Black Dog Unit Six Project

eDockets No. E002/GS-15-834

Environmental Assessment

May 25, 2016

MINNESOTA DEPARTMENT OF COMMERCE

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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.

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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.

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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 (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 person[13] 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 meeting[25] 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

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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]

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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 report[38] 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]

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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.

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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]

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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 application[54] 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.

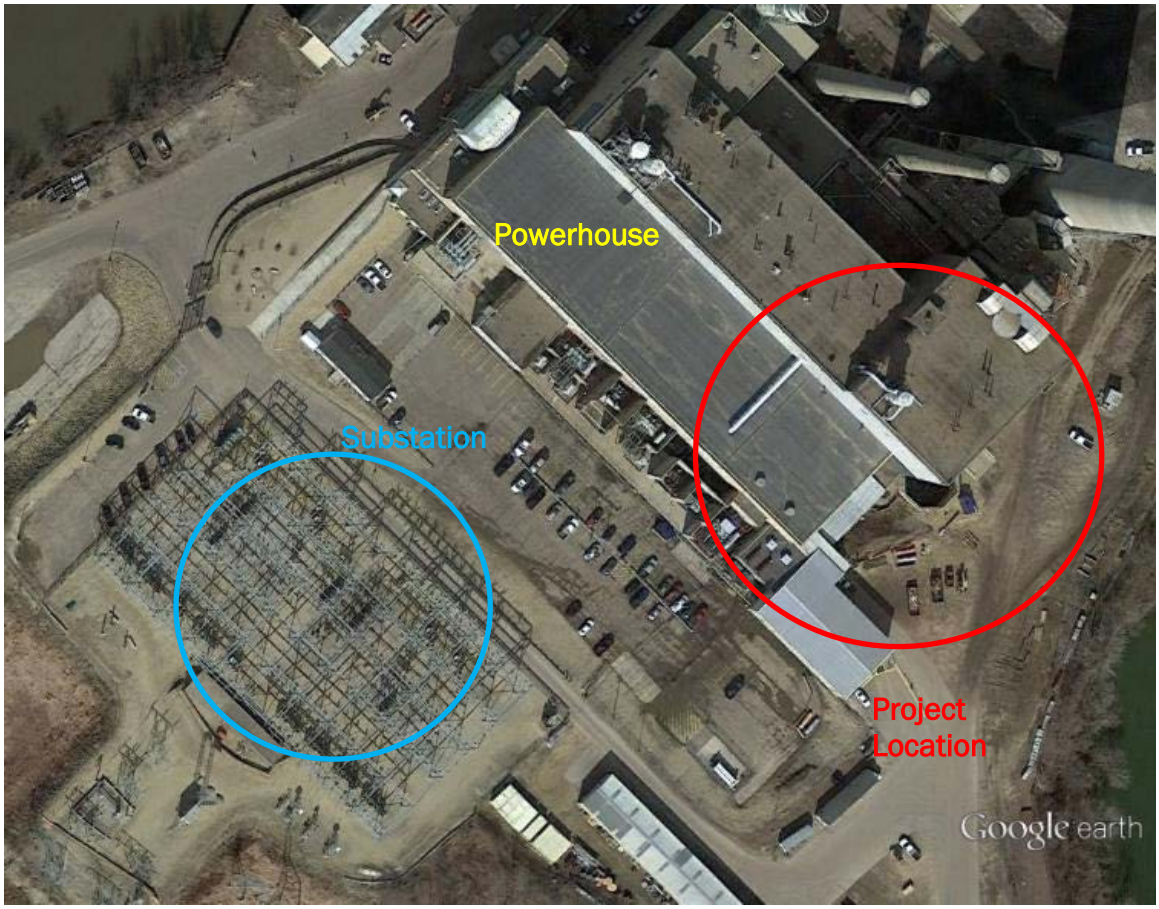
In 2002, a combined cycle natural gas-fired power block (Unit 5/2) replaced Units 1 and 2. Unit 5/2 generates electricity through a natural gas-fired combustion turbine, which is connected to a heat recovery steam generator (HRSG). The exhaust heat from the combustion turbine generates steam within the 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.

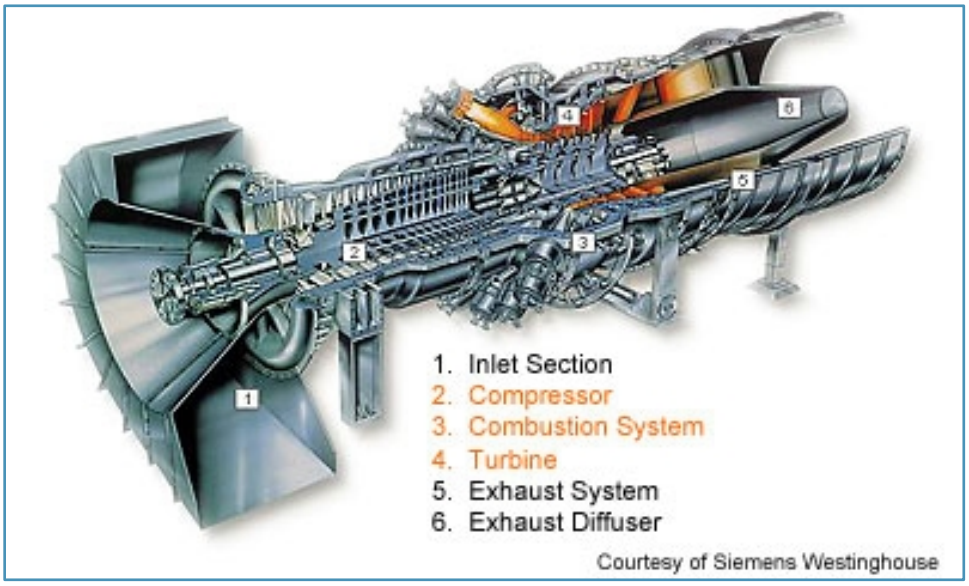
3.2 Project Description

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 Energy[57]

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]

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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]

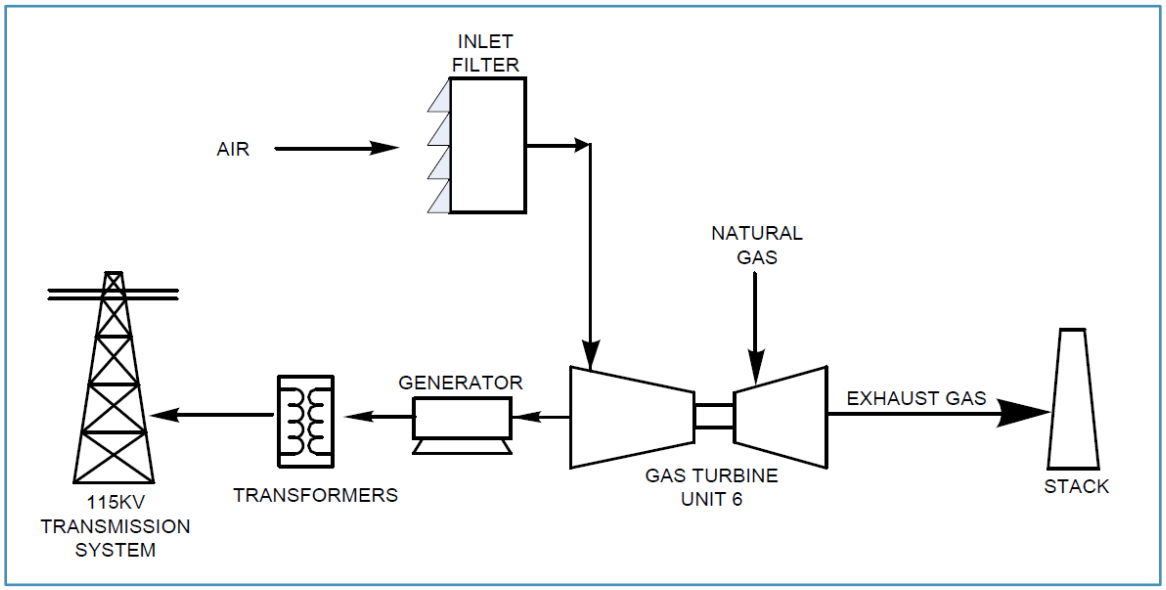
Water Supply

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.

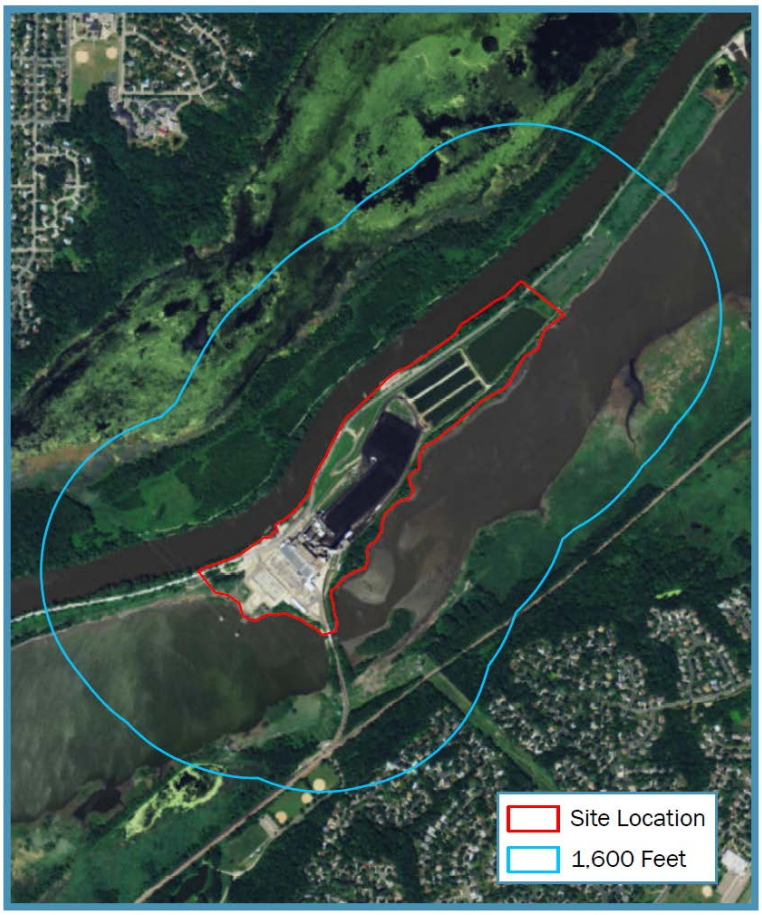
This EA uses the following ROIs to assess potential impacts to resources:

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 Electrocution	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 3,524,583[78] 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.

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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=bkmk.
79 Metropolitan Council (September 2014) *Metro Stats – Prosperity Imbalanced: The Twin Cities Metropolitan Area in 2013*, Retrieved April 20, 2016, from: http://metrocouncil.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.

Figure 9 Current Viewshed from I-35W

Source: Google, Inc.

Figure 8 Current Viewshed from MN-77

Source: Google, Inc.

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

[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, Subsaharan 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

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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 District[95] and the Floodway District[96]. General setback requirements for sewered 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.

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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. L_{10} may be exceeded 10 percent of the time, or six minutes per hour, while L_{50} 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.

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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 L_{10} noise levels of 55.7 dBA and L_{50} of

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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 L_{10} noise levels of 49.1 dBA and L_{50} 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 L_{10} of 48 dBA and L_{50} of 47 to L_{10} noise levels of 47 dBA and L_{50} 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.

Figure 10 Black Dog Park

Source: Google, Inc.

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.

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]

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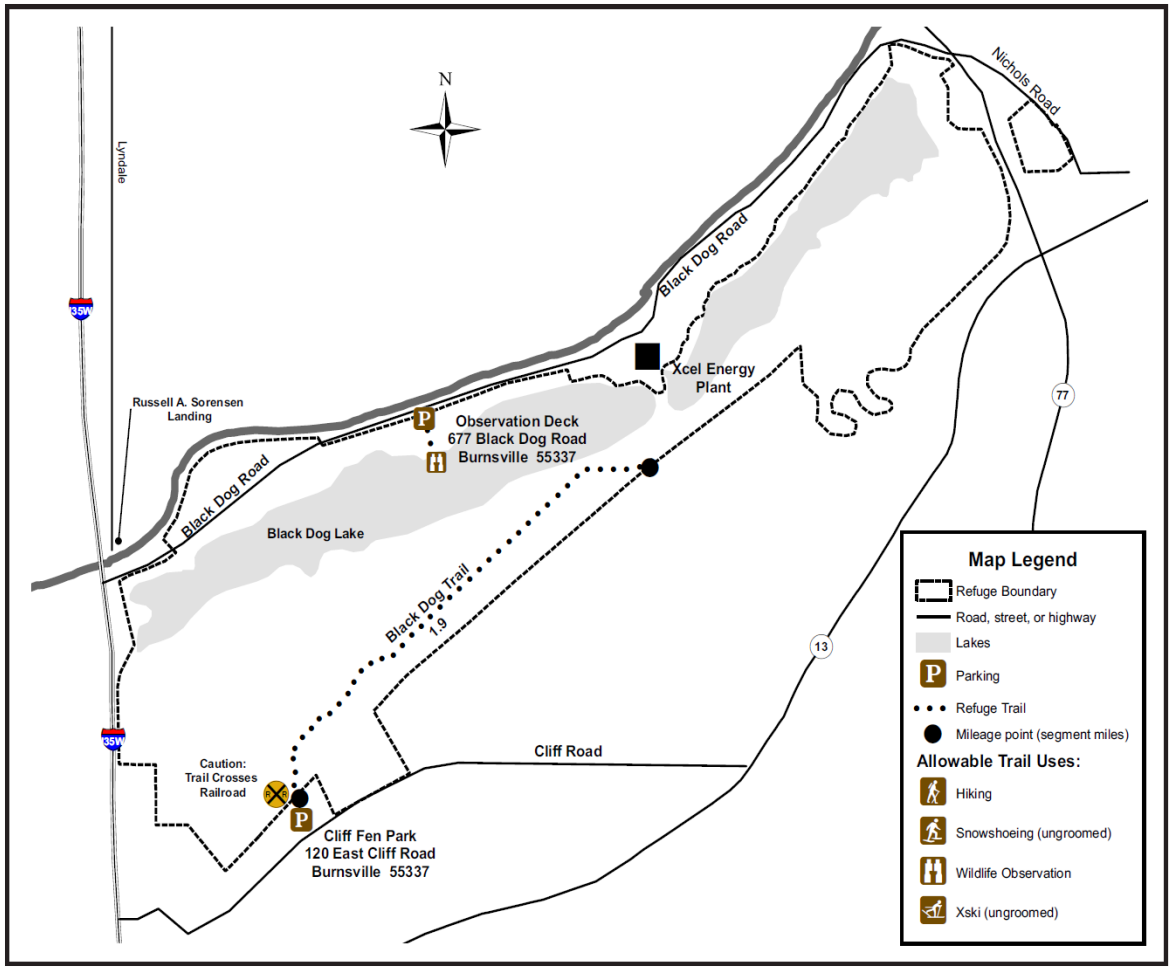
111 Application, page 43.
112 Application, page 43.
113 U.S. Fish and Wildlife Service (n.d.) *Minnesota Valley National Wildlife Refuge Black Dog Preserve Trail Map*, Retrieved March 28, 2016, from: http://www.fws.gov/uploadedFiles/Black%20Dog%20Trail%20Map.pdf#c.
114 City of Burnsville (July 9, 2014) *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 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.[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

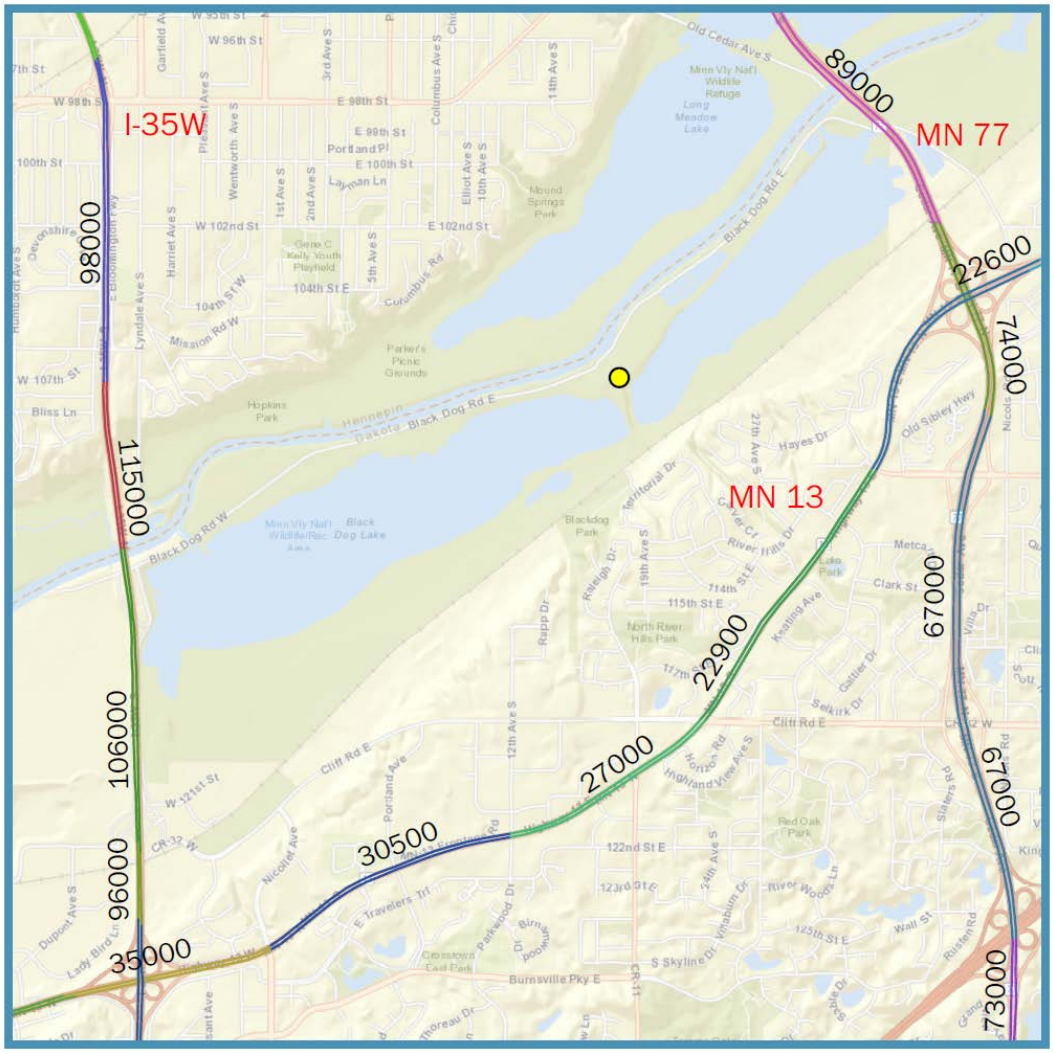
Impacts to roads and vehicular traffic can be mitigated through coordination with appropriate state and local authorities. This includes obtaining all necessary load permits and following all permit stipulations. MnDOT also request the applicant coordinate with their agency to ensure highway construction 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]

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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/lraq-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 (CO_2e) 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.

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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 (SO_2), carbon monoxide (CO), particulate matter less than 2.5 microns ($PM_{2.5}$), particulate matter less than 10 microns (PM_{10}), 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 CO_2e 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 SO_2 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

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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]

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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]

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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.

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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]

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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 Resouces (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=AMACC01150.

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 needed[217]—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 Resoruces (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]

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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 Electrocution	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.