not be placed in native prairie unless addressed in a prairie protection and management plan and shall not be located in areas enrolled in the Native Prairie Bank Program. Construction activities, as defined in Minn. Stat. § 216E.01, shall not impact native prairie unless addressed in a prairie protection and management plan.

4.2.10 Vegetation Management

The Permittee shall disturb or clear the site only to the extent necessary to assure suitable access for construction, safe operation and maintenance of the project.

The Permittee shall minimize the number of trees to be removed in selecting the site layout specifically preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation, to the extent that such actions do not violate sound engineering principles.

4.2.11 Invasive Species

The Permittee shall employ best management practices to avoid the potential spread of invasive species on lands disturbed by project construction activities.

4.2.12 Noxious Weeds

The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil the Permittee shall select site appropriate seed certified to be free of noxious weeds. To the extent possible, the Permittee shall use native seed mixes. The Permittee shall consult with landowners on the selection and use of seed for replanting.

4.2.13 Roads

The Permittee shall advise the appropriate governing bodies having jurisdiction over all state, county, city or township roads that will be used during the construction phase of the project. Where practical, existing roadways shall be used for all activities associated with construction of the facility. Oversize or overweight loads associated with the facility shall not be hauled across public roads without required permits and approvals. The Permittee shall, prior to the use of such roads, make satisfactory arrangements with the appropriate state, county, and city governmental bodies having jurisdiction over the roads to be used for construction, for repair and maintenance of those roads that will be subject to extra wear and tear due to transportation of equipment and materials. The Permittee shall notify the Commission of such arrangements upon request of the Commission.

The Permittee shall promptly repair private roads or lanes damaged when moving equipment or when obtaining access to the site, unless otherwise negotiated with the affected landowner.

4.2.14 Archaeological and Historic Resources

The Permittee shall make every effort to avoid impacts to identified archaeological and historic resources when constructing the facility. If required by the State Historic Preservation Office (SHPO), the Permittee shall conduct a survey of the project site. If a survey is required, the results shall be submitted to the Commission with the site plan pursuant to Section 8.3.

In the event that a resource is encountered, the Permittee shall contact and consult with SHPO and the State Archaeologist. Where feasible, avoidance of the resource is required. Where not feasible, mitigation must include an effort to minimize project impacts on the resource consistent with SHPO and State Archaeologist requirements.

Prior to construction, workers shall be trained about the need to avoid cultural properties, how to identify cultural properties, and procedures to follow if undocumented cultural properties, including gravesites, are found during construction. If human remains are encountered during construction, the Permittee shall immediately halt construction and promptly notify local law enforcement and the State Archaeologist. Construction at such location shall not proceed until authorized by local law enforcement or the State Archaeologist.

4.2.15 Interference with Communication Devices

If interference with radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices is caused by the presence or operation of the project, the Permittee shall take whatever action is feasible to restore or provide reception equivalent to reception levels in the immediate area just prior to the construction of the project.

4.2.16 Restoration

The Permittee shall restore the areas affected by construction of the facility to the condition that existed immediately before construction began to the extent possible. The time period to complete restoration may be no longer than 12 months after completion of the construction, unless otherwise negotiated with the affected landowner. Restoration shall be compatible with the safe operation, maintenance and inspection of the project. Within 60 days after completion of all restoration activities, the Permittee shall advise the Commission in writing of the completion of such activities.

4.2.17 Cleanup

All waste and scrap that is the product of construction shall be removed from the site and all premises on which construction activities were conducted and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

4.2.18 Pollution and Hazardous Wastes

All appropriate precautions to protect against pollution of the environment shall be taken by the Permittee. The Permittee shall be responsible for compliance with all laws applicable to the generation, storage, transportation, clean up and disposal of all wastes generated during construction and restoration of the site.

4.2.19 Damages

The Permittee shall promptly repair or fairly compensate landowners for damage to crops, fences, private roads and lanes, landscaping, drain tile, or other damages sustained during construction and operation unless otherwise negotiated with the affected landowner.

4.2.20 Public Safety

The Permittee shall provide educational materials to landowners adjacent to the site and, upon request, to interested persons about the project and any restrictions or dangers associated with the project. The Permittee shall also provide any necessary safety measures such as warning signs and gates for traffic control or to restrict public access. The Permittee shall submit the location of all underground facilities, as defined in Minn. Stat. § 216D.01, subd. 11, to Gopher State One Call following the completion of construction at the site.

4.2.21 Site Identification

The site shall be marked with a visible identification number and or street address.

4.3 Other Requirements

4.3.1 Safety Codes and Design Requirements

The electric energy generating system and associated facilities shall be designed to meet or exceed all relevant local and state codes, Institute of Electrical and Electronics Engineers, Inc. (IEEE) standards, the National Electric Safety Code (NESC), and North American Electric Reliability Corporation (NERC) requirements.

4.3.2 Other Permits and Regulations

The Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of these permits. The Permittee shall submit a copy of such permits to the Commission upon request.

5.0 SPECIAL CONDITIONS

[Project Name and PUC Docket No.]

The Permittee shall provide a report to the Commission as part of the site plan submission required under Section 8.3 that describes the actions taken and mitigative measures developed regarding the project and the following special conditions. Special conditions shall take precedence over other conditions of this permit should there be a conflict.

[Describe any special conditions]

Examples of special conditions included in permits:

- *Avian Mitigation Plan*
- *Environmental Control Plan*
- *Agriculture Mitigation Plan*
- *Vegetation Management Plan*
- *Property Restrictions*
- *Minnesota Department of Natural Resources Requirements*
- *Minnesota Pollution Control Requirements*
- *Minnesota State Historical Preservation Office Requirements*
- *Minnesota Department of Transportation Requirements*

For example:

Landscaping Plan

The Permittee shall develop a site specific landscaping plan in consultation with Chisago County, and considering local government ordinances and setbacks, that reasonably mitigates the visual impacts to all adjacent residences. The landscaping plan shall be filed at least 14 days prior to the pre-construction meeting.

Vegetation Management Plan

The Permittee shall develop a vegetation management plan in consultation with the DNR to the benefit of pollinators and other wildlife, and to enhance soil water retention and reduce storm water runoff and erosion. The vegetation management plan shall be filed at least 14 days prior to the pre-construction meeting.

Security Fence

The security fence surrounding the facility shall be designed to minimize the visual impact of the project. While maintaining compliance with the NESC, the Permittee shall install an eight-foot wood pole and woven wire fence, or substantially similar, around the perimeter of the facility. This type of fence is commonly referred to as a "deer fence" or "agricultural fence." The

permittee shall consult with the DNR to insure the design of the facilities preserves or replaces identified natural wildlife, wetland, woodland or other corridors.

6.0 DELAY IN CONSTRUCTION

If the Permittee has not commenced construction or improvement of the site within four years after the date of issuance of this permit the Permittee shall file a report on the failure to construct and the Commission shall consider suspension of the permit in accordance with Minn. R. 7850.4700.

7.0 COMPLAINT PROCEDURES

Prior to the start of construction, the Permittee shall submit to the Commission the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements of Minn. R. 7829.1500 or Minn. R. 7829.1700, and as set forth in the complaint procedures attached to this permit.

Upon request, the Permittee shall assist the Commission with the disposition of unresolved or longstanding complaints. This assistance shall include, but is not limited to, the submittal of complaint correspondence and complaint resolution efforts.

8.0 COMPLIANCE REQUIREMENTS

Failure to timely and properly make compliance filings required by this permit is a failure to comply with the conditions of this permit. Compliance filings must be electronically filed with the Commission.

8.1 Site Plan

At least 30 days prior to commencing construction, the Permittee shall provide the Commission with a site plan that includes specifications and drawings for site preparation and grading; specifications and locations of structures to be constructed including all electrical equipment, pollution control equipment, fencing, roads, and other associated facilities; and procedures for cleanup and restoration. The documentation shall include maps depicting the site boundary and layout in relation to that approved by this permit.

The Permittee may not commence construction until the 30 days has expired or until the Commission has advised the Permittee in writing that it has completed its review of the documents and determined that the planned construction is consistent with this permit. If the

Permittee intends to make any significant changes to its site plan or the specifications and drawings after submission to the Commission, the Permittee shall notify the Commission at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

8.2 Periodic Status Reports

The Permittee shall report to the Commission on progress regarding site construction. The Permittee need not report more frequently than monthly. Reports shall begin with the submittal of the site plan for the project and continue until completion of construction or restoration, whichever is later.

8.3 Notification to Commission

At least ten days before the facility is to be placed into service, the Permittee shall notify the Commission of the date on which the facility will be placed into service and the date on which construction was complete.

8.4 As-Builts

Within 60 days after completion of construction, the Permittee shall submit copies of all final as-built plans and specifications developed during the project.

8.5 GPS Data

Within 60 days after completion of construction, the Permittee shall submit to the Commission, in the format requested by the Commission, geo-spatial information (e.g., ArcGIS compatible map files, GPS coordinates, associated database of characteristics) for all structures associated with the generating system.

8.6 Emergency Response

The Permittee shall prepare an Emergency Response Plan in consultation with the emergency responders having jurisdiction over the facility prior to project construction. The Permittee shall submit a copy of the plan, along with any comments from emergency responders, to the Commission at least 30 days prior to construction. The Permittee shall provide as a compliance filing confirmation that the Emergency Response Plan was provided to the emergency responders and Public Safety Answering Points (PSAP) with jurisdiction over the facility prior to commencement of construction. The Permittee shall obtain and register the facility address or

other location indicators acceptable to the emergency responders and PSAP having jurisdiction over the facility.

9.0 COMMISSION AUTHORITY AFTER PERMIT ISSUANCE

9.1 Final Boundaries

After completion of construction the Commission may determine the need to adjust the final site boundaries required for the project. This permit may be modified, after notice and opportunity for public hearing, to represent the actual site boundary required by the Permittee to operate the project authorized by this permit.

9.2 Expansion of Site Boundaries

No expansion of the site boundary described in this permit shall be authorized without the approval of the Commission. The Permittee may submit to the Commission a request for a change in the boundary of the site for the project. The Commission will respond to the requested change in accordance with applicable statutes and rules.

9.3 Modification of Conditions

After notice and opportunity for hearing this permit may be modified or amended for cause, including but not limited to the following:

- (a) violation of any condition in this permit;
- (b) endangerment of human health or the environment by operation of the Project; or
- (c) existence of other grounds established by rule.

9.4 More Stringent Rules

The issuance of this permit does not prevent the future adoption by the Commission of rules or orders more stringent than those now in existence and does not prevent the enforcement of these more stringent rules and orders against the Permittee.

10.0 PERMIT AMENDMENT

This permit may be amended at any time by the Commission. Any person may request an amendment of the conditions of this permit by submitting a request to the Commission in writing

[Project Name and PUC Docket No.]

describing the amendment sought and the reasons for the amendment. The Commission will mail notice of receipt of the request to the Permittee. The Commission may amend the conditions after affording the Permittee and interested persons such process as is required.

11.0 TRANSFER OF PERMIT

The Permittee may request at any time that the Commission transfer this permit to another person or entity. The Permittee shall provide the name and description of the person or entity to whom the permit is requested to be transferred, the reasons for the transfer, a description of the facilities affected, and the proposed effective date of the transfer.

The person to whom the permit is to be transferred shall provide the Commission with such information as the Commission shall require to determine whether the new Permittee can comply with the conditions of the permit. The Commission may authorize transfer of the permit after affording the Permittee, the new Permittee, and interested persons such process as is required.

12.0 REVOCATION OR SUSPENSION OF THE PERMIT

The Commission may initiate action to revoke or suspend this permit at any time. The Commission shall act in accordance with the requirements of Minn. R. 7850.5100, to revoke or suspend the permit.

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Appendix C

EA Development Questions and Responses

EA Development Informal Questions and Applicant Responses*

March 10, 2016

1. Can I get the shapefiles for the facility boundary and the parcel boundary as depicted on the site location map found on page 2 of the application.

Shapefiles provided.

2. I'll need a schematic of how the turbine works. See as an example, figure 4, page 14 of the Mankato Energy Center Expansion Project EA. Available here:
<http://mn.gov/commerce/energyfacilities/Docket.html?id=34238>

Schematic provided.

3. Please complete the following Table as much as possible.

Table 3 Estimated Costs

Project Component	Estimated Cost
Planning / Permitting	\$
Design	\$
Procurement	\$
Construction	\$
Close Out	\$
Total	\$

Response:

Black Dog Unit 6

Table 3 Estimated Costs

Project Component	Estimated Cost
<i>Planning / Permitting / Design</i>	<i>\$ 7,000,000</i>
<i>Procurement</i>	<i>\$ 60,000,000</i>
<i>Construction</i>	<i>\$ 33,000,000</i>
<i>Close Out</i>	<i>Included Above</i>
Total	\$ 100,000,000

* Informal questions and applicant responses organized by applicant response date. Data requests, for example, shapefile requests, are listed as "provided" or "not provided."

4. Several noise studies have been completed (2002/2011). Can I get copies of those?

Studies provided.

5. An Air Emission Permit was or is being filed. Is that something I can see? For reference, see again Mankato Energy Expansion Appendix E.

Permit application provided. Informed appendices available if desired.

March 16, 2016

Page 15 states that water will be used for "initial filling" of the fin fan cooler system; however, page 28 states the cooling system will contain "a glycol solution." Is water mixed with the solution? Or is there a discrepancy here?

Solution will be 55% ethylene glycol and 45% water.

Also, where will the cooler be located? On or attached to the building? Stand-alone on the ground?

Fin fan cooler will be located directly south of the building and will be stand-alone elevated above the ground.

The generator has not been described. Could I get a brief description of the generator. Perhaps how it interplays with the turbine and the voltage of the electricity coming off the generator.

The generator converts rotating motion to electrical energy. It is the opposite of a motor. The turbine rotor shaft is directly and solidly connected to the generator rotor shaft to provide the rotating motion. The Black Dog Unit 6 generator will produce electricity at 18,000 volts before the step-up transformer. The step-up transformer will boost the voltage to 115,000 volts.

Will the on-site natural gas pipeline be buried or above ground?

The onsite natural gas pipeline will be mostly underground. There may be a short above ground section before it enters the building. The onsite delivery point/regulating station will be located to the south and west of the building.

Where will the on-site natural gas conditioning system be located?

The on-site conditioning system will be located in a room within the building.

Does on-site natural gas conditioning system do anything else besides remove moisture and other impurities from the natural gas? For example, does it adjust pressure?

The conditioning skid will only remove impurities and moisture. Pressure regulation will be performed at the on-site delivery point and the Cedar town border station.

What minor modifications will be made?

A 115,000 volt motor operated disconnect will be added and minor buswork will be added between the generator breaker located in the substation and the incoming high voltage lines from the step-up transformer. This work will all occur within a small area of the substation.

April 8, 2016

Exhaust stack. What is it made of?

Stack will be a steel alloy rated for the exhaust temperature. It will likely be insulated for most if not all of the height.

I know it is going to be delivered by truck, but how? In modules?

Stack will be delivered in sections sized for shipping via truck.

Will these be over-sized loads?

Some sections may be oversized and if so those loads will require oversize permits. Permitted loads will follow permit route and requirements.

How is it constructed?

Sections of the stack are either bolted or welded together depending on vendor installation instructions.

Is it craned into place in one piece or multiple pieces?

Stack will be assembled in pieces. Some sections will likely be assembled together at ground level prior to lifting to reduce the number of lifts.

Will the crane be on a truck or will it be a tower crane assembled on-site?

Crane will most likely be either a truck mounted or crawler depending on weight and reach requirements. Crane pieces will be brought in via multiple truck loads and assembled on site.

On-site delivery pipeline. How will this be constructed?

Pipe sections will be welded together.

I assume a trench will be dug, soil stockpiled, pipe placed into the trench, etc. until completed.

Trenching will be used with normal trenching safety practices. Soil will be stockpiled and returned after pipe installation.

Explain what happens to the soil during the construction process. I also assume this is one of the only steps in construction that will require the use of heavy equipment to move soils around.

The onsite pipeline route is in a previously disturbed area. After trenching is completed, backfilling and compacting will be performed along with restoring surface to previous condition. Excavators and skid loaders will be used.

Fin Fan Cooler. How is this thing anchored to the ground?

The fin fan cooler will most likely have large underground spread footings and steel columns supporting the fin fan cooler will be bolted to the footings.

How loud is it?

Noise will not exceed 85 dBA at 1 meter.

Floodplain. What precautions are being taken to ensure the on-site delivery pipeline and fin fan cooler will not be affected by a flooding event.

All outdoor equipment will be located above 720 feet which exceeds the 100 year flood level including the gas regulation station, inlet air filter and cooling module.

Delivery Timing. Will there be any special timing for deliveries? For example, outside of rush hour? Any over-sized loads?

Largest loads will be delivered to the onsite rail siding (combustion turbine, generator and step-up transformer). All other deliveries are expected by truck. Some of the loads may be oversized and if so will have oversized load permits. Oversize load permits have a specific route and may have restrictions on timing of travel.

April 14, 2016

Could you have your air permit people take a look at the accuracy of this paragraph? I'd like to provide the reason(s) why the AERA is not required as opposed to simply stating it isn't required. If necessary, please provide additional information as to the reason should this paragraph not cover it. Thanks.

In addition to meeting NAAQS and PSD standards, certain new facilities must also assess, through an air emissions risk analysis (AERA), the potential health risks associated with air emissions from the facility. An AERA is not required for the proposed project because it will not generate 250 tons or more per year of any single air criteria pollutant or result in a net increase of CO₂e by more than 100,000 tons.

April 19, 2016

The peregrine falcon nest box. Application says it was scheduled to be removed in 2015. Was it removed?

It was removed earlier this year prior to the nesting season due to retirement of the coal units and removal of the stack.

April 27, 2016

The original plan called for a water-based cooling system that used river water as the cooling medium. After further review, it was determined that the original design would not have been compliant with the Clean Water Act Section 316(b) regulations for new cooling water sources. After reviewing the options, it was decided that an air-cooled fin fan system would be installed instead. Therefore, the current design will not use any surface water. Given this change, below are the responses to Question 5.

Surface water GPD is anticipated to be 5,760. The listed uses are not daily activities. Is this number averaged over the year? How did you estimate water usage for fire suppression? What are some examples of minor uses? (I thought domestic, but that is well water.)

This was based off of a river based cooling scheme that is no longer planned. The process will not use any surface water.

Please explain how surface water is used for pump seals and pump drains. Where does it go after it is used? Does it evaporate? Wastewater treatment? Closed loop system?

There is no surface water used for pump seals or drains.

Ground water use will be 26,820 gallons per day when operating the evaporative air inlet cooler. Does this number include anything else?

This includes only the evap cooler consumption.

How much groundwater will be needed per day for cooling system make-up? How about filling the closed loop system? How much ground water will the project use per day in total (not including evaporative air inlet cooling)

The cooling water will not need any daily makeup. The exact system volume has not been determined, but we expect a one-time fill of 10,000-20,000 gallons. Makeup will be required following future maintenance and repairs on portions of the system.

Other intermittent uses are as follows:

Off-line water wash: 3,000 gallons/wash.

Fire water mist skid: Initial fill and re-fill after discharge. Exact tank size is TBD, but is expected to be less than 5,000 gallons.

April 27, 2016

Was the box relocated? If so, was it relocated at the generating plant?

It was not relocated.

With the nesting box no longer in place, what is the expectation that peregrine falcons will return to the generating plant this year?

Yes, they have returned to the plant site.

Could a pair nest at the stack anyway with the nesting box removed?

Recent reports from plant personnel indicate they may be nesting on the roof of the boiler building.

May 4, 2016

"Softened" water. Is the ground water softened prior to use in the fin fan cooler?

Prior to use in the fin fan cooler, water is treated using a Reverse Osmosis (RO) process to remove impurities. Note: as part of the RO system water is put through a softener prior to the actual Reverse Osmosis.

Well Water → Softener → Reverse Osmosis → Closed Cooling Initial Fill

My softener at home uses water to make water. Is this the case for the softener at the plant? If so, how much water are we talking about? (This appears to be the case based on Section 4.3.)

Water is periodically backflushed through the softener based on hardness to remove minerals from the softener resin. Approximately 3% of water into the softener is used for softener regeneration.

Does the water going into the evaporative cooler (intake air cooler) need to be softened or go through the reverse osmosis/makeup demineralizer?

The existing U5 evaporative cooler uses a softener for treatment.

The U6 Combustion Turbine manufacturer's quality requirements are 70% RO water mixed with 30% well water. As noted above all RO water goes through a water softener as part of the RO process.

If so, do those process take water to make water? If so, how much water are we talking about?

Through the RO treatment process, approximately 75% of the water is recovered, and 25% is lost as waste.

I imagine pump seals and pump drains will be serviced now with groundwater. I still need to know where the water goes after it is used. Does it evaporate? Wastewater treatment? Closed loop system? Same questions for misc. uses and fire suppression. Section 4.3 provides some of this information, but I guess I don't understand entirely, especially considering it says process water is discharged into Black Dog Lake but Section 4.2.4 says no significant additional thermal loading to surface waters. Also, I guess I don't know what "process water" is in Section 4.3. And if it is discharged to the lake, how does it get there?

The pump seal water that was previously mentioned was to be used on river water pumps. The purpose of the seal water is to provide the seals with clean water to extend their life. U6 will not have any river water pumps, therefore it will not consume any water as pump seal water. The closed loop cooling pumps do not consume any seal water.

The misc. uses are discharged to the following locations:

On-line water wash: This water is consumed by the combustion turbine in operation. It is discharged as vapor through the CT exhaust stack.

Off-line water wash: This water is collected in a temporary tank. Here it is tested for contaminants. If it is acceptable, it is discharged to the plant wastewater system. If it is not acceptable, it is shipped offsite for disposal.

Fire water mist skid: In the event of a fire or any system discharge, this water is collected through floor drains and processed by an oil-water separator to remove any oil. After passing through the oil water separator, it is discharged to the plant wastewater system.

Waste water from the softener regeneration, reverse osmosis waste and evaporator cooling blowdown all become process water. Process water is combined with Unit 5 process water and will be sent to the process water pond. From the process water pond, water will be monitored and discharged to Black Dog lake under the requirements of the plant's NPDES permit.

Please explain in greater detail the last paragraph on page 29 regarding thermal discharge. "With closed cycle systems, there will be no...."

The closed loop system takes hot water from the equipment and pumps it through a series of air-water heat exchangers with fans. The heat is removed from the water and discharged to the air. The cooled water returns to the system to cool the equipment. Since there is no input or output of water to the system, no heat is added to the river.

Public Safety

- 1) Please provide information regarding safety for crews during project construction.
- 2) Please provide information regarding safety of staff and visitors during operation.

This should include a discussion regarding construction, fire, and electrocution. For an example of the type of discussion I'd like to provide in the EA, please refer to page 40 of the Calpine EA.

<http://mn.gov/commerce/energyfacilities/documents/34238/EA%20Text,%202015-620,%20Mankato%20Energy%20Center%20Expansion.pdf>

There are multiple layers of safety requirements for all Xcel projects starting with federal OSHA standards, Minnesota OSHA requirements, Xcel Energy corporate requirements and site safety requirements. Each work task is evaluated as to the safety requirements for that task and only trained and qualified individuals are allowed to perform those tasks. There are many different types of tasks that require specific safety procedures, equipment and training. All project activities will be performed in compliance with federal and state OSHA requirements.

The project construction area will be restricted to those that have direct activities in the area. Plant staff has annual training required for operation of the plant and the project area will have a designated boundary. Visitors will be escorted by project staff when in the project area and all visitors to the plant are escorted or restricted to specific areas.

Fire and Electrocution

The power generation equipment at the Black Dog plant and the equipment proposed for the Unit 6 project combust natural gas at high pressure and temperature and convert this heat energy to electrical power. As a result, there is a risk of fire or explosion and a risk of electrocution. However, because of systems and

controls in place at the Black Dog plant, because access to the site is controlled, and because the site is relatively distant from populated areas (approximately one-half mile), the risk to public health and safety from these potential accidents is anticipated to be minimal.

Potential impacts due to safety risks at the plant are minimized by a number of controls at the site including training, personal protective equipment, and signage. All plant employees participate in on-going safety training. All employees, contractors, and visitors are required to use appropriate personal protection equipment, e.g., hard hats, safety glasses, fall protection. Employees assigned to specific tasks are trained in the proper use of safety equipment required for the task. The Black Dog plant is equipped with a security system and a fire suppression system. The fire suppression system includes a diesel-fueled fire pump.

The city of Burnsville provides any fire, police, or rescue services needed at the plant. Accordingly, public health impacts from a potential fire at the Black Dog plant are anticipated to be minimal.

The Black Dog plant utilizes step-up transformers and electrical switchgear to commute the electrical power generated at site to the adjacent substation. The switchgear includes circuit breakers and relays that de-energize electrical equipment should a structure or conductor fall to the ground or should electrical equipment otherwise fail. Accordingly, public health impacts resulting from electrocution are anticipated to be minimal.

Mitigation

Impacts to public health and safety as a result of fire or electrocution accidents at the Black Dog plant are anticipated to be minimal; thus, no mitigation measures are proposed.

Supply Pipeline

Please provide an update regarding the natural gas supply pipeline. Has a contract been issued? What process will be used to permit the pipeline project? If the process will not be one administered by EERA, please provide a paragraph or two description of the permitting process. Has a permit application been filed? What are anticipated timelines? Also, is there a preferred route? By this I mean is there a general conceptualization of where the pipeline might be routed available for the public, for example, a public fact sheet regarding the project? If there is, I would like to see that. If there isn't something publically available at this time, simply let me know and that will suffice.

The contract for supplying the natural gas to the plant was competitively bid and awarded to NSP Gas. A route permit application will be filed with the EERA and MPUC in June; approval is anticipated in late 2016. We are currently evaluating the route options, working with input from key stakeholders such as the cities of Burnsville and Eagan, the U.S. Fish and Wildlife Service, and the Minnesota Department of Natural Resources. A fact sheet has not yet prepared.

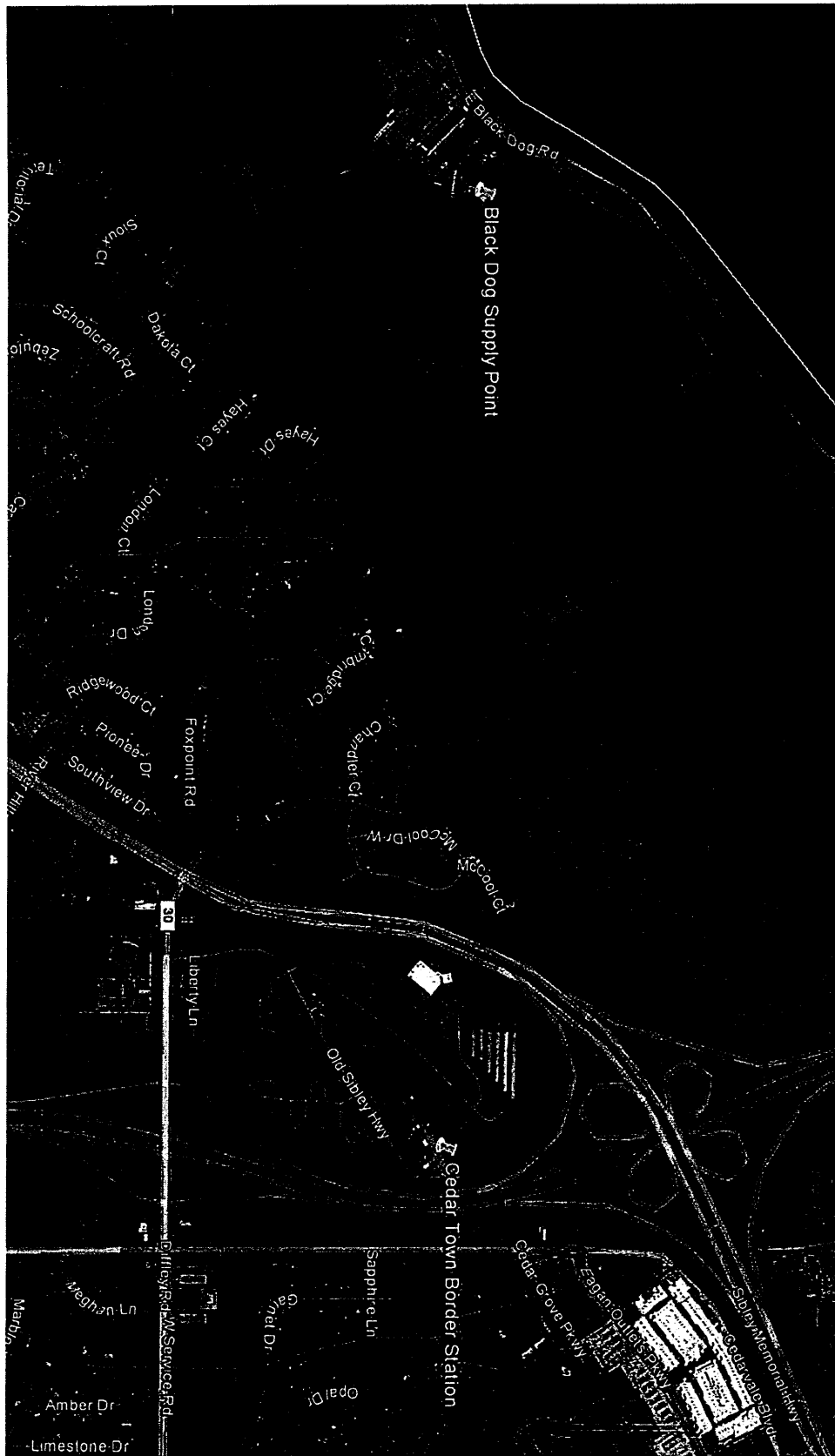
Project Schedule

If possible, please provide a more detailed project schedule for installation of the exhaust stack and intake air cooler. Mainly, I want to know if construction related work on the roof will begin prior to March/April of 2017?

The construction schedule we have available is moderately detailed and not available for public release. However, in answer to the specific question significant exterior work will not begin until after the winter of 2016/2017 as building heat is an issue and the schedule allows the roof and South wall penetrations to not occur earlier than the spring 2017 timeframe. It is anticipated these two activities would begin no earlier than April 2017.

GIS Data

Please provide shapefiles for the locations of the fin fan cooler and the natural gas supply line termination/on-site natural gas pipeline starting point. (Based on my understanding of the project, I want to show visually that the fin fan cooler is 50 feet from Black Dog Lake meeting Burnsville zoning setback requirements. I assume this is also the case for the on-site gas delivery point. This information will also be useful should I decide to include a detailed project overview map.)



May 17, 2016

Is Table 4.3 still accurate?

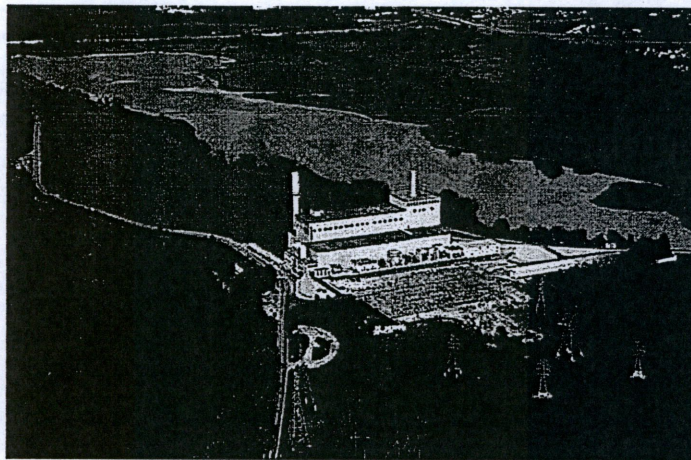
System	Existing Facility 5-year Average	Existing Facility Maximum Potential	Expansion Project Maximum Potential	Combined Facility Maximum Potential
Wastewater Discharge (MGD ¹)	0.2 long term includes days of no (0) discharge (3.4 over discharge days)	13.5 (for present arrangements: batch pond release over 3 days (48 hours) every 1-4 months)	0.038 MGD (Summer only)	<p><u>Summer:</u> 0.15 MGD max</p> <p><u>Winter:</u> 0.08 MGD max</p> <p>(Based on continuous discharge, long term average), may approach 0.432 MGD, 1.2 MG Batch Total on periodic basis if future pond design allows batch release similar to present)</p>

Appendix D

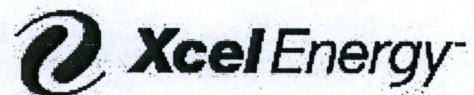
Air Emissions Permit Major Amendment Application

Air Emissions Permit Major Amendment Application

Black Dog Generating Plant Unit 6 Combustion Turbine Project



Submitted by:



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B	Project Emission Calculations
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Executive Summary

Xcel Energy proposes to construct a new combustion turbine (CT) with approximately 215 megawatts (MW) of natural gas fired generating capacity at its Black Dog Generating Facility (Facility) located in Burnsville, MN. The proposed CT, referred to as Unit 6, will be of simple cycle configuration, and operate as a peaking service. The Units 3 and 4 coal-fired boilers were decommissioned in April 2015. All coal activities at the Facility were ceased at this time. The existing Unit 5/2 Combustion Turbine will remain in service along with the existing emergency engines.

Construction for the Unit 6 Combustion Turbine Project (Project) will begin in June 2016 and will take place in the location of the decommissioned Unit 4 Boiler. Commercial operation is expected to follow in 2nd quarter 2018. The proposed combustion turbine will be a GE model, equipped with low-NO_x burners. Emission calculations, ambient air quality analysis, and regulatory analysis are provided in this application.

Project ancillary equipment will include the extension of the existing natural gas pipeline and addition of components from the natural gas distribution system for Unit 6. The necessary electrical equipment breakers for Unit 6 will be reused from previously installed breakers serving Units 3 and 4.

The Project will avoid applicability of Prevention of Significant Deterioration (PSD), and remain a minor source of hazardous air pollutants (HAPs) by proposing an annual fuel usage limit for the proposed Unit 6 CT. The enclosed permit application forms include an annual fuel usage limit of less than or equal to 6,457,726 MMBtu per year for the Unit 6 CT. The PSD applicability determination also includes emission calculations from startup and shutdown (SUSD). Separate limits for SUSD and combustion tuning are also proposed as part of this application. Proposed compliance methods for the fuel usage limit, SUSD limit, and tuning limit are described further in Section 3.

The decommissioning of Units 3 and 4, and the addition of the new auxiliary boiler (EU 029) are not part of the Project and occurred independently of the Unit 6 CT Project. However, they will be included as creditable contemporaneous changes for the PSD analysis. Additional discussion is provided in Section 1.

Xcel Energy has completed an air dispersion modeling analysis to demonstrate that emissions from the facility will not cause or contribute to a violation of ambient air quality standards, nor PSD increment standards. The proposed project triggers remodeling according to the current facility permit (Permit No: 03700003-011). A Significant Impact Level (SIL) analysis was completed as part of preliminary modeling for particulate matter less than 10 microns (PM₁₀) and nitrogen dioxide (NO₂). Results indicate that emissions from the project do not result in predicted maximum ambient concentrations of criteria pollutants above significant ambient impact levels, and therefore further modeling is not required. Results from the modeling analysis along with modeling procedure and assumptions are provided in Appendix C.

The Unit 6 CT will be subject to New Source Performance Standards (NSPS). Applicable regulations include 40 CFR 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines (NSPS KKKK) and Subpart TTTT: Standards of Performance for Greenhouse Gas Emissions (NSPS TTTT). Compliance with NSPS KKKK will be demonstrated

October 2015

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with Continuous Emission Monitoring Systems (CEMS) for nitrogen oxides (NO_x) and either fuel purchase contract specifications or fuel sampling to determine continuous sulfur dioxide (SO₂) composition. NSPS TTTT will require Unit 6 to comply with a heat input limitation of 120 lb CO₂/MMBtu. Compliance for the requirement will be demonstrated by fuel purchase records. Section 6 provides additional discussion on the applicable regulations for the Project. Environmental Review was not required for the Project; however a Site Permit was submitted to the Public Utilities Commission. Neither Air Emissions Risk Analysis (AERA), nor Compliance Assurance Monitoring (CAM) is required for the Unit 6 CT Project.

While the decommissioning of the Unit 3 and 4 boilers is not part of the proposed Unit 6 CT project with respect to PSD, the decommissioning does have an effect on the total facility emissions of Black Dog Generating Facility. Below is a table providing a historical overview of the total facility potential emissions pre-decommissioning of Units 3 and 4, for the present scenario with Unit 5/2 only, and for the future scenario including the proposed project. As shown in Table E-1 below, there is a large reduction in total facility potential emissions following the decommissioning of Units 3 and 4.

Table E-1. History of Total Facility Limited Potential Emissions from Black Dog Generating Facility

Pollutant	Pre- Decommission	Present Scenario	Future Scenario	Pre-Decommission to Future Scenario
	Units 3, 4 and Unit 5/2* (tpy)	Unit 5/2 Only (tpy)	Units 5/2 & 6 (tpy)	Change in Total Facility Emissions (tpy)
PM	4,120	47.6	57.8	-4,062
PM ₁₀	8,167	87.0	97.3	-8,070
PM _{2.5}	944	87.0	97.3	-847
NO _x	14,750	672	776	-13,975
SO ₂	6,995	10.9	21.8	-6,973
CO	1,949	809	986	-963
VOC	100	25.5	47.5	-52.7
Lead	0.167	0.000187	0.00177	-0.165
CO _{2e}	4,085,624	1,273,205	1,657,857	-2,427,767
Total HAPs	79.0	3.58	12.6	-66.4

*Pre Unit 3/4 scenario includes ancillary equipment such as coal/ash handling equipment and emergency engines. Present and future scenarios include ancillary equipment for emergency engines only.

1.0 Prevention of Significant Deterioration Applicability

Xcel Energy's Black Dog Facility is currently subject to state and federal PSD requirements as the facility qualifies as a major stationary source under the PSD rules, defined in 40 CFR 52.21(b)(1)(i). The existing total facility potential emissions of particulate emissions (PM), PM₁₀, PM less than 2.5 microns (PM_{2.5}), SO₂, nitrogen oxides (NO_x), volatile organic compounds (VOC), and carbon monoxide (CO) are each greater than the PSD major source threshold of 100 tons/yr. The existing total facility potential greenhouse gas (GHG) emissions are greater than the PSD major source threshold of 100,000 tons/yr.

If emissions of one or more regulated pollutants from a project at an existing major facility exceed the major modification thresholds, the project is subject to PSD review. The definition of major modification under 40 CFR Part 52.21(b)(2)(i) is the following:

Major modification means any physical change in or change in the method of operation of a major stationary source that would result in: a significant emissions increase (as defined in paragraph (b)(40) of this section) of a regulated NSR pollutant (as defined in paragraph (b)(50) of this section); and a significant net emissions increase of that pollutant from the major stationary source.

Based on Step 1 of the PSD applicability determination, limited potential emissions of PM_{2.5}, NO_x, CO, and carbon dioxide equivalent (CO_{2e}) exceed the PSD major modification thresholds for the Project. Additional discussion on emission calculation methodology is included in Section 4.

Significant net emissions increase takes into account the project emissions as well as any decreases or increases in actual emissions that are contemporaneous with the project. Therefore, Xcel Energy performed Step 2 of the PSD analysis to determine if the Project is a major modification. The analysis incorporated netting exercises which account for total facility creditable contemporaneous decreases associated with the decommissioning of Unit 3 and 4 boilers, and increases associated with the addition of an auxiliary boiler (EU 029). A discussion of these decreases and increases is found in Section 4.3. Total significant net increases were found to be negative; and, therefore PSD does not apply to the Project.

Table 1-1 compares the limited potential emissions associated with the proposed Unit 6 CT, the net increase accounting for contemporaneous decreases and increases, and the PSD major modification threshold for each pollutant. Contemporaneous decreases and increases were only accounted for in net increase values for pollutants where Unit 6 CT PTE values exceeded the PSD thresholds as per CH-04a and CH-04d form instruction.

Table 1-1 Unit 6 GE CT Emissions Increase and PSD Applicability

Pollutant	Limited Potential Emissions (tpy)	PSD Analysis Step 2 Net Increase (tpy)	PSD Major Modification Threshold (tpy)
PM	10.26	10.26	25
PM ₁₀	10.26	10.26	15
PM _{2.5}	10.26	-44.9	10
NO _x	103.5	-6,017	40
SO ₂	10.98	10.98	40
CO	177.3	-18.49	100
VOC	22.02	22.02	40
Lead	1.58E-03	1.58E-03	0.6
CO ₂ e	3.78E+05	-1.20E+06	75,000
Asbestos	NA	NA	0.007
Beryllium	NA	NA	0.004
Mercury	NA	NA	0.1
Vinyl chloride	NA	NA	1
Hydrogen sulfide	NA	NA	10
Sulfuric acid mist	1.35E-03	1.35E-03	7
Total reduced sulfur	NA	NA	10
Reduced sulfur compounds	NA	NA	10

2.0 Project Description

As mentioned previously, Xcel Energy proposes to construct a new Unit 6 Simple Cycle CT with approximately 215 megawatts (MW) of natural gas fired generating capacity at its Black Dog Generating Facility for operation as a peaking service. Construction is expected to begin in June 2016 with commercial operation following in 2nd quarter 2018. The existing Units 3 and 4 pulverized coal fired boilers have been decommissioned along with all of the coal handling activities. The existing Unit 5/2 Combustion Turbine will remain in service along with the existing emergency engines and auxiliary boiler.

2.1 PROJECT SITE

The project site is located in Burnsville, Minnesota in Township 27N, Range 24W, Sections 13, 22, 23, 24, 26 and 17 in Dakota County on the Minnesota River, on property owned by Xcel Energy. The new Unit 6 CT will be constructed in the old Unit 4 boiler area within the existing facility site. A new exhaust stack will be approximately 200 feet tall and installed adjacent to the unit. The facility location and surrounding area is shown in Figure 2-1 at the end of this section. The project location within the site is shown on Form GI-03 located in Appendix A.

2.2 GENERATING TECHNOLOGY

A simple cycle facility refers to a generation block with one combustion turbine generator. The combustion turbine will be a GE 7F5 Series model. The Project proposes an annual fuel usage limit of less than or equal to 6,457,726 MMBtu per year for the Unit 6 CT, limiting use of the CT, as it will operate as a peaking power supply. See Section 3 for further discussion of the proposed fuel usage limit and compliance demonstration.

The proposed combustion turbine is an F-Class model, which utilizes compressed air and fuel to produce electricity and high temperature exhaust gas. Model F class combustion turbines have fast start capability, reaching 150 MW in 10 minutes from a cold start, and operate in a range of 50 to 100 percent load while meeting emission limits, with faster ramp rates over the load range. Maximum output during summer heat and humidity conditions is approximately 215 MW. Both the base performance at full load capacity and heat rate, and the maintenance and overhaul cycles have been significantly improved from past models. The proposed combustion turbine will be fired by natural gas only.

The combustion turbine consists of the following equipment in series:

- ▲ an inlet air filter;
- ▲ a compressor, where air is drawn in and compressed;
- ▲ a combustor, where fuel is mixed with the compressed air and burned;
- ▲ a power turbine, where the combusted gases expand to rotate a turbine;
- ▲ an electric generator; and
- ▲ an evaporative cooler.

Air pollution control equipment for the proposed combustion turbine includes low-NO_x burners. These burners are designed to maintain a stoichiometric fuel-to-oxygen ratio by premixing and introducing the minimum amount of oxygen containing air into the combustion chamber allowing the fuel to burn. This "lean" ratio results in a relatively cool

combustion zone. NO_x production increases in high-temperature zones; therefore, a lower temperature combustion zone will reduce the NO_x produced. Low-NO_x burners effectively limit the NO_x and CO formation in simple cycle combustion turbines, and thus no other control devices are necessary for these pollutants. In addition, natural gas combustion produces minimal particulate and SO₂ emissions; therefore no specific control equipment is required for either pollutant.

2.3 ANCILLARY EQUIPMENT

There are fugitive emission sources from ancillary equipment, which will be associated with the Unit 6 CT. These include increased fugitive emissions from extension of the natural gas piping system, and previously existing fugitive emissions from electrical equipment breakers insulated with sulfur hexafluoride (SF₆), which will be re-used for the Unit 6 CT.

3.0 Requested Permit Changes

The following section addresses the requested changes to the current permit as a result of the Project. These proposed changes are also included in the required CD-01 Forms included in Appendix A.

3.1 FUEL USAGE LIMIT AND COMPLIANCE DEMONSTRATION

An annual fuel limit is proposed, which will allow annual emissions from the Unit 6 CT Project to remain below PSD threshold values. An annual fuel usage limit of less than or equal to 6,457,726 MMBtu/year is proposed for the Unit 6 CT as a 12-month rolling sum of natural gas. This fuel use limit corresponds to an annual capacity factor of 33%. Compliance will be demonstrated through monthly records of the total annual rolling fuel usage. The monthly fuel use will be determined by multiplying the actual natural gas consumption for the Unit 6 CT in cubic feet by the energy content of the fuel obtained by supplier specifications, or assumed to be a standard 1020 Btu/scf. Monthly fuel use will be summed for the most recent 12 months and compared to the 12-month rolling limit for the Unit 6 CT.

3.2 STARTUP/SHUTDOWN EMISSION LIMITS

The maximum hourly emissions for some pollutants differ from normal operation during times of SUSD; therefore, separate limits for SUSD are required. A limit on the total annual operating hours of SUSD is proposed for the Unit 6 CT. Pound per event emission estimates based on worst case vendor data are converted to annual hours of SUSD using a worst case estimate of annual SUSD events. Using this method, a limitation of less than or equal to 260 operating hours of SUSD per year is proposed. Compliance will be demonstrated for the annual hours of SUSD events limitation by tracking the annual operating hours of SUSD events.

Normal operating mode for the Unit 6 CT is considered to be operation at 50 percent or greater of the maximum potential load based on ambient conditions at the time of operation when combusting natural gas. An event is defined as a period of operation outside of normal operating mode, including startup, shutdown, and malfunction. A startup event begins when fuel flow to the combustion chamber starts, and ends when the control parameter "L30OUT_ALM" reads "False". A shutdown event begins when the control parameter "L30OUT_ALM" reads "True", and ends when fuel flow to the combustion chamber ceases.

Xcel Energy is proposing that the SUSD limit listed above will not be in effect until after shakedown occurs for Unit 6.

The Project shakedown is defined as the period of time commencing on the day of initial start-up of Unit 6 and terminating on the earlier of the following three dates:

1. 180 days after initial start-up of Unit 6, or
2. 60 days after achieving maximum production of Unit 6, or
Submittal of successful Compliance Test and CEMS Certification reports of Unit 6.

3.3 COMBUSTION TUNING LIMITS

The maximum hourly emissions for some pollutants differ from normal operation during combustion tuning; therefore, separate limits are proposed for combustion tuning.

Combustion tuning is the operation of the Unit 6 CT for performance tuning operations after a unit overhaul, or as part of routine maintenance and testing, after the CT shakedown is complete. A NO_x limit of less than or equal to 100 ppm by volume at 15 percent oxygen on a dry basis using a 1-hour average is proposed for tuning operations. This limit applies only during combustion tuning, and to the stack/vent for the Unit 6 CT. The NO_x CEMS will be used to determine compliance with the proposed limit. Combustion tuning operating hours will be limited to less than or equal to 25 hours per year on a 12-month rolling sum basis for the Unit 6 CT.

3.4 TOTAL FACILITY SO₂ DATA REQUIREMENT RULES

In order to address total facility compliance with the SO₂ data requirement rules, an SO₂ limit for the total facility is also included in this major amendment permit application. It is proposed that the total facility annual emissions of SO₂ be limited to less than or equal to 100 lbs SO₂ per year. Compliance will be demonstrated through annual emissions inventory reporting. This limit and compliance demonstration is not related to the Unit 6 CT Project, but is incorporated into this amendment as a separate total facility CD-01 form in Appendix A.

4.0 Emission Calculations

This section discusses the emissions associated with the individual emission units that will be installed as part of the Project, as well as the contemporaneous past actual emissions associated with the previously decommissioned coal-fired plant, and contemporaneous potential to emit associated with the previously installed EU 029 auxiliary boiler. This discussion supplements the emission calculations provided in Appendix B. The Project will include the following emission unit groupings:

- A. Natural Gas-Fired Simple Cycle Combustion Turbine
- B. Natural Gas Piping Components

4.1 COMBUSTION TURBINE

Operational and emissions data have been provided and analyzed for the GE F-Class turbine. This data includes operational and emissions data for natural gas, different load scenarios, various ambient temperatures, and operating scenarios. The data also includes SUSD emissions cases. The calculations based on the worst-case operational and emissions data calculations have been included in Appendix B, and are discussed below.

Potential total PM (PM, PM₁₀, and PM_{2.5}), NO_x, CO, and VOC emissions were calculated using the worst-case emission rates derived from the GE turbine vendor data including all ambient temperatures, and all load and operating scenarios. The emission values represent the calculated maximum controlled emissions from data at ambient conditions for the simple cycle system. SO₂ emissions rates were not provided by the vendor, and were calculated using an AP-42 Section 3.1 "Stationary Gas Turbines" (rev 04/00) Table 3.1-2a emission factor. This emission factor assumes 100% sulfur conversion to SO₂ for a worst case. Sulfuric acid mist emissions were determined using EPRI's "Estimating Total Sulfuric Acid Emissions from Stationary Power Plants" (03/12) document. This method is demonstrated in the emissions calculations included in Appendix B.

Annual NO_x, CO and VOC emissions from the GE manufactured CT include the contribution of emissions from SUSD events. The lb/event values were determined using the highest lb/event value at 50% load at the lowest ramp speed from startup and shutdown events. The annual emissions were then calculated based on the estimated worst case annual number of events and the duration of each event. These SUSD emission quantities were added to steady state emissions for the remaining operating hours of the year, given a 33% annual capacity factor, which corresponds to the proposed fuel usage limit for Unit 6. Additional information on the calculation methodology is provided in the data calculation sheets included in Appendix B. Limits on the annual hours of SUSD events for the proposed Unit 6 are discussed in Section 3, and are included in the Forms in Appendix A.

Greenhouse gas emissions are based on emission factors from 40 CFR Part 98 Subpart C (GHG Mandatory Reporting Rule, Combustion); converted from kg/MMBtu to lb/MMBtu based on 2.2046 lb/kg. Global warming potentials (GWP) conversion factors are from Table A-1 to Subpart A of Part 98—Global Warming Potentials. Annual emissions include the proposed fuel use limit for the unit.

Hazardous air pollutant (HAP) emissions were calculated using the maximum manufacture heat input capacity and emission factors taken from AP-42, Chapter 3.1 "Station Gas Turbines" (4/00), except the emission factor for hexane, which was taken from 1.4 "Natural Gas Combustion" (07/98). Annual emissions include the proposed fuel use limit for the unit.

4.2 NATURAL GAS PIPING

As mentioned previously, natural gas is currently metered and delivered to the site via pipeline, and additional piping will be installed for the Unit 6 CT. Greenhouse gas fugitive emissions from the natural gas pipeline system (FS 018) will be modified to include emissions associated with the addition of the Unit 6 CT. The emissions for the total facility fugitive emissions will include the existing Unit 5/2 and Unit 6, and net increases from U6 will be taken into account in netting calculations. The fugitive components for Units 3 and 4 have been previously decommissioned and are not included in the total facility calculation. The FS 018 emissions increase associated with Unit 6 are calculated as maximum potential to emit based on continuously full pipes for a conservative approach, while existing Unit 5/2 emissions are calculated as past actual emissions.

Greenhouse gas emission factors are provided for valves, flanges/connectors, relief valves, and open-ended lines in 40 CFR Part 98 Subpart W "Mandatory Reporting of Greenhouse Gases: Petroleum and Natural Gas Systems; Final Rule" Table W-7.

4.3 MAJOR MODIFICATION DETERMINATION

As mentioned above, if emissions of one or more regulated pollutants from a project at an existing major facility exceed the major modification thresholds, the project is subject to PSD review. The definition of major modification under 40 CFR Part 52.21(b)(2)(i) is the following:

*Major modification means any physical change in or change in the method of operation of a major stationary source that would result in: a **significant emissions increase** (as defined in paragraph (b)(40) of this section) of a regulated NSR pollutant (as defined in paragraph (b)(50) of this section); and a **significant net emissions increase** of that pollutant from the major stationary source.(emphasis added)*

Based on Step 1 of the PSD applicability determination, limited potential emissions of PM_{2.5}, NO_x, CO, and carbon dioxide equivalent (CO₂e) exceed the PSD major modification thresholds for the Project. This represents the first test of major modification.

Significant net emissions increase takes into account the project emissions as well as any increases or decreases in actual emissions that are contemporaneous with the project. Therefore, Xcel Energy performed Step 2 of the PSD analysis to determine if the project is a major modification. The analysis incorporated netting exercises which account for total facility creditable contemporaneous decreases associated with the decommissioning of Unit 3 and 4 boilers, and increases associated with the addition of an auxiliary boiler (EU 029). Further discussion is provided for both the contemporaneous increases and decreases.

4.3.1 Significant Emissions Increase Calculations

As mentioned above, the first step to determine if the Project is subject to PSD review is to calculate the significant emissions increase. Three tests are available to determine PSD applicability under this first step:

- ▲ Past actual to future potential emissions;
- ▲ Past actual to future projected actual emissions; and
- ▲ Hybrid test for projects that include multiple types of emissions.

The Project involves the installation of new emission units and does not include modified or replacement units; therefore, the past-actual-to-future-potential test is applied to the new Unit 6 CT emission unit as well as the associated modification of the natural gas pipeline fugitive emissions increase.

4.3.2 Significant Net Emissions Increase Calculations

Significant net emissions increase takes into account the project emissions as well as any increases or decreases in actual emissions that are contemporaneous with the project. A discussion of the contemporaneous emissions increase and decreases are discussed below.

4.3.2.1 Creditable Contemporaneous Emissions Decrease

An emissions decrease occurs when the baseline actual emissions from an emissions source exceed its limited future emissions. For a decrease to be creditable the limitations on future emissions must be enforceable as a practical matter. The creditable contemporaneous emissions decrease for the Unit 6 CT is associated with the baseline emissions for Units 3 and 4 boilers, which have been decommissioned. The baseline period for electric utility generating units (EUSGUs) should be based on any consecutive 24-months within a period 5 years prior to a particular change. The consecutive 24-month period can be different for each pollutant analyzed, but must be consistent among all units analyzed for a particular pollutant. For each pollutant regulated under PSD, a baseline period of January 2013 – December 2014 was selected.

Past actual emissions were computed for the existing coal-fired boilers in order to be used as part of the significant net emissions project test. Past actual emissions were not included for coal handling and fugitive sources. This is a conservative assumption. All emission sources except for the diesel emergency generators, the existing greenhouse fire pump and the existing combined cycle unit ("Unit 5/2") will be decommissioned as a result of the project. Unit 3 and 4 past actual emissions data for all pollutants, except sulfuric acid mist (H₂SO₄), was obtained from the 2013 and 2014 Air Emissions Inventory Review documents submitted to the MPCA. Sulfuric acid mist emissions were estimated using EPRI's "Estimating Total Sulfuric Acid Emissions from Stationary Power Plants" (03/12) document. This method is demonstrated in the emissions calculations in Appendix B.

4.3.2.2 Creditable Contemporaneous Emissions Increase

An emissions increase occurs when a new emission source is installed, or when an existing emissions source is modified during the contemporaneous period and this results in an increase in emissions. Emissions increases from the project itself and emissions from units that were previously subject to PSD are not included. All emissions increases that occur

during the contemporaneous period are considered creditable. In 2015 an amendment application for the EU 029 Auxiliary Boiler was submitted to the MPCA. This source is considered a creditable contemporaneous increase. Values for emissions increases from the auxiliary boiler were obtained from potential to emit calculations contained in the minor amendment application submitted in February, 2015.

4.3.3 Summary

Table 4-1 provides a summary of the PSD applicability test for the Project for the Unit 6 CT. Emission calculations are provided in Appendix B. As shown below, the Unit 6 CT Project is not subject to PSD for any of the applicable pollutants. This analysis is also shown on the required forms in Appendix A.

Table 4-1 indicates that the Project's net emissions increases are less than the PSD major modification thresholds for all pollutants for the Unit 6 CT. In order to maintain emission below threshold values federally enforceable an annual fuel usage limit has been proposed for the CT as previously discussed.

Table 4-1 Unit 6 CT, GE Model Major Modification Calculations

Pollutant	CT Future Limited Potential Emissions (tpy)	NG Piping Fugitive Emissions Net Increase (tpy)	Contemporaneous Decrease Unit 3 and 4 Boilers (tpy)	Contemporaneous Increase Auxiliary Boiler (tpy)	PSD Analysis Step 2 Net Increase (tpy)	PSD Major Modification Threshold (tpy)
PM	10.26	NA	NA	NA	10.26	25
PM ₁₀	10.26	NA	NA	NA	10.26	15
PM _{2.5}	10.26	NA	-56.7	1.58	-44.9	10
NO _x	103.5	NA	-6,127	6.67	-6,017	40
SO ₂	10.98	NA	NA	NA	10.98	40
CO	177.3	NA	213.3	17.5	-18.49	100
VOC	22.02	NA	NA	NA	22.02	40
Lead	1.58E-03	NA	NA	NA	1.58E-03	0.6
CO ₂ e	3.78E+05	403	-1.60E+06	24,362	-1.20E+06	75,000
Asbestos	NA	NA	NA	NA	NA	0.007
Beryllium	NA	NA	NA	NA	NA	0.004
Mercury	NA	NA	NA	NA	NA	0.1
Vinyl chloride	NA	NA	NA	NA	NA	1
Hydrogen sulfide	NA	NA	NA	NA	NA	10
Sulfuric acid mist	1.35-03	NA	NA	NA	1.35E-03	7
Total reduced sulfur	NA	NA	NA	NA	NA	10
Reduced sulfur compounds	NA	NA	NA	NA	NA	10

5.0 Ambient Air Quality Analysis

An air dispersion modeling analysis was performed for the proposed project. The purpose of the modeling analysis was to demonstrate that the emissions from the facility would not cause or contribute to a violation of the MAAQS and NAAQS and PSD increment standards. Preliminary modeling was conducted to determine whether emissions from the proposed project alone would result in any predicted maximum ambient concentrations of criteria pollutants above the significant ambient impact levels.

According to Air Emission Permit No. 03700003-011, modeling was completed in April 1998 (24-hour and annual PM₁₀) and March 2002 (annual NO_x). The modeling input parameters from those analyses are documented in Appendix D to the permit. The permit states that:

For any changes that affect any modeled parameter or emission rate documented in Appendix D, or are an addition to information documented in Appendix D, a Remodeling Submittal requirement is triggered. This includes changes that do not require a permit amendment as well as changes that require any type of permit amendment.

The proposed installation of the simple cycle combustion turbine (Unit 6) includes adding new modeling parameters and emission rates, which triggers remodeling.

5.1 SIL ANALYSIS

A Significant Impact Level (SIL) analysis was completed as part of the proposed project. Pollutants modeled in this SIL analysis were PM₁₀ and NO₂. The modeled concentrations of each pollutant were compared to their respective SIL value using High First High (H1H) modeled impacts. The SIL modeling analysis was completed for the following averaging periods with the following results:

Table 5-1 Class II Significant Impact Level Modeling Results

Pollutant	Averaging Period	Modeled Impact H1H (µg/m ³)	SILs (µg/m ³) *As of 10/26/2010	Percent of SIL (%)	Exceed SIL?	Radius of Impact (if exceeds SIL)
PM ₁₀	24-Hour	0.11	5	2.18	No	--
	Annual	0.01	1	0.62	No	--
NO ₂	Annual	0.07	1	6.57	No	--

Based on the results above, further modeling is not required for PM₁₀ and NO₂ NAAQS because the impacts from the proposed project do not exceed the SIL.

6.0 Applicable Requirements

The applicable state and federal air quality regulations are summarized in this section. The MPCA forms that identify all applicable requirements are included as Appendix A.

6.1 PSD APPLICABILITY

The Project is not subject to PSD as discussed in Sections 1 and 4. A discussion of the requested fuel use limit and compliance demonstration requirements is found in Section 3, and CD-01 forms.

6.2 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS)

The facility as currently permitted under Air Emissions Permit 03700003-011 is a major source of HAPs. However, following the decommissioning of Units 3 and 4, the total potential facility emissions are below major source thresholds for HAPs. The facility will continue to be a minor source of HAPs following the Unit 6 project with the proposed fuel use limit for the Unit 6 CT. There are no AREA source NESHAPS that are applicable to the facility and proposed Unit 6. A discussion of the requested fuel usage limit and compliance demonstration requirements is found in Section 3, and CD-01 forms.

6.3 NEW SOURCE PERFORMANCE STANDARDS (NSPS)

The Project will have equipment subject to New Source Performance Standards (NSPS). Highlighted NSPS outline all applicable requirements and are included in Appendix A.2 of this application. An overview of key requirements is given below.

6.3.1 NSPS Subpart KKKK

The proposed combustion turbine will be subject to 40 CFR 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines. According to the applicability of NSPS KKKK, Unit 6 will be exempt from 40 CFR 60 Subpart GG: Standards of Performance for Stationary Gas Turbines. The facility will install a NO_x CEMS on Unit 6 in accordance with §60.4345, to demonstrate compliance with the NSPS KKKK limits of 15 ppm, or 0.43 lb NO_x/MWh, while operating at greater than 75 percent of peak load, and at temperatures greater than 0 °F. Compliance with the NSPS KKKK limits of 96 ppm, or 4.7 lb/MWh will be demonstrated during periods of operation at less than 75 percent of peak load, or at temperatures less than 0 °F. Consistent total SO₂ composition of the combustion fuel will be demonstrated either by fuel purchase contract specifications, or through representative fuel sampling in accordance with §60.4365.

6.3.2 NSPS Subpart TTTT

The proposed CT will be subject to 40 CFR 60 Subpart TTTT: Standards of Performance for Greenhouse Gas Emissions. Based on this regulation, a heat input based limit of 120 lb CO₂/MMBtu is required for the CT as its net electric sales will be less than its design efficiency times its potential electric output and the unit will burn natural gas only (Table 2 of Subpart TTTT). For facilities which only burn natural gas, a fuel of consistent composition that results in

a consistent emission rate of 160 lb CO₂/MMBtu, the only necessary compliance demonstration is maintaining fuel purchase records as stated in §60.5520(d).

NSPS Subpart TTTT describes how to calculate net electric sales and potential electric output. Xcel Energy performed the calculation to determine the net electric sales allowed under this regulation based on the design efficiency for Unit 6 times its potential electric output. This value was then compared to the maximum net electric sales for the proposed unit. The allowable percentage of maximum net electric sales is greater than the annual capacity factor corresponding to the proposed fuel use limit for the proposed Unit 6 GE model CT. Therefore, the proposed fuel limit will ensure compliance that the net electric sales will not exceed the design efficiency for Unit 6 times its potential electric output and on-going calculations under Subpart TTTT are not required.

6.4 STATE RULES

6.4.1 Air Emission Standards

In addition to the generally applicable state requirements, the facility has equipment subject to opacity standards. The proposed Unit 6 CT will be subject to Minnesota Rules 7011.2300 for Stationary Internal Combustion Engines (Generators). Unit 6 will comply with the emission limits of 20 percent opacity, and 0.5 lb SO₂ per MMBtu of actual heat input by combusting only natural gas fuel and maintaining fuel purchase records.

6.4.2 Environmental Review

Xcel Energy will apply to the Minnesota Public Utilities Commission for a Site Permit in accordance with the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E and Minnesota Rules 7850). The Site Permit application will contain environmental information as specified by Minnesota Rules 7850.1900, Subpart 3. Data and other information on air impacts is one area that will be covered in the Site Permit application.

6.4.3 Air Emissions Risk Analysis

An AERA was not required as part of the Project. The purpose of the AERA is to assess the potential health risk attributed to air emissions from a given source.

6.5 COMPLIANCE ASSURANCE MONITORING (CAM)

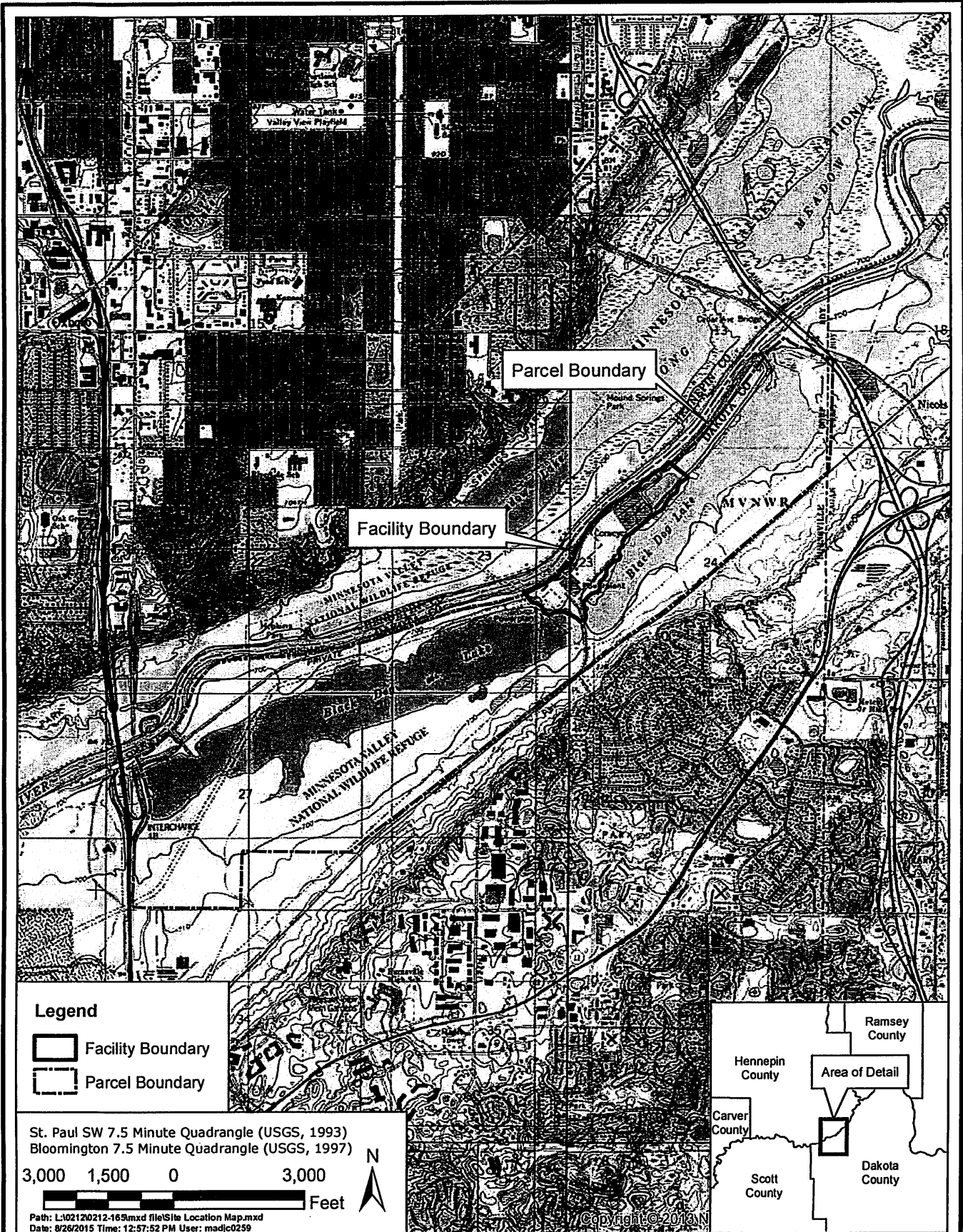
Compliance Assurance Monitoring applies on a pollutant specific basis to emissions units that:

1. Are subject to an emission limit or standard, and
2. use add-on pollution control to achieve compliance with the applicable limit or standard, and
3. have pre-controlled potential emissions greater than the Part 70 major source level for that pollutant.

Proposed pollution control equipment at includes low-NO_x burners, which do not meet the definition of add-on controls under the CAM regulation. Therefore, Unit 6 is not subject to CAM.

Figures

Figure 2-1 Facility Location Map



XCEL ENERGY - BLACK DOG GENERATING PLANT

Site Location Map



AUG 2015

Figure 1

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Appendix E

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CERTIFICATE OF SERVICE

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

**Minnesota Department of Commerce
Environmental Assessment**

Docket No. E002/GS-15-834

Dated this 26th day of May 2016

/s/Sharon Ferguson

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