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August 2015

Site Permit Application – Mankato Energy Center Mankato, MN

Docket #: IP-6949/GS-15-620

Prepared for:

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Exceptional outcomes.

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Definitions

Blowdown: Water discharged from the cooling tower which was used to maintain the appropriate quality of water in the cooling tower system.

Combined Cycle Power Train: One combustion turbine generator and one heat recovery steam generator.

Combined Facility: The combined components at the Mankato Energy Center that includes both the Existing Facility and the Expansion Project.

Commission: Minnesota Public Utilities Commission

Dead-end structure: Structure at the end of a transmission line.

Effluent: Outflow of water typically associated with a discharge from an industrial facility

Existing Facility: The Mankato Energy Center, as it exists today, including the land and equipment current owned by Mankato Energy Center I, LLC and operated by Calpine Operating Services Company, Inc.

Expansion Project: The additional equipment required to complete construction of the Mankato Energy Center (an additional combustion turbine, additional heat recovery steam generator, additional cooling tower cells and related ancillary equipment). The components that make up the Expansion Project will be owned by Mankato Energy Center II, LLC and will be operated by Calpine Operating Services Company, Inc.

Gray Water: Treated wastewater effluent that is delivered from the Mankato Waste Water Treatment Plant to the Mankato Energy Center.

High Voltage: Voltage levels above 69,000 volts.

Housekeeping: Operation and maintenance programs at a site with the ultimate goal of preventing or reducing storm water pollutant runoff from site operations into the storm sewer system.

Low Voltage: Voltage levels up to 1,000 volts.

Medium Voltage: Voltage levels higher than 1,000 volts, and equal to or below 69,000 volts.

Operating Costs: Labor, materials, management, and all applicable taxes paid to the appropriate jurisdictions.

Operating Synergies: Actions that will occur for the Combined Facility that will not need to be duplicated between the Existing Facility and the Expansion project.

Oxidation Catalyst Module: Mechanical structure used to control CO emissions from the combustion turbine and duct burner exhaust.

Potable Water: Water that is safe to drink. The facility uses potable water for steam cycle makeup, fire protection, and domestic uses such as drinking water, eye wash stations, showers, toilets, sinks, and other incidental water needs.

Prevention of Significant Deterioration (PSD) Permit: Federal air permit issued by the Minnesota Pollution Control Agency prior to construction.

Process Water: Water used for operation of the Combined Facility, such as control of NOx emissions when the currently installed combustion turbine burns low sulfur fuel oil and for CTG power augmentation and when the CTG burns natural gas.

Selective Catalytic Reduction System: Mechanical structure used to reduce NO_x emissions from the combustion turbine and duct burner exhaust.

Service Water: Water that does not meet drinking water quality standards but is used for domestic purposes, such as water used for hose bibs, pump sealing water, and eye wash stations.

Significant Impact Level: The levels which serve as screening criteria to determine if further analyses are required to verify that the emissions will not cause or contribute to an exceedance of an ambient air quality standard or Prevention of Significant Deterioration increment.

Wilmarth Generating Station: A two-unit generating plant that was built in the late 1940s initially to burn coal but has since been converted to burn processed municipal solid waste

Acronyms

AERA	Air Emissions Risk Analysis
BACT	Best Available Control Technology
BMP	Best management practices
CEM	Continuous Emission Monitoring System
CO	Carbon monoxide
CON	Certificate of Need
COSCI	Calpine Operating Services Company, Inc.
CTG	Combustion turbine generator
DLN	Dry low-NO_x
DNR	Minnesota Department of Natural Resources
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
EQB	Environmental Quality Board
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GHG	Greenhouse gas
GIA	Generator Interconnection Agreement
HHV	Higher Heating Value
HRSG	Heat recovery steam generator
MAAQS	Minnesota Ambient Air Quality Standards
MaSBD	Major source baseline date
MEC I	Mankato Energy Center I, LLC
MEC II	Mankato Energy Center II, LLC
MEQB	Minnesota Environmental Quality Board
MGD	Million Gallons per Day
MISO	Midcontinent Independent System Operation, Inc.
MW	Megawatts
MMBtu	One Thousand British Thermal Units
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MSL	Mean Sea level
MW	Megawatts
NAAQS	National Ambient Air Quality Standards
NAC	Noise area classification
NHIS	Natural Heritage Information System
NO_x	Nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NSP	Northern States Power Company
PM	Particulate matter
$PM_{2.5}$	Particulate matter less than 2.5 microns
PM_{10}	Particulate matter less than 10 microns
PPA	Power purchase agreement
PPMVD	Parts per Million, Volumetric Dry
PSD	Prevention of Significant Deterioration
SCR	Selective catalytic reduction system
SHPO	Minnesota State Historic Preservation Office

Acronyms (Cont.)

SIL	Significant impact levels
SMC	Southern Minnesota Construction Company, Inc.
SWPPP	Stormwater Pollution Prevention Plan
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile organic compound
WWTP	Wastewater Treatment Plant

Application Completeness Checklist

Application Completeness Checklist		
Authority	Required Information	Where
2014 Minnesota Statutes 216B.243	**Certificate of Need for Large Energy Facility**	1.2.4
2014 Minnesota Statutes 216B.2422	**Resource Planning; Renewable Energy**	
Subdivision 5(c)	A certificate of need proceeding is also not required for an electric power generating plant that has been selected in a bidding process approved or established by the commission, or such other selection process approved by the commission, to satisfy, in whole or in part, the wind power mandate of section 216B.2423 or the biomass mandate of section 216B.2424.	1.2.4
2014 Minnesota Statutes 216E.04	**Alternative Review Of Applications**	
Subdivision 1	An applicant who seeks a site permit or route permit for one of the projects identified in this section shall have the option of following the procedures in this section rather than the procedures in section 216E.03. The Applicant shall notify the Commission at the time the application is submitted which procedure the Applicant chooses to follow.	1.2
Subdivision 2, (2)	Large electric power generating plants that are fueled by natural gas;	1.2.1, 2.6
Subdivision 2, (8)	Large electric power generating plants that are powered by solar energy.	--
Subdivision 3	The applicant for a site or route permit for any of the projects listed in subdivision 2 who chooses to follow these procedures shall submit information as the commission may require, but the applicant shall not be required to propose a second site or route for the project. The applicant shall identify in the application any other sites or routes that were rejected by the applicant and the commission may identify additional sites or routes to consider during the processing of the application. The commission shall determine whether an application is complete and advise the applicant of any deficiencies.	2.6

Application Completeness Checklist		
Authority	Required Information	Where
Subdivision 7	The commission shall make a final decision on an application within 60 days after completion of the public hearing. A final decision on the request for a site permit or route permit under this section shall be made within six months after the commission's determination that an application is complete. The commission may extend this time limit for up to three months for just cause or upon agreement of the applicant.	1.2.1
Minnesota Rules Chapter 7030.0040	**Noise Pollution Control**	4.3, 10.0
Minnesota Rules Chapter 7850.1900, Subpart 1.	**Site Permit For Large Electric Power Generating Plant**	
A.	A statement of proposed ownership of the facility as of the day of filing and after commercial operation;	1.2, 1.2.2, 2.1, 2.2
B.	the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated;	2.1, 2.2
C.	at least two proposed sites for the proposed large electric power generating plant and identification of the Applicant's preferred site and the reasons for preferring the site;	2.6, Alternatives not required under alternative process (2014 Minnesota Statutes 216E.04 Subdivision 3)
D.	a description of the proposed large electric power generating plant and all associated facilities, including the size and type of the facility;	2.3, 2.4, 2.7, 2.8, 2.9, 3.0, Figure 3 Process Flow Diagram, Figure 4 General Arrangement, Figure 5 General Water Balance
E.	the environmental information required under subpart 3;	4.0, 5.0, 6.0, 7.0, 8.0, 9.0
F.	the names of the owners of the property for the proposed site;	2.1
G.	the engineering and operational design for the large electric power generating plant;	2.3, 2.7, 3.0, Figure 3 Process Flow Diagram

Application Completeness Checklist		
Authority	Required Information	Where
H.	a cost analysis of the large electric power generating plant, including the cost of constructing and operating the facility that is dependent on design and site;	2.8
I.	an engineering analysis of the site, including how the site could accommodate expansion of generating capacity in the future;	2.9, 3.0
J.	identification of electrical transmission systems, transportation, pipeline, and that will be required to construct, maintain, and operate the facility;	3.0
K.	a listing and brief description of federal, state, and local permits that may be required for the	11.0
L.	A copy of the Certificate of Need (CN) for the Project from the Public Utilities Commission or documentation that an application for a CN has been submitted or is not required.	Exemption language included in 1.2.4
Minnesota Rules Chapter 7850.1900, Subpart 3.	**Site Permit For Large Electric Power Generating Plant**	
A.	A description of the environmental setting for the site;	4.1
B.	a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services;	4.2 through 4.8
C.	a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;	6.0
D.	a description of the effects of the facility on archaeological and historic resources;	7.0
E.	a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna;	8.0
F.	a description of the effects of the facility on rare and unique natural resources;	9.0

Application Completeness Checklist		
Authority	Required Information	Where
G.	identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route; and	10.0
H.	A description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures.	10.0
Minnesota Rules Chapter 7850.2800	**Eligible Projects**	1.2.1
Minnesota Rules Chapter 7850.3100	**Contents of Application**	1.2.2
Minnesota Rules Chapter 7850.3800	**Public Hearing**	1.2.3

Project Summary

The Mankato Energy Center received a Site Permit in 2004 to construct a primarily natural gas fired combined cycle electric generating facility in Blue Earth County, Minnesota. The facility was permitted to consist of two combined-cycle power trains, one steam generator and other ancillary equipment. Each combined cycle power train includes on combustion turbine generator and one heat recovery steam generator. The Mankato Energy Center commenced operations in 2006 with only one combined cycle power train.

On February 5, 2015, the Minnesota Public Utilities Commission ("Commission") issued an Order in Docket No. E002/CN-12-1240 approving a draft power purchase agreement ("PPA") between MEC II and Northern States Power Company, dba, Xcel Energy ("NSP") pursuant to which NSP would purchase energy and capacity from a planned expansion of the Mankato Energy Center. The PPA was subsequently executed by MEC II and NSP and submitted as compliance filing with Commission on May 6, 2015.

The Mankato Energy Center, as it exists today, consists of equipment and land owned by Mankato Energy Center I, LLC and operated by Calpine Operating Services Company, Inc. (both subsidiaries of Calpine Corporation). This land and equipment is referenced as the "Existing Facility" throughout this Site Permit Application. The Existing Facility is capable of producing 375 Megawatts under winter conditions through the combustion of natural gas or fuel oil for a limited number of hours. Mankato Energy Center accesses the transmission grid via the Northern States Power Company's Xcel Wilmarth Substation and under the functional control of the Midcontinent Independent System Operation, Inc., otherwise known as MISO. Under the current power purchase agreement, NSP provides sufficient quantities of natural gas to the Existing Facility through a pipeline owned by Calpine Natural Gas and supplied by Northern Natural Gas. The City of Mankato provides both gray water and potable water of sufficient quantity to operate the Existing Facility. The City of Mankato also accepts all water discharges from the facility. Air emissions are regulated under an existing Minnesota Air Emissions Permit ("Total Operating Permit"). The Mankato Energy Center has not encountered challenges with natural gas or water supply in regards to meeting operational requirements.

The additional equipment required to complete construction of the Mankato Energy Center will be owned by Mankato Energy Center II, LLC and will be operated by Calpine Operating Services Company, Inc. (both subsidiaries of Calpine Corporation). This equipment is referenced as the "Expansion Project" throughout this Site Permit Application and will be solely located within the 25-acres of the Existing Facility. The Expansion Project is capable of producing 345 MW under winter conditions[1] through the combustion of natural gas only (fuel oil cannot be burned in the Expansion Project turbine). The existing offsite infrastructure installed for the Existing Facility (i.e. electrical transmission, gas, water) will be used and is of sufficient capacity to operate the Expansion Project. No upgrades to this offsite infrastructure will affect public use. Air emissions will be permitted via modification of the Total Operating Permit.

[1] Winter capacity values based on reference conditions at 6°F and 68% relative humidity.

The combined features and equipment for both the Existing Facility and the Expansion Project are referenced as the "Combined Facility" throughout this Site Permit Application. The total power generating capacity of the Combined Facility will be 720 megawatts at winter conditions in a configuration that provides a large efficiency advantage over a conventional simple cycle plant. No effects are anticipated due by the Combined Facility on the human environment, public safety, land based economics, archaeological and historical resources, or on the natural environment. Operational noise impacts of the Combined Facility have been modeled and will not adversely affect the surrounding area. Traffic levels in the area will temporarily increase over the construction period. However, current roadways have adequate capacity to accommodate this temporary construction increase. The Existing Facility has received no resident displacement, noise, aesthetic or other complaints since the Existing Facility commenced operation. The Combined Facility is anticipated to be complete and operational by June 1, 2018 with the following operating characteristics:

System (Units-update as you see appropriate just make them the same for the row)	Existing Facility 5-year Average	Existing Facility Maximum Potential	Expansion Project Maximum Potential	Combined Facility Maximum Potential
Cooling Water (MGD[1])	0.344	3.48	2.56	6.04
Wastewater Discharge (MGD[1])	0.159	0.868	0.597	1.465
Service Water (MGD[2])	0.0212	0.363	0.059	0.422
Natural Gas (MMscf/day[3])	4.891	64.75	58.13	122.88
Production (GW-yr[4])	464	3180	2838	6018

1: Million Gallons Per Day; Maximum potential is based on 24 hours of operation with duct burning and make up requirements on 89F day
2: Million Gallons Per Day; Maximum potential is based on 24 hours of operation with two units of duct burning and oil operation on CTG 2 (from the WP 1X1 and 2X1 water balances)
3: One Million Standard Cubic Feet of Natural Gas Per Day; Maximum potential is based on 24 hours of operation with two units of duct burning on a 6F day
4: Giga-watts Per Year; Maximum potential is based on 8760 hours of operation and capacity based on two units of duct burning on average annual 45F day

Mankato Energy Center II, LLC respectfully submits this Site Permit Application to the Minnesota Public Utilities Commission and requests a Site Permit be issued for the Expansion Project by January 15th, 2016 to facilitate the anticipated June 1, 2018 operation date. Notification of this submittal and the applicant's intent to submit the Site Permit Application under the alternative site permitting process was provided to the Public Utilities Commission on June 29th 2015. While a Certificate of Need is normally required to construct a generation facility with a total capacity of 50 megawatts or more, the February Minnesota Public Utilities Commission Order determined that any project selected as a result of the Order was exempt from the Certificate of Need process.

The following person should be contacted regarding any information presented in this application:

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1.0 Introduction

1.1 BACKGROUND

Mankato Energy Center II, LLC (MEC II) is submitting this Application for a Site Permit to expand the existing Mankato Energy Center, which is a 375 Megawatt (MW) dual fuel combined-cycle generating facility located in the City of Mankato in Blue Earth County, Minnesota (Existing Facility). The Existing Facility is owned by Mankato Energy Center I, LLC (MEC I). The expansion involves the planned completion of the existing Mankato Energy Center, through the addition of one natural gas-fired combustion turbine generator (CTG), an additional heat recovery steam generator (HRSG), and related ancillary equipment (the Expansion Project). The Expansion Project would result in an additional 345 MW of integrated combined-cycle and peaking capacity, as measured under winter conditions, located entirely within the Existing Facility's 25-acre footprint.

1.2 REGULATORY FRAMEWORK

On September 16, 2004, the Minnesota Environmental Quality Board (EQB) issued a Site Permit for the construction of the Existing Facility, which at the time, was planned to be a 2 x 1 combined cycle electric generating facility. However, the project owner, MEC I, constructed the Existing Facility, which became the first phase of the project. Importantly, however, the Existing Facility was designed and constructed to accommodate future expansion by including a steam turbine generator sufficiently sized to accommodate the Expansion Project.

Since the time the Existing Facility was permitted and constructed, the Minnesota Public Utilities Commission (Commission) has assumed responsibility under the Power Plant Siting Act (Minn. Stat. § 216E.01 *et. seq.*) for siting large electric power generating plants. This Application for a Site Permit is submitted in compliance with the Power Plant Siting Act and Minnesota Rules Chapter 7850.

1.3 CERTIFICATE OF NEED (CON)

While Minn. Stat. § 216B.243 generally requires a CON to construct a generation facility with a total capacity of 50 MW or more, a CON is not required if the facility is selected in a bidding process established by the Commission (Minnesota Statute § 216B.2422, Subd. 5(b)). On February 5, 2015, the Commission issued its *Order Approving Power Purchase Agreement with Calpine, Approving Power Purchase Agreement with Geronimo, and Approving Price Terms with Xcel,* selecting the Expansion Project and approving the terms of PPA between Northern States Power Company and MEC II. The PPA was subsequently executed by the Parties and submitted as a compliance filing on May 6, 2015. Accordingly, the Expansion Project is exempt from the CON process.

1.4 SITE PERMIT - ALTERNATIVE REVIEW

Calpine is electing to pursue the alternative site permitting process because the Expansion Project will be a large electric power generating plant that produces electricity from natural gas. The Expansion Project will be permitted by the Commission pursuant to the alternative site permitting process, as provided for in Minn. Stat. § 216E.04, Subd. 2(2). As required by Minnesota Rules part 7850.2800, subpart 2, by letter dated June 29th, 2015, MEC II notified

the Commission of the intent to submit an Application for a Site Permit for the Expansion Project under the alternative permitting process set forth in Minnesota Rules parts 7850.2800 to 7850.3900. In relevant part, Minn. R. 7850.3100 provides that an "applicant shall include in the application the same information required in part 7850.1900, except the applicant need not propose any alternative sites or routes to the preferred site or route." Pursuant to Minn. Stat. § 216E.04, Subd. 7, "[a] final decision on the request for a site permit or route permit under this section shall be made within six months after the commission's determination that an application is complete. The commission may extend this time limit for up to three months for just cause or upon agreement of the applicant."

1.5 SITE PERMIT APPLICATION REQUIREMENTS

In accordance with Minnesota Rules 7850.3100 (and, by reference, Minn. Rule 7850.1900), which defines the contents of the application for projects that qualify for the alternative review process; the following general information is included in this site permit application:

- Information on proposed ownership of the facility, permit applicant, and current landowners.
- Description of the facility and all associated equipment including size, type, and cost.
- Engineering and operational design.
- Future site expansion and generating capacity possibilities.
- Identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility.
- Description of the proposed site and environmental setting.
- Effects of the facility on the human environment (noise, safety, aesthetics, cultural and historical resources, and natural environment (including air and water quality, rare and unique natural resources, flora and fauna) that will be used in preparing the environmental assessment.
- Effects of the facility on land-based economies.
- Listing and brief description of federal, state, and local permits that may be required for the project.
- Documentation that a Certificate of Need application has been submitted to the PUC or documentation that a Certificate of Need is not required.

1.6 ENVIRONMENTAL ASSESSMENT

Applications for site permits under the alternative permitting process are subject to environmental review, which is conducted by the Department of Commerce (Department) under Minn. Rule 7850.3700. Department staff provides notice and conducts a public scoping meeting to solicit public comments on the scope of the environmental assessment (EA). Based on the information received during the scoping process, the Department's Deputy Commissioner will determine the scope of the EA, which describes the human and environmental impacts of a proposed project and methods to mitigate such impacts.

Applications for site permits under the alternative permitting process require a public hearing upon completion of the EA. The hearing would be conducted in the project area and in accordance with the procedures provided in Minn. Rule 7850.3800. The EA is completed and made available prior to the public hearing.

2.0 Project Description

2.1 OWNERSHIP

The proposed Expansion Project will be owned by MEC II and operated by Calpine Operating Services Company, Inc. (COSCI). The Existing Facility, including the associated land, is owned by MEC I and operated by COSCI. All entities are wholly owned indirect subsidiaries of Calpine Corporation (Calpine)[2] . Calpine is an independent power producer that specializes in the development, construction, ownership, and operation of wholesale electric generating facilities. Calpine owns and operates the largest and most modern fleet of clean, reliable and fuel-efficient gas-fired and geothermal power plants in North America, with a portfolio of 88 power plants located throughout the U.S. and Canada with a combined total of nearly 27,000 MW of electric generating capacity.

2.2 PERMITTEE

The permittee to be named on the Site Permit is Mankato Energy Center II, LLC (MEC II). Transfer of the permit is not contemplated at this time.

2.3 SIZE AND TYPE

On September 16, 2004, the EQB issued a Site Permit for the construction of a 2 x 1 combined cycle electric generating facility[3] consisting of two natural gas fired (with fuel oil back-up) CTGs, two HRSGs with natural gas fired duct burners, one steam turbine and associated machinery and equipment.[4] However, MEC I constructed the Existing Facility as a 375 MW (winter rating) natural gas-fired combined-cycle generating facility and included only one natural gas fired (with oil back-up) combustion turbine, one heat recovery steam generator with natural gas-fired duct burners, one steam turbine generator, and associated machinery and equipment (Figures 1 and 2). Importantly, however, the Existing Facility was constructed so as to accommodate future expansion through the installation of an additional combined cycle power train (CTG and HRSG) and includes a steam turbine generator that is sufficiently sized for the expansion.

The Expansion Project, for which MEC II now seeks a Site Permit, involves the completion of the originally planned 2 x 1 project located within the City of Mankato, Minnesota through the addition of one natural gas-fired CTG, an additional HRSG, and related ancillary equipment (*e.g.,* four additional cooling tower cells). The Expansion Project would result in an incremental 345 MW of integrated combined-cycle and peaking capacity, as measured

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[2] MEC I is the permit holder for the Existing Facility. MEC II will be the permit holder for the proposed Expansion Project.

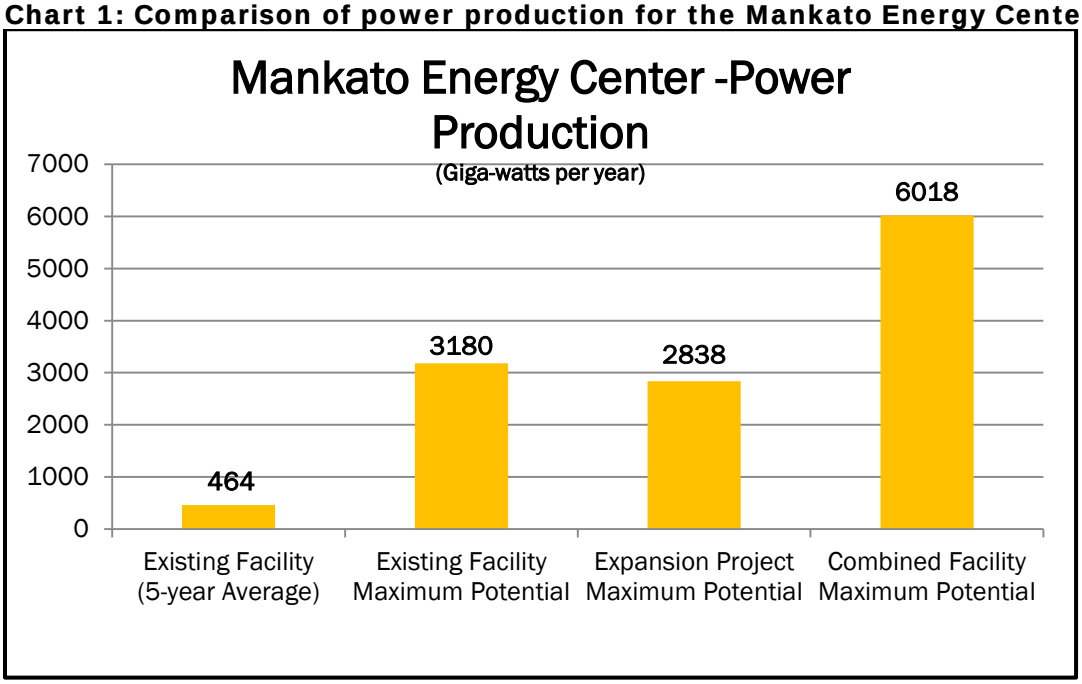
[3] A combined cycle facility refers to a power block arrangement with at least one combustion turbine generator, one heat recovery steam generator that may be equipped with duct burners and one steam turbine-generator.

[4] *See* Site Permit issued September 16, 2004 in MEQB Docket No. 04-76-PPS-CALPINE; *see also,* Order Granting Certificate of Need issued September 22, 2004 in Docket No. IP-6345/CN-03-1884.

under winter conditions.[5] The Expansion Project would be sited entirely on the Existing Facility site within its 25-acre footprint.

The Existing Facility is a combined cycle plant that is currently constructed in a 1x1 configuration, meaning there is one combined cycle power train and one steam turbine used to generate electricity. The Expansion Project will add a second combined cycle power train to the Existing Facility to allow it to operate in a 2x1 configuration. With the Expansion Project both the existing and new combined cycle power trains will provide steam to the existing steam turbine. Upon completion of the Expansion Project, the Combined Facility will be capable of producing approximately 720 MW of electricity (at winter conditions). Low sulfur distillate oil is available for use at the Existing Facility. The Expansion Project's combined cycle power train cannot burn fuel oil for emergency back-up and will not operate in times when gas supplies are not available. A simplified process flow diagram for the Combined Facility is shown in Figure 3. With the Expansion Project, the Combined Facility will continue to operate in a similar manner as the existing operations, although there will be two combined cycle power trains instead of one. Chart 1 provides a comparison of the power production for the Mankato Energy Center. The maximum generating potential of the Existing Facility, the Expansion Project and the sum of those two for the Combined Facility is displayed. The 5-year average power generation is also shown for comparison. It is important to note that the Mankato Energy Center does not operated continuously and only generates power to the grid when needed. As a result, the average amount of power generated over the last five years is significantly less that the maximum potential of the facility. The operation of the Combined facility will continue in the same manner.

Chart 1: Comparison of power production for the Mankato Energy Center



A more detailed description of the project is provided in Section 2.7

[5] Winter capacity values based on reference conditions at 6°F and 68% relative humidity.

2.4 SITE LOCATION

The Existing Facility is located in Blue Earth County within the municipal limits of the City of Mankato, with the address 1 Fazio Lane. The Existing Facility was originally constructed outside of the City of Mankato in Lime Township but the site has since been annexed by the City as part of a previous joint agreement in 1997 between the City of Mankato and Lime Township. The current zoning at the Existing Facility is Class 3A – Commercial/Industrial/Public Utility. The Existing Facility is situated on the southern portion of an old limestone quarry that has been mined to completion and converted to a demolition waste landfill and composting facility. The demolition landfill has completed operations, is no longer accepting waste and is closed. The Existing Facility site is approximately 25 acres in size and its location is shown in Figures 1 and 2. The Expansion Project will be located within the Existing Facility site.

The Existing Facility is located east of U.S. Highway 169, north of U.S. Highway 14, and west of County Road 5 (3rd Avenue). A set of railroad tracks no longer in use runs along the south side of the existing Facility. Access to the Existing Facility is provided from the south off Summit Avenue onto Fazio Lane and north to the main facility gate. Industrial and manufacturing facilities located adjacent to the site include Xcel's Wilmarth Generating Plant, a waste processing company, auto salvage yards, scrap metal operations, a construction company, a U.S. Postal Service mail processing facility, and a household hazardous waste collection site. The closest residential dwelling was previously a single residential dwelling located approximately 2,000 feet from the center of the Existing Facility. However, this property is now vacant and some of the buildings have been demolished. The nearest residential areas of Mankato lie more than one-half mile to the south on the other side of U.S. Highway 14.

2.5 PROPERTY OWNER

MEC I is the current owner of the property upon which the Existing Facility is located. The parcel was purchased from a larger parcel of land that was owned by Southern Minnesota Construction Company, Inc. (SMC). The construction of the Expansion Project will take place within the fence line of the Existing Facility site. Approximately 15 acres of temporary construction laydown space and parking space will be needed to accommodate construction of the Expansion Project. MEC II (or another Calpine affiliate) intends to secure land from a local property owner to accommodate the temporary construction laydown space.

2.6 ALTERNATIVE SITES

The parent company of MEC I and MEC II, Calpine, specializes in the development, construction, and operation of combined cycle natural gas-fired facilities. One element of that specialization consists of identifying areas within the United States that have energy needs. In some instances, energy needs are sought by a local utility through the issuance of a request for power supply proposals. This was the case with this Existing Facility. On April 15, 2013, Calpine submitted the Expansion Project in response to the Commission's March 5, 2013 Order in Docket No. E-002/CN-12-1240, seeking energy and capacity to meet the needs of Xcel's customers. On February 5, 2015, the Commission issued its Order[6]

[6] *Order Approving Power Purchase Agreement with Calpine, Approving Power Purchase Agreement with Geronimo, and Approving Price Terms with Xcel*

approving the terms of a power purchase agreement (PPA) between Northern States Power Company (NSP) and MEC II for delivery of energy and capacity from the Expansion Project to NSP, anticipated to be as early as June 1, 2018. The PPA was subsequently executed by the Parties and submitted as a compliance filing on May 6, 2015.

The Expansion Project includes the addition of a CTG and one HRSG with duct burners, both of which will be powered by natural gas. As a result the Expansion Project qualifies for the Alternative Review process outlined in Minn. Stat. § 216E.04. As listed under Subdivision 2, item 2 "large electric power generating plants that are fueled by natural gas" are eligible for this alternative review process. As further set out under Subdivision 3 of this same statute that outlines the application requirements, the applicant for a site permit "shall submit information as the commission may require, but the applicant shall not be required to propose a second site or route for the project."[7]

Accordingly, alternative sites were not investigated for the Expansion Project and are not proposed as part of this application.

2.7 ENGINEERING AND OPERATIONAL DESIGN

The Existing Facility is a 1 x 1 combined cycle power generating facility fueled primarily by natural gas. The generating capacity of the Existing Facility is approximately 375 MW of electricity, at winter conditions. The electricity is transmitted to a part of the electrical grid owned by Xcel and under the functional control of the Midcontinent Independent System Operator, Inc. (MISO). The proposed Expansion Project will add a second CTG, HRSG, and ancillary equipment to the Existing Facility, resulting in a total electrical generating capacity of the Combined Facility of nominally 720 MW at winter conditions.

The Expansion Project will receive natural gas from a local area pipeline, non-bulk chemicals by truck, and electricity for backup power supply from Xcel Energy. The Expansion Project will continue to receive service water from the Mankato municipal water supply system, and cooling water from the Mankato WWTP.

The Expansion Project will include the following major pieces of equipment to be installed at the Existing Facility site:

- One natural gas-fired combined cycle combustion turbine generator.
- One heat recovery steam generator, equipped with natural gas-fired duct burners.
- Addition of four new cells to the existing multi-cell mechanical draft evaporative cooling tower.
- One generator step up transformer
- One emergency generator (to be installed if needed)

[7] As required by Minnesota Rules part 7850.2800, subpart 2, by letter dated June 29th, 2015, MEC II notified the Commission of the intent to submit an Application for a Site Permit for the Expansion Project under the alternative permitting process set forth in Minnesota Rules parts 7850.2800 to 7850.3900. In relevant part, Minn. R. 7850.3100 provides that an "applicant shall include in the application the same information required in part 7850.1900, except the applicant need not propose any alternative sites or routes to the preferred site or route."

The proposed layout of the Expansion Project (and the Combined Facility) is presented in the general arrangement drawing (Figure 4). A flow diagram of Combined Facility water usage is provided as Figure 5. The Combined Facility fuel supply, major equipment, and transmission considerations are discussed in more detail below.

The Existing Facility currently generates base load and peak load electricity. The Existing Facility's current total electricity generating capacity of 375 MW is composed of approximately 290 MW base load capacity at winter conditions and 85 MW peak load service. The Expansion Project will add approximately 290 MW of baseload capacity and 55 MW of peaking capacity at winter conditions. This would bring the total generating capacity of the Combined Facility to 720 MW, consisting of approximately 580 MW of baseload and 140 MW of peaking capacity at winter conditions. The Expansion Project will provide approximately 315 MW of net capacity at summer conditions.

Once the Expansion Project is complete, approximately 580 MW of baseload capacity of the Combined Facility will be generated from the two CTGs and the single steam turbine-driven generator. The steam turbine receives steam from the HRSGs, which use the waste heat from the combustion turbine exhaust streams to produce steam. Supplemental firing of the duct burners associated with the HRSGs will generate approximately 140 MW of peak load capacity. This combined cycle plant will offer a large efficiency advantage over a conventional simple-cycle plant, which relies only on CTGs.

2.7.1 Primary Fuel Supply: Natural Gas

The primary fuel for the Combined Facility will be natural gas. Per the Power Purchase Agreement, NSP is responsible for arranging the delivery of natural gas to the Expansion Project. The natural gas is delivered through a lateral pipeline approximately 4 miles in length connecting the Existing Facility to the Northern Natural Gas Company mainline. The connecting lateral pipeline was permitted and constructed by MEC I and is currently owned by Calpine Natural Gas. The original Site Permit Application for the Existing Facility suggested a 12 to 16 inch pipeline would be built. However, the final route permit issued to MEC I for the lateral pipeline was for a 20 inch line. The lateral pipeline is connected to the mainline downstream of Northern Natural Gas Company's interconnection with Northern Border Gas Company at Welcome, Minnesota. This segment of the Northern Natural Gas Company's system is further reinforced by connections with their other north-south lines that run between Ventura and the Minneapolis-St. Paul market. The minimum throughput design of the existing pipe is one million cubic feet of natural gas per day with a maximum throughput capacity of 126 million cubic feet per day at a maximum allowable pressure of 936 pounds per square inch. The pipeline is operated at a normal pressure of between 525 and 550 pounds per square inch.

The existing natural gas lateral that was constructed in conjunction with the Existing Facility is a 20 inch line as shown in Figure 6. The existing lateral has sufficient capacity to accommodate the natural gas requirements of the Existing Facility as well as the Expansion Project. As a result, no new additional gas pipeline facilities will be required for the Expansion Project.

During periods when gas supplies in Minnesota are constrained because of high demand or a disruption of pipeline deliveries, the existing combustion turbine will have the capability to switch to low sulfur distillate fuel oil as an alternate fuel for limited periods. However, the Expansion Project will not operate during these times as it will not be able to operate on distillate fuel oil.

2.7.2 Secondary Fuel Supply: Low Sulfur Distillate Fuel Oil

There is an existing above ground storage tank at the Existing Facility that stores low sulfur distillate fuel oil as a back-up fuel supply during periods when natural gas is not available and the Existing Facility must generate and supply electricity to the grid. The storage capacity of the tank is 350,000 gallons, which represents approximately 36 hours of uninterrupted electricity generation at the Existing Facility when operating the existing CTG at baseload. The existing air permit conditions limit the Existing Facility's use of fuel oil. There will be no changes to the low sulfur distillate fuel oil storage as a result of the Expansion Project. The new CTG that will be installed as part of the Expansion Project will not have the option of operating with fuel oil as a secondary fuel. In the event that gas supply is low or not available, the second CTG will not operate.

2.7.3 Natural Gas-fired Combustion Turbines

The Existing Facility is currently equipped with one natural gas-fired (with oil back-up) CTG located outdoors in the central portion of the Existing Facility site. The existing combined cycle CTG is a Siemens-Westinghouse F-Class turbine (501FD model) and has an output of approximately 200 MW (at winter conditions).

The proposed new equipment will be a natural gas only F-Class combined cycle CTG, with an output of approximately 200 MW with similar characteristics to the existing unit. Both the existing and proposed CTGs are equipped with dry low-NO_x (DLN) combustors, which are used when firing natural gas. The existing CTG uses water injected into the combustors during periods of fuel oil firing. Each of these systems is used to control emissions of NO_x within the CTG.

2.7.4 Heat Recovery Steam Generators

Exhaust gas from the new CTG will be directed to a new HRSG. The heat in the exhaust gas, which would otherwise be directed (wasted) up the exhaust stack, will convert water that flows through tubes in the HRSG into steam. The steam produced in new and existing HRSGs will be directed to the steam turbine where it will be used to generate additional electric power. Steam exiting the steam turbine will be condensed into water and returned to the HRSGs for recirculation. The new HRSG will be located outdoors and situated adjacent to the existing HRSG.

The new HRSG will be a triple-pressure, reheat-type steam generator designed to supply high-pressure steam that matches the conditions of the existing unit. The HRSG will also be equipped with natural gas-fired duct burners used for additional steam production to provide peaking capacity at the steam turbine. The proposed duct burner will incorporate a low-NO_x burner technology and will have a maximum heat input rate of 824 MMBtu/hr, mirroring the design of the existing HRSG unit.

The new HRSG will have the same emissions control devices as the existing unit. A selective catalytic reduction system (SCR) will be used downstream of the duct burners to reduce NO_x emissions from the CTGs and duct burners. An oxidation catalyst will also be used to reduce emissions of CO and volatile organic compounds (VOCs).

The exhaust gas from the HRSG and the duct burners will be directed to an exhaust stack, similar to the existing HRSG stack. Exhaust stack emissions will comply with the federally

enforceable air emissions permit to be issued by the Minnesota Pollution Control Agency (MPCA).

Anhydrous ammonia is currently used in the existing HRSG at the Existing Facility as an SCR reagent. The new proposed HRSG will be operated in the same manner utilizing anhydrous ammonia. A new 15,000 gallon ammonia storage tank will be added to the Facility as part of the Expansion Project and will be constructed adjacent to the existing tank. Ammonia use at the Combined Facility will continue in the same manner as the existing operations. (see General Arrangement - Figure 4). Ammonia will continue to be delivered to the tank via tanker truck and will be transferred from the main storage tank to each of the ammonia injection skids situated immediately north of each HRSG.

2.7.5 Steam Turbine Generator

The existing steam turbine generator converts mechanical energy from the rotating steam turbine into electrical energy. With the additional steam from the new HRSG, the steam turbine has the capacity to generate approximately 150 MW of additional electrical power, to its full rated capacity of nominally 330 MW. Electricity from the steam turbine generator is transferred along aboveground electrical bus duct to the transformer yard.

There will be no changes to the existing steam turbine as a result of the Expansion Project, with the exception that it will be connected to the new proposed HRSG to receive additional high pressure steam.

The steam turbine condenser converts exhausted steam from the steam turbine back into liquid water so that it can again be returned to the HRSGs to be converted into steam. The condenser receives exhausted steam from the steam turbine and fresh demineralization water as needed to replace any losses. In the condenser, heat is transferred from the exhausted steam to the cooling water in a non-contact, heat exchanger arrangement. The cooling water from the condenser is transferred to the cooling tower where it is cooled through evaporation before returning to the condenser. As a result of the Expansion Project, heat rejection to the cooling water will increase due to the additional steam flow.

2.7.6 Cooling Water

Cooling water is supplied to the Existing Facility via a contract with Mankato WWTP. The contract allows for a maximum use of 6.2 million gallons per day. A storage pond was constructed at the WWTP to provide an additional limited backup supply of cooling water for the Existing Facility in the unlikely event that the WWTP remains off-line for a limited period.

The Combined Facility will continue to operate and utilize cooling water in the same manner as current conditions after the Expansion Project is constructed with the exception of the increased volume of water required at the Combined Facility.

The existing contract with the Mankato WWTP allows for the supply of cooling water in sufficient quantities to meet the water needs of the Combined Facility. MEC II will install upgrade consisting of an additional water supply pump, as required by the Mankato WWTP to accommodate the Expansion Project. Figure 5 provides a water usage flow diagram for the Combined Facility showing estimated flow values for the various water streams for both annual average and summer average (conditions). The average cooling water use is displayed in Table 2-1 and compared to the maximum potential cooling water use of the

Existing Facility, the Expansion Project and the sum of the two for the Combined Facility. Because the Existing Facility is not in continuous operation the amount of cooling water used over the last five years is significantly less that the maximum potential use for the Existing Facility. The operation of the Combined facility will continue in the same manner.

Table 2-1: Cooling Water Use

Existing Facility 5-year average (MGD)	Existing Facility Maximum Potential (MGD)	Expansion Project Maximum Potential (MGD)	Combined Facility Maximum Potential (MGD)
0.344	3.48	2.56	6.04

Note: Maximum potential is based on 24 hours of operation with duct burning and make up requirements on 89F day

2.7.7 Process and Service Water

Water from the Mankato municipal water system is supplied to the Existing Facility for the use as service water. Service water has three main uses at the Existing Facility:

- Domestic Uses – Examples include: drinking water, showers, toilets, sinks.
- Ancillary Services – Examples include: hose bibs, fire protection, and eye wash stations.
- Process Water – Examples include: demineralized water for stream cycle make-up, compressor washes, and control for NO_x emissions when burning fuel oil from the Existing unit.

The service water used as process water is first purified with demineralized water equipment and transferred to a 200,000 gallon storage tank. The average service water use is displayed in Table 2-2 and compared to the maximum potential cooling water use of the Existing Facility, the Expansion Project and the sum of the two for the Combined Facility. Because the Existing Facility is not in continuous operation the amount of service water used over the last five years is significantly less that the maximum potential use of the Existing Facility. The operation of the Combined facility will continue in the same manner.

Table 2-2: Service Water Use

Existing Facility 5-year average (MGD)	Existing Facility Maximum Potential (MGD)	Expansion Project Maximum Potential (MGD)	Combined Facility Maximum Potential (MGD)
0.0212	0.363	0.059	0.422

Note: Maximum potential is based on 24 hours of operation with two units of duct burning and oil operation on CTG 2 (from the WP 1X1 and 2X1 water balances)

2.7.8 Cooling Tower

The Existing Facility is equipped with a multi-cell evaporative cooling tower, situated along the eastern side of the Existing Facility property. The cooling tower cools hot cooling water from the steam turbine condenser and other heat loads, such as generators and lube oil systems. The cooled water is then returned for reuse. The cooling tower currently receives cooling water to replace water lost to evaporation and blowdown from cooling operations. The cooling tower receives small quantities of recycled water from the oil/water separator, demineralized water processing, and the HRSG blowdown tank.

The cooling tower receives chemical feeds from the chemical storage enclosure situated approximately 75 feet west of the cooling tower. The chemicals are stored in small quantities and will be used to assist in maintaining the appropriate water quality parameters for efficient operation of the cooling tower system.

The cooling tower operates with a water circulation rate of approximately 200,000 gallons per minute. The cooling tower has a liquid drift rate of approximately 0.0005 percent of the cooling water flow rate, which is achieved through the use of high efficiency (low-drift) mist eliminators.

The cooling tower discharges water as cooling tower blowdown to maintain the appropriate quality of water in the cooling tower system. The cooling tower blowdown is directed back to the municipal water treatment facility.

The Expansion Project will add four additional cells to the existing cooling tower, which will result in a total of 12 cooling tower cells at the Combined Facility. There will be no changes to the operation of the cooling towers or flow of water (Figure 5) with the addition of the new cells or other aspects of the Expansion Project. The only changes will be the increase in evaporation and blowdown associated with the additional cooling needs of the new CTG and HRSG.

2.7.9 Wastewater Collection/Treatment Systems

Process wastewater from demineralizer water production, steam cycle blowdown, and equipment sumps is collected and treated at the Existing Facility prior to discharge back to the Mankato WWTP, along with the cooling tower blowdown.

The Existing Facility is equipped with a blowdown tank, which receives discharge water from the HRSG process blowdown and cooling water to lower temperatures in the tank. Process wastewater from this tank discharges to the cooling tower basin. An additional HRSG blowdown tank will be installed as part of the Expansion Project and will be handled in the same manner.

Stormwater generated at the Existing Facility is managed in one of two ways. Stormwater runoff that comes into contact with the equipment pads, where there is potential for contamination by oils and other chemicals from pumps and motors, is confined within curbed areas and drains to area wastewater sump pump systems. The stormwater that is collected in the wastewater sumps is pumped to the Existing Facility's oil/water separator and recycled into the cooling tower make-up water system. Oil/sludge from the oil/water separator system will continue to be collected and shipped off-site for appropriate disposal as a waste material. The wastewater sump system will be expanded as required for the new equipment and will continue to operate in this same manner as a result of the Expansion Project.

Stormwater runoff from non-process areas of the Existing Facility is routed to the existing on-site stormwater detention pond. This pond is located in the northeast corner of the Existing Facility site within the fence line. The pond discharges to the existing drainage ditch along the east side of the site that flows into the Minnesota River. Stormwater discharges from the site and detention pond are regulated under an existing National Pollution Discharge Elimination System (NPDES) general stormwater discharge permit and conditional use permit. Since the Expansion Project will be constructed within the Existing Facility site, no change in stormwater discharges is anticipated.

Domestic wastewater generated from the Existing Facility (i.e., bathrooms and sink areas in the administrative building and water treatment building) is discharged directly to the City of Mankato sanitary sewer system. This discharge is authorized by the City of Mankato and subject to appropriate discharge limits and monitoring requirements. No significant changes to sanitary discharge are expected as a result of the Expansion Project.

2.7.10 Other (Ancillary) Structures/Buildings

The following existing plant support systems will be modified or expanded as part of the Expansion Project:

- Fire suppression systems, including a diesel-fueled fire pump.
- Fuel supply systems, consisting of a natural gas conditioning system.
- Steam and process supply piping.
- Cooling water systems.
- Plant electrical systems.
- Equipment enclosures.
- Chemical feed systems.

These systems will be expanded accordingly to accommodate the construction and operation of the equipment associated with the Expansion Project.

Natural gas, steam, and water pipelines will be expanded as required to support the tie-in of the Expansion Project CTG and HRSG. The design of these piping systems will mirror the existing equipment.

There are no anticipated changes to the existing administrative building, warehouse, or steam turbine building as part of the Expansion Project. The water treatment building and equipment will be modified as needed to meet the demineralized water needs of the Expansion Project.

2.7.11 Electrical Equipment

All electricity generated from the existing CTG and the steam turbine generator is transferred to generator step-up transformers (one for each generator). The generator step-up transformers increase voltage to 345 kV (steam turbine) or 115 kV (CTGs). A new step-up transformer will be added for the new CTG as part of the Expansion Project. In addition, medium and low voltage electrical switchgear will be expanded as needed to power the additional equipment.

2.7.12 Switchyard and Transmission lines

The switchyard is a 75-foot by 485-foot area situated along the west edge of the Existing Facility site (Figure 7). The switchyard consists of a high-side breaker, disconnect switch, and dead-end structure for each generator. Dedicated, 1,000 foot long Xcel transmission lines connect the dead-end structures to the existing Wilmarth substation. For the Expansion Project, a generator breaker, disconnect, and dead-end structure for the new CTG will be added to the switch yard within the Existing Facility site.

2.7.13 Electrical Transmission

Xcel's Wilmarth substation has been expanded to accommodate the interconnection with the Existing Facility and the Expansion Project. Even though only one CTG/heat recovery generator pair and one stream generator were constructed at the Existing Facility, Xcel constructed three transmission lines to accommodate the originally planned 2 x 1 combined cycle power block (Figure 7). As a result no new substation upgrades will be needed to accommodate transmission of the power from the Expansion Project to the Wilmarth substation.

MEC I has also entered into an Amended and Restated Generator Interconnection Agreement (GIA) with Xcel and MISO to accommodate interconnection of the Expansion Project to Xcel's Wilmarth Substation. The GIA requires the installation of limited network upgrades beyond the point of interconnection on Xcel's transmission system. Such upgrades will be undertaken by Xcel, as the transmission owner. The Federal Energy Regulatory Commission accepted the GIA effective October 16, 2014 by order issued on March 10, 2015.[8]

2.8 COST ESTIMATE AND DESIGN LIFE

The Expansion Project will be completed at a cost that is below the replacement cost of a new combined cycle plant because the Existing Facility was designed and constructed to accommodate the Expansion Project. This includes design and engineering, procurement of equipment, site preparation, building construction, equipment installation, plant start-up and testing, and other costs associated with development and construction of the Expansion Project. The current construction costs for the Expansion Project are estimated to be between $220 and $300 million. This range will continue to fluctuate until the project's commercial operation date has been determined and definitive documentation has been executed. The Expansion Project is anticipated to have a useful life of at least 30 years. Annual operating costs during the life of the Expansion Project are expected to be below those of a new combined cycle plant because of the operating synergies with the Existing Facility. Annual project operating costs are expected to be between $3.5 and $5 million. This range will continue to fluctuate until the project's commercial operation date has been determined and definitive documentation has been executed. Operating costs include labor, materials, management, and all applicable taxes paid to the appropriate jurisdictions.

2.9 FUTURE SITE EXPANSION AND GENERATING CAPACITY POSSIBILITIES

At this time, there are no plans to expand the proposed Expansion Project beyond its current size and scope. The Power Purchase Agreement specifies the size and expected output of the Expansion Project. In addition, the interconnection agreement with Xcel and MISO places technical limits on the total electricity injection capability and generating characteristics of the Combined Facility. Additionally, the land currently available at the site would preclude a physical expansion of the Combined Facility beyond its current scope.

[8] *See Midcontinent Independent System Operator, Inc.,* 150 FERC ¶ 61,180 (2015).

3.0 Infrastructure Needs and Connections

As previously noted, MEC I was permitted and constructed in 2004 and 2005. The Expansion Project includes the completion of the 2 x 1 project through the addition of a new CTG and HRSG, which will be sited within the property and fence line of the Existing Facility. When MEC I was constructed, the vast majority of the utility and infrastructure needs of the overall 2 x1 Combined Facility were permitted and constructed. As a result, the majority of the infrastructure needed for operation of the Combined Facility is already in place and only limited upgrades or improvements are needed as part of the Expansion Project.

3.1 TRANSPORTATION

The existing roadway network and site access road are adequate to serve the Combined Facility and, at this point, no transportation improvements have been identified. Access to the facility is on Fazio Lane off of Summit Avenue, approximately one quarter mile west of the intersection of Summit Avenue and 3rd Avenue (Figure 2). The closest main highway serving the facility is US Highway 14 located approximately one-half mile to the south. There is access to 3rd Avenue (County Road 5) directly from US Highway 14 via a diamond intersection providing a safe entrance and exit to and from the highway (see Figure 1). The total distance from US Highway 14 to the facility entrance is very short at less than three quarters of a mile. Employees, deliveries and temporary construction vehicles will continue to utilize the existing roadways to access the facility.

3.2 GAS PIPELINE

As described in Section 2.7.1, NSP is responsible for arranging the delivery of natural gas to the interconnection point of Northern Natural Gas' pipeline and the Calpine Natural Gas Lateral located approximately four miles from the facility (Figure 6). The lateral pipeline was permitted and constructed by MEC I (MEQB Docket No: 04-77-PRP-Calpine) to have a minimum throughput design of one million cubic feet of natural gas per day with a maximum throughput capacity of 126 million cubic feet per day at a maximum allowable pressure of 936 pounds per square inch. The pipeline is operated at a normal pressure of between 525 and 550 pounds per square inch. The existing 20 inch pipeline has sufficient capacity to accommodate the natural gas requirements of the Combined Facility. As a result, no new additional gas pipeline facilities will be required for the Expansion Project.

Table 3-1: Natural Gas Use

Existing Facility 5-year average (MMscf/day)	Existing Facility Maximum Potential (MMscf/day)	Expansion Project Maximum Potential (MMscf/day)	Combined Facility Maximum Potential (MMscf/day)
4.891	64.75	58.13	122.88

Note: Maximum potential is based on 24 hours of operation with two units of duct burning on a 6F day (winter conditions).

A comparison of the maximum potential natural gas use for the Existing Facility, Expansion Project, and the sum of the two for the Combined Facility is displayed in Table 3-1. The daily average gas use by the Existing Facility over the last five years is also provided.

Because the Existing Facility is not in continuous operation the amount of natural gas used over the last five years is significantly less that the maximum potential use for the Existing Facility. The operation of the Combined facility will continue in the same manner.

3.3 ELECTRICAL TRANSMISSION

Electricity generated at the Combined Facility will be carried from the west edge of the Facility property to Xcel Energy's nearby Wilmarth Substation. In 2004 and 2005 Northern States Power (d/b/a Xcel) permitted and constructed new transmission lines to serve MEC I (MEQB Docket No. 04-86-TR-Xcel). The lines are approximately 1,000 feet long and consist of one 115 kV and one 345 kV transmission line that are contained entirely on Xcel's property (Figure 7). When the transmission lines were permitted and constructed, improvements to the Wilmarth Substation were made to accommodate the new transmission lines and MEC I. The existing CTG and steam generator are connected through the switch yards within the Existing Facility to the transmission lines. An existing transmission line pole, currently not in use, is already present on Xcel's property immediately west the Existing Facility. The new CTG will connect to the Wilmarth Substation via a new 115 kV transmission line that will be connected to the new CTG's dead-end structure. The Expansion Project will include the addition of a generator breaker, disconnect, and dead-end structure for the new CTG within the Existing Facility site.
Xcel takes title to the Expansion Project's electricity at its dead-end structure. At the Wilmarth Substation, electricity from the Combined Facility will enter NSP's transmission system for distribution within MISO.

3.4 WATER AND SEWER

As described in detail in Section 2.7.7, service water is supplied to the Existing Facility by the City of Mankato through a lateral service line connection to the municipal water supply system. Cooling water used at the facility will continue to be supplied by the City of Mankato in the form of treated wastewater effluent from the Mankato WWTP. The City of Mankato will continue to provide service and cooling water to the Combined Facility via the existing service lines. Water volumes are provided in the table located in Section 2.7.7.

As discussed in detail in Section 2.7.9, process wastewater (including cooling water blowdown, demineralized water production wastewater, steam cycle blowdown, and equipment sumps) are discharged to the Mankato WWTP and domestic wastewater is discharged to the City of Mankato sanitary sewer system through a lateral service line connection. These discharges are authorized by the City of Mankato and subject to appropriate discharge limits and monitoring requirements.

Table 3-2: Process Wastewater Discharge

Existing Facility 5-year average (GPD)	Existing Facility Maximum Potential (GPD)	Expansion Project Maximum Potential (GPD)	Combined Facility Maximum Potential (GPD)
0.159	0.868	0.597	1.465

Note: Maximum potential is based on 24 hours of operation with duct burning and make up requirements on 89F day

A comparison of the maximum potential process water discharge for the Existing Facility, Expansion Project, and the sum of the two for the Combined Facility is displayed in Table 3-2. The daily average process water discharge for the Existing Facility over the last five years

is also provided. Because the Existing Facility is not in continuous operation the amount of process water discharge over the last five years is significantly less that the maximum potential discharge for the Existing Facility. The operation of the Combined facility will continue in the same manner.

3.5 OTHER UTILITIES

All other utility connections to the Existing Facility were completed upon initial construction and no new connections will be needed in association with the Expansion Project or to support the Combined Facility.

4.0 Effects on Human Environment

4.1 ENVIRONMENTAL SETTING

As described in Section 2.4, the Existing Facility is located within the City of Mankato in Blue Earth County. The Expansion Project site is located within the Existing Facility's boundary which is approximately 25 acres in size and within an area zoned Class 3A – Commercial/Industrial/Public Use. The Existing Facility is located south of an old limestone quarry that was converted to a demolition landfill. The demolition landfill is now closed. A set of railroad tracks no longer in use runs along the south side of the site. Access to the site is provided from the south off Summit Avenue onto Fazio Lane to the front gate. The facility currently contains a combined cycle plant that generates electricity and is fueled primarily by natural gas. The Existing Facility was permitted in 2004. An aerial photograph of the Existing Facility is provided as Figure 2. The general arrangement displaying the location of the existing infrastructure as well as the items to be constructed as part of the Expansion Project is provided as Figure 4.

The Combined Facility is located within an industrial area in the City of Mankato. Adjacent properties consist of numerous industrial and manufacturing facilities including Xcel Energy's Wilmarth Generating Plant and electrical substation, a waste processing company, auto salvage yards, scrap metal operations, a construction company, a U.S. Postal Service mail processing facility, and a household hazardous waste collection site. There are numerous railroad tracks and spur lines in the area as well as overhead electrical transmission lines. Previously there was a single residential dwelling is located approximately 2,000 feet north of the fence line of the Existing Facility, however this property is now vacant. The nearest residential areas of Mankato lie more than one-half mile to the south on the other side of U.S. Highway 14.

The Minnesota River is located approximately 1,800 feet west of the Existing Facility. The river and adjacent wooded river bottoms provide wildlife habitat as well as recreational opportunities in the form of boating, fishing, and hunting. There are also trails, parks, and other recreational facilities in the general area. A large drainage ditch is located along the east side of the site, which flows in a north/northwesterly direction to the Minnesota River. The Minnesota River valley extends approximately one mile to the east of the site at which point steep bluffs rising 150 feet dominate the landscape. Outlying rural areas to the north and east of the site in Lime Township consist predominately of agricultural and conservation lands.

4.2 DISPLACEMENT

The project site is appropriately zoned for industrial use. The closest residential neighborhood is located approximately 3,500 feet south of the fence line of the Existing Facility, on the other side of U.S. Highway 14. The Expansion Project will take place within the fence line of the Existing Facility. The Expansion Project will secure additional lands for temporary construction laydown space, which will be leased from a nearby property owner and may be located on either vacant industrial lands or agricultural lands. There will be no physical displacement of adjacent land owners or residents as a result of the Expansion Project nor will the project alter the use of adjacent properties.

4.3 NOISE

The site is located within an established industrial and manufacturing area on the north edge of Mankato more than one-half mile from the nearest residential areas of town. The nearest residential noise receptor is the residential neighborhood located over one half mile south on the south side of US Highway 14 (Figure 8). There are no other known sensitive noise receptors in the area. Existing noise sources located in the general vicinity of the project site include industrial facilities, highways, county roads, and railroad tracks.

Noise will be generated during construction of the Expansion Project as well as during normal operation of the Combined Facility. The largest potential noise impacts are generated during the construction and commissioning of the Expansion Project. Construction noise is temporary and mitigated as described Section in 4.3.2.

The major components of the plant that will generate noise during the operation of the Combined Facility include the cooling tower cells, the CTGs, electrical transformers and HRSGs. MEC II will utilize noise mitigation and control methods and equipment in the final design of the Expansion Project as necessary to mitigate noise to ensure MPCA standards are not exceeded during operation.

The Expansion Project is designed to ensure that the Combined Facility operates within the State of Minnesota Noise Standards (Minnesota Rules 7030.0040) listed in Table 4-1 below. The City of Mankato does not have a noise ordinance but relies on the State's noise level restrictions for local control of noise problems. The noise area classification (NAC) is determined by the land use activity of the receiver. Land use activities are generally divided into three NACs: 1) residential, 2) commercial, and 3) industrial. The Combined Facility and adjacent industrial and manufacturing facilities are characterized as NAC 3. The most sensitive receptors are residences that are classified as NAC 1, with the most restrictive noise levels during the nighttime.

Table 4-1: Minnesota Noise Standards (Minnesota Rules 7030.0040)

Receiver Noise Area Classification (NAC)	Daytime (7 am to 10 pm)		Nighttime (10 pm to 7 am)	
	L_{50}	L_{10}	L_{50}	L_{10}
1 - Residential	60	65	50	55
2 - Commercial	65	70	65	70
3 - Industrial	75	80	75	80

Noise limits are in decibels on the A scale, abbreviated dBA.
L_{50} is the sound level exceeded for 50% of the time and is considered the "average" sound level.
L_{10} is the sound level exceeded for 10% of the time.

4.3.1 Existing Noise

The Existing Facility produces noise through the operation of the power generating equipment at the facility. The major components that generate noise during plant operation include the cooling tower cells, the CTGs, electrical transformers, steam turbine and HRSGs. The Existing Facility currently complies with Minnesota noise standards during normal operations. MEC II has collected noise data and conducted a noise analysis to assist in the design of the Expansion Project. Noise measurements collected in 2015 at the Existing Facility at two monitoring locations along the north fence line and one location along the

south fence line were all below the L10 and L50 noise standards for industrial properties. All of the properties adjacent to the Existing Facility have the same zoning and property use classifications (industrial) as the facility (Figure 8).

Results of a noise analysis using the field noise measurements predict that the Combined Facility will continue to comply with Minnesota noise standards. MEC II will conduct noise testing after completion of the Expansion Project to confirm compliance of the Combined Facility. There are no sensitive noise receptors adjacent to the Existing Facility. The nearest residential receptor is over 3,500 feet south of the Existing Facility and is shielded by numerous structures and the raised section of US Highway 14. The noise level at this location is predicted to be at or below 50 dBA. MEC I has not received a noise complaint from adjacent property owners or residential receptors.

4.3.2 Noise During Construction

The Expansion Project construction is expected to consist of foundation work, steel erection, finishing, and the installation of new equipment. Site excavation or site grading will be conducted as necessary. Sources of noise during the construction period will include delivery trucks and haul trucks, cranes, excavation equipment, fabrication activities (pneumatic wrenches, impact wrenches, welding equipment), back up alarms on construction vehicles and equipment and equipment cleaning activities. Many of these noise sources are intermittent and of short-term duration/burst during the construction period.

Construction noise is unavoidable, but the impacts are temporary as construction is a limited-duration activity and a number of noise-abatement measures will be implemented to help mitigate these impacts, including the following:

Outdoor construction activities that produce significant noise levels will be limited to normal daytime hours to the extent practicable.
Controlling the extent and duration of significant noise generating activities that may be required during construction.
Limiting the duration of the overall construction period, by contracting for sufficient construction resources and through efficient scheduling and coordination of construction activities.

Based on the mitigation measures, existing background noise levels, and distance to sensitive noise receptors, noise impacts are anticipated to be minimal.

Noise during initial commissioning and systems shake out will produce increased noise levels over short periods of time. Precautionary measures will be in place to mitigate the effects of these activities and operational upsets during the initial activities.

4.3.3 Noise During Facility Operation

Sources of noise during normal operation of the Combined Facility include operation of power generating equipment (CTGs, HRSGs, steam turbine, electrical transformers and cooling tower cells), delivery trucks, and maintenance activities.

The Existing Facility currently complies with the Minnesota noise standards during normal operations and has not received a noise complaint from adjacent property owners or residential receptors. MEC II collected noise data and conducted a noise analysis to assist in the design of the Expansion Project (Appendix A). The analysis confirmed that the Existing

Facility noise levels are well within the Minnesota Noise Standards. The study included noise level monitoring at three locations, two along the north fence line and one along the southeast fence line, during both start-up and normal plant operations. One monitoring location immediately north of where the new CTG building will be constructed was observed to have an existing noise level of 67 dBA during operations. The new CTG building will move the noise source closer to the fence line which was estimated to result in an increase of 6 dBA at the fence line. This would result in a future estimated noise level of 73 dBA at this location, which is below the L10 and L50 noise standards for industrial properties.

Noise readings collected at one location along the south fence line found observed noise levels to range 63 to 65 dBA during existing operations. At this location the new cooling tower cells that will be added for the Expansion Project would bring the noise source closer to the south fence line. The noise levels at the south fence line are expected to increase by 8 – 10 dBA to approximately 72.5 dBA. This estimated noise level is below both the L10 and L50 noise standards for industrial properties.

Based on the noise study the Combined Facility will continue to meet the noise standards with the additional equipment associated with the Expansion Project during normal operations.

4.4 AESTHETICS

The Combined Facility will blend into the industrial area on the north edge of Mankato. The Existing Facility site is already established and the Expansion Project will occur within the Existing Facility's footprint. The Expansion Project will include a new CTG, HRSG, and exhaust stack as well as additional cooling tower cells and certain associated equipment such as storage tanks. The equipment that will be added to the facility is shown on the General Arrangement (Figure 4). The various buildings, pieces of equipment, exhaust stacks, storage tanks, cooling tower, and ancillary equipment that make up the Combined Facility will be nominally arranged on the site as shown. All roads at the Existing Facility are paved and efficiently and safely move traffic onto, around and off of the property. In the final configuration, sufficient paved parking areas for Existing Facility employees and visitors are also on site.

The Existing Facility is adjacent to the Wilmarth Generating Station and related Wilmarth electrical substation. The Wilmarth Generating Station is a two-unit generating plant that was built in the late 1940s initially to burn coal but has since been converted to burn processed municipal solid waste. The Existing Facility is located within a designated industrial area of the City of Mankato. Other industrial and manufacturing facilities located adjacent to the Existing Facility site include a waste processing company, auto salvage yards, scrap metal operations, a construction company, a U.S. Postal Service mail processing facility, and a household hazardous waste collection site.

The tallest structure at the Existing Facility is the CTG stack, which is 200 feet tall. The new CTG exhaust stack will be built to a similar height to maintain the determination of "no hazard" by the Federal Aviation Administration. All other structures at the Existing Facility are shorter than the CTG stacks, and range from 30 to 120 feet in height. The building that will contain the new CTG and HRSG units will be similar in appearance and height compared to the existing buildings and will be located immediately north of the existing CTG building.

The stacks are most visible from the west end of Summit Avenue and possibly visible from the Minnesota River. Due to the existing topography, finished grades at the landfill, a dense

grove of mature trees located around the perimeter of the site, and the distance away from adjacent roadways, most of the other structures at the Combined Facility will not be visible to the general public.

As flue gas is emitted from the stacks at the Combined Facility, such as the CTG, the water vapor present in the flue gas may condense to form a visible steam plume. In addition, water vapor emitted from cooling towers can result in a similar, visible plume. The length and persistence of these visible plumes are influenced by prevailing weather conditions such as temperature, relative humidity, and wind speed. The plumes are most persistent and visible during cold and damp weather, principally during the winter. On most days of the year, however, visible steam or vapor plumes, if present, disperse and evaporate after traveling only a moderate distance aloft.

In addition to effects on visibility associated with water vapor, certain stack emissions have the potential to impact local visibility. Emissions of particulate matter can reduce visibility by scattering light, and emissions of nitrogen oxides can reduce visibility by absorbing light. The Combined Facility must apply Best Available Control Technology (BACT) for both of these visibility-related pollutants, as explained in Section 5.1. Furthermore, nitrogen oxides emissions are and will continue to be continuously monitored to ensure compliance with BACT-related emission limits. Accordingly, emissions from the Combined Facility are not expected to have a significant impact on local visibility.

Lighting at the Combined Facility will be provided for security and plant operational purposes. Lighting will be expanded in the same manner for the newly installed equipment. The facility is lit in a manner similar to other industrial sites using directional lighting and minimizing light impacts onto adjacent property. No additional impacts from lighting are anticipated from the Expansion Project.

The Expansion Project is located within the Existing Facility. The Combined Facility is located in an industrial area on the north edge of Mankato. There are no residential or retail areas adjacent to the facility and most of the buildings and structures are far enough away from adjacent roadways or screened from view by existing trees or other physical barriers including the closed landfill to the immediate north. Overall, the Combined Facility will have limited visibility outside of the industrial area where it is located and will blend in well with existing adjacent industrial and manufacturing facilities.

4.5 SOCIOECONOMIC IMPACTS

The Expansion Project will benefit the local and regional communities as well as the State of Minnesota. The Combined Facility will support efforts by Xcel Energy to enhance and diversify their power supply portfolio in meeting the utility's growing demand for electricity. The Combined Facility will primarily utilize natural gas, a clean-burning fossil fuel, and highly efficient combustion technology to generate reliable electricity while minimizing environmental impacts. The Existing Facility is sited close to a major natural gas pipeline and high-voltage electric transmission system minimizing impacts associated with infrastructure connections. The Expansion Project will enhance the benefits of the Existing Facility.

The construction of the Expansion Project and the operation of the Combined Facility will provide many benefits to the local community including economic benefits resulting from the construction and continued operation of the facility and through the purchase of local goods and services. Some of the economic benefits include the following:

- Construction of the Expansion Project is estimated to exceed $200 million and will employ as many as 250 construction workers at peak construction periods. It is anticipated that workers commuting to the site from the three-county area (Blue Earth, Nicollet, and Le Sueur) will fill most of the construction job needs. These jobs (include welders, pipefitters, iron workers, millwrights, carpenters, electricians, and other trades) will benefit the local economy during the construction phase. Construction is estimated to take 24 to 27 months to complete. Once in operation, the Combined Facility anticipates adding two additional employees, for a total of approximately 19 full time employees.
- The state of Minnesota and Blue Earth County will receive tax revenue from the construction of the project as well as continue to receive income taxes from permanent full-time employees operating the Combined Facility.
- The Combined Facility will continue to bring indirect jobs to the area in the form of local support services.
- MEC I and MEC II will remain an active member of the local community, participating in charitable events, community service organizations, and outreach programs.
- The Combined Facility is anticipated to have a useful life of at least 30 years, meaning that the facility will provide the City of Mankato and Blue Earth County area with a reliable, consistent source of economic and other benefits for many years.

4.6 CULTURAL VALUES

Prior to the mid-1800s, the Mankato area along the banks of the Minnesota River was inhabited mainly by Dakota (Sioux) Indian tribes. The first white settlers began to arrive in the area in the early 1850s after the Dakota had ceded the land to the United States government under the Treaty of Traverse des Sioux in 1851. The Minnesota River and its tributary streams provided easy access to the area from the territorial capital of St. Paul (located 80 miles downstream) and Mankato was one of several cities platted along the upper Minnesota River in 1852. Mankato was named the Blue Earth County Seat in 1853, and the city grew rapidly in the 1850's and 60's after a crude military road was built between Mankato and St. Paul and with the westerly expansion of the railroads. Mankato became a railroad hub for southern Minnesota, which helped establish the town as an important regional center for providing goods and services to the surrounding area.

Today, the Cities of Mankato and North Mankato with a combined population of 54,080 continue to be a significant regional center for education, health care, commerce, industry, and agriculture. In addition to serving as the county seat for Blue Earth County, Mankato provides goods and services to the nearby Counties of Nicollet and Le Sueur as well as other outlying areas of southern Minnesota.

The Existing Facility is located within an area zoned for industrial use. The Existing Facility was permitted in 2004 and has been in operation since 2005. The site is situated on the southern portion of an old limestone quarry that was mined to completion. The limestone quarry then served as a demolition waste landfill and composting facility, which has since reached capacity and has been closed. A set of railroad tracks run along the east side of the site. Based on available records, operation of the limestone quarry began in the mid-1950s. In 1992, the demolition landfill began accepting construction and demolition wastes under a permit issued by the MPCA.

As discussed in Section 7, the Minnesota State Historic Preservation Office (SHPO) was contacted prior to construction of the Existing Facility about possible archeological, historical

or architectural resources located on or near the site. A review of SHPO records was again completed in 2015 as part of this Site Permit Application. Upon review of their records, SHPO concluded that there are no known or suspected resources present on or near the site that would be affected by construction of the Expansion Project or operation of the Combined Facility. Based on SHPO's findings for the initial construction of the Existing Facility, the disturbed nature of the site from past limestone and gravel mining activities, and that the Expansion Project is sited within the footprint of the facility, construction of the Expansion Project and operation of the Combined Facility should have no impact on cultural resources in the area.

4.7 RECREATION

There are no designated recreational facilities located on or immediately adjacent to the Existing Facility site. The Existing Facility site is located in the southern end of the East Minnesota River State Game Refuge. This refuge extends north to the town of Kasota along the east side of the Minnesota River. There is no state-owned land within the game refuge; all land is under private ownership. Based on discussions with DNR staff, state game refuge status is given to local property owners who wish to protect waterfowl and deer by restricting firearm hunting on their property. This refuge is not managed by the DNR and does not carry special environmental regulations or land use restrictions other than use for hunting. Proposed developments must follow typical zoning requirements enforced by the local government agencies.

The Minnesota River is located approximately 1,800 feet west of the Existing Facility. The river and adjacent river bottoms provide recreational opportunities in the form of boating, fishing, and hunting. However, there are no public access points, boat landings, designated trails, or developed public facilities along the stretch of river flowing near the facility. The forested areas along the Minnesota River are part of a conservation district under Blue Earth County zoning. The Combined Facility will not impact the conservation district, wildlife habitat along the Minnesota River or recreational opportunities within these areas.

The Sakatah Singing Hills State Trail is a 39-mile paved multi-use trail running between Mankato and Faribault. The trail begins at Lime Valley Road approximately one mile east of the Existing Facility site and follows an abandoned railroad grade through the countryside near pastures, farmland, and lakes, and passing through several small towns. The Sakatah Trail connects with other trails in the area that are part of the Mankato trail system.

There are also several city parks and recreational facilities located in the general vicinity of the Existing Facility site including Columbia Park, Tourtelotte Park and swimming pool, Hiniker Pond Park, and the Mankato Golf Club (a private club with an 18-hole golf course, driving range, and swimming pool). These recreational facilities are located at least three-quarters of a mile from the site. There are numerous state parks, county parks, and wildlife management areas along the Minnesota River and its tributary streams, but none within three miles of the existing Facility site.

Although there are recreational facilities in the vicinity, as described above, construction and operation of the Combined Facility will not directly impact existing public land, trails, parks, or other areas used for recreation. Neither the Expansion Project nor the Combined Facility would result in impacts to recreation.

4.8 PUBLIC SERVICES

4.8.1 Transportation System

As discussed in Section 3.1, the existing public roadway network and site access road are adequate to serve the Combined Facility. At this point, access to the Combined Facility will be off of Fazio Lane from Summit Avenue. The most likely route for vehicles will access Summit Avenue via 3rd Avenue from US Highway 14. No public transportation improvements will be required for construction or operation.

The Mankato Municipal Airport, located approximately 3.7 miles to the northeast in Lime Township, is the closest active airport to the site. As discussed later in Section 5.4, the Combined Facility will not affect airport operations in any way.

4.8.2 Water and Sewer Services

As discussed previously in Sections 2.7 and 3.4, water and sewer services are provided to the Existing Facility by the City of Mankato. The City supplies both domestic water and service water and receives domestic wastewater discharges. MEC I has an existing contract with the Mankato WWTP for the supply of cooling water to the Existing Facility. MEC II is contemplating installing upgrades at the WWTP to accommodate the Expansion Project. The Combined Facility will continue to operate and utilize cooling water in the same manner as current conditions after the Expansion Project is constructed with the exception of the increased volume of water required at the Combined Facility.

Service and domestic water is supplied to the Existing Facility by the City of Mankato through a lateral service line connection to the municipal water supply system. The City of Mankato municipal water supply system will continue to provide service water to the Combined Facility.

A water flow diagram including a summary of the major water inputs and discharges for the Combined Facility is presented as Figure 5. There are water storage facilities on site that serve the Existing Facility, such as serviced and demineralized water storage tanks and there are additions that are being explored as part of the Expansion Project (see Figure 4 – General Arrangement). No additional improvements to water utilities are anticipated for the construction of the Expansion Project or operation of the Combined Facility.

4.8.3 Waste Collection and Disposal

Local waste haulers are privately contracted with to properly collect and dispose of all liquid and solid wastes generated at the Existing Facility. No additional municipal services would be required with the Expansion Project.

4.8.4 Fire and Police Protection

The City of Mankato provides fire and police protection and rescue services. The Existing Facility is equipped with a security system and fire suppression system. The Combined Facility is not anticipated to affect the existing capabilities of the City's fire and police departments.

5.0 Effects on Public Health

5.1 AIR EMISSIONS

5.1.1 Sources of Emissions to the Air

MEC I currently owns a 1 X 1 one (1) combined cycle power block consisting of one combustion turbine, one HRSG, and one steam turbine. The existing unit in combined cycle mode is capable of producing approximately 375 MW at peak load at winter conditions.

The current combustion turbine is fired primarily by natural gas with distillate fuel oil as a backup fuel. The combustion turbine exhausts to a separate heat recovery steam generator (HRSG) having supplementary duct firing capacity of 800 MMBtu/hr. The steam generated in the HSRG exhausts in to the steam turbine. The unit is equipped with dry low-NO_x (DLN) burners and a selective catalytic reduction (SCR) system to reduce nitrogen oxides (NO_x) emissions and a catalyst oxidation system to control carbon monoxide (CO) and volatile organic compound (VOC) emissions from the combustion turbine and duct burner exhaust.

Calpine is proposing to install a new combined cycle power train, converting the Existing Facility to a 2 X 1 combined cycle power block (referred to herein as the Combined Facility). The proposed Expansion Facility will be owned by Mankato Energy Center II, LLC (MEC II) and operated by COSCI. The new combined cycle power train will generate an additional 345 MW at peak load at winter conditions. The proposed combustion turbine will be fired with natural gas only and will exhaust to the new HRSG having a supplementary duct firing capacity of 824 MMBtu/hr. The duct burners will be fired only with natural gas. The steam generated by the new HRSG will exhaust into the existing steam turbine.

MEC II will install SCR and DLN burners to reduce NO_x emissions and a catalyst oxidation system to control CO and VOC emissions from the proposed combustion turbine and HRSG duct burner exhaust. The equipment selection is not yet final. The proposed new combustion turbine will be an F-Class turbine with similar characteristics to the existing unit. The new HRSG will also be designed to produce steam conditions matching the existing equipment. In order to provide additional cooling due to the increased steam flow to the steam turbine, four new cells will be added to the existing cooling tower. A new anhydrous ammonia tank will be installed to provide the reagent to the new HRSG SCR.

Secondary combustion sources at the both the Existing Facility and Expansion Facility (referred to as the Combined Facility) include an existing natural gas fired auxiliary boiler with a rated heat input of 70 MMBtu/hr, an existing diesel fired fire pump engine, existing bath heater, and a proposed emergency generator. Other non-combustion related sources include storage tanks and the new and existing cooling tower cells.

5.1.2 Air Pollutants Emitted, Control Measures, & Compliance Testing

5.1.2.1 Air Pollutants Emitted

MEC I is currently subject to state and federal Prevention of Significant Deterioration (PSD) requirements because the facility qualifies as a major stationary source under the PSD rules, defined in 40 CFR 52.21(b)(1)(i). The Existing Facility potential emissions of

particulate matter (PM), PM less than 10 microns (PM_{10}), PM less than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), NO_x, VOC, and CO are greater than the PSD major source threshold of 100 tons/yr. The Existing Facility potential greenhouse gas (GHG) emissions are greater than the PSD major source threshold of 100,000 tons/yr. GHG emissions are any gases whose absorption of solar radiation is responsible for the greenhouse gas effect, including carbon dioxide (CO_2) methane, nitrous oxide, ozone and fluorocarbons. Carbon dioxide equivalent or CO_2e is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO_2e signifies the amount of CO_2 which would have the equivalent global warming impact. A quantity of GHG can be expressed as CO_2e by multiplying the amount of the GHG by its global warming potential. The PSD major source threshold is in reference to CO_2e.

If emissions of one or more regulated pollutants from a project at an existing major facility exceed the major modification thresholds, the project is subject to PSD review. MEC II must obtain a PSD permit from the MPCA prior to construction of the Expansion Project. An air permit application for the Expansion Project is anticipated to be submitted to the MPCA in August 2015. The associated modeling protocol has already been submitted to the MPCA and was approved on July 30, 2015. Combustion-related emissions from the Expansion Project of PM, CO, NO_x, VOC and GHG are of primary interest because these pollutants are emitted in quantities that exceed the threshold triggering PSD review. The estimated annual emissions of these pollutants from the Expansion Project's draft PSD application are shown in Table 5-1. Emissions of sulfuric acid, ammonia, and other non-criteria pollutants are addressed further in Section 5.1.5.

Table 5-1: Potential Emissions and PSD Applicability Thresholds

Pollutant	Combined Facility Post Project Total Potential Emissions (tpy)	Expansion Project Potential Emissions (tpy)	PSD Major Modification Threshold (tpy)
PM	192.91	58.71	25
PM_{10}	175.08	52.76	15
$PM_{2.5}$	173.20	52.14	10
SO_2	98.58	30.46	40
NO_x	354.01	167.44	40
VOC	647.02	382.58	40
CO	1,266.03	768.64	100
Lead	0.52	0.01	0.6
CO_2e	3,094,401	1,576,725	75,000
Asbestos	NA	NA	0.007
Beryllium	3.91E-04	4.24E-05	0.004
Mercury	3.07E-03	9.20E-04	0.1
Vinyl chloride	NA	NA	1
Hydrogen sulfide	NA	NA	10
Sulfuric acid mist	14.88	4.58	7
Total reduced sulfur	NA	NA	10
Reduced sulfur compounds	NA	NA	10

In addition to the above pollutants, there will be a small release of ammonia from the Combined Facility's stacks. The Existing Facility utilizes SCR systems to control NO_x emissions from the combustion turbine, and the same control technologies will be used for the Expansion Project. Ammonia emissions result from the use of ammonia as a reagent in

the SCR system. Ammonia emissions, also referred to as "ammonia slip," from the Combined Facility will be low and are not explicitly quantified.

5.1.2.2 Emission Control Measures

As noted earlier, MEC II must obtain a PSD permit from the MPCA to authorize construction of the Expansion Project. This requires the application of the BACT to control emissions from the Combined Facility. MEC II will satisfy BACT requirements by applying the most effective of available options to control NO_x, CO, VOC, organic and GHG emissions from the Expansion Project's combustion turbine. The Expansion Project will utilize the following emissions control strategies:

- Firing primarily natural gas in the turbine to minimize NO_x, sulfur dioxide and particulate emissions.
- DLN combustors are used while firing natural gas to minimize the formation of oxides of nitrogen in the combustion turbine.
- SCR to reduce oxides of nitrogen emissions in the combustion turbine exhaust gas.
- Catalytic oxidation to reduce CO, VOC, and organic air pollutant emissions from the combined cycle system exhaust gas.
- Limiting operation of the emergency generator and fire pump to less than 100 hours per year.
- Installation of high efficiency mist eliminators to reduce cooling tower drift rate to minimize particulate matter emissions from the cooling tower.

Table 5-2 provides the proposed permit limits, potential to emit and emission controls for the combined cycle system.

Table 5-2: Proposed Combined Cycle System Permit Limits and Potential Annual Emission Rates

	Maximum Emissions			
Pollutant	Proposed Permit Limit[1]	Potential to Emit (tpy)	Proposed Emission Controls	Compliance Basis
Particulate Matter (PM) / PM_{10} / $PM_{2.5}$	11.9 lb/hr natural gas combustion	52.1	Good combustion control practices and use of clean fuels.	Performance Test
Nitrogen Oxides ("NO_x")	3.0 ppmvd	166.8	DLN combustor technology and the installation of selective catalytic reduction (SCR) on the combined cycle combustion turbine/HRSG systems.	Continuous Emission Monitor (CEM)

	Maximum Emissions			
Carbon Monoxide ("CO")	4.0 ppmvd at full load 4.7 ppmvd at partial load	777.0	Good combustion control practices and the installation of an oxidation catalyst system on the combined cycle combustion turbine/HRSG systems.	Continuous Emission Monitor (CEM)
Volatile Organic Compounds ("VOCs")	3.4 ppmvd	382.5	Good combustion control practices and the installation of an oxidation catalyst system on the combined cycle combustion turbine systems.	Performance Test
Greenhouse Gas Emissions ("GHG")	Net Heat Rate of 8,374 Btu/kWh (HHV[2]) and 0.5 ton CO_2e/MWhr (net)	1,578,145	Energy efficiency processes, practices, and designs	Annual Efficiency Test and Recordkeeping

[1] All concentrations based on a parts per million, volumetric dry (ppmvd) are corrected to 15% oxygen.
[2] Higher heating value (HHV)

5.1.2.3 Compliance Testing

Compliance by the Combined Facility with emissions permit limits will be monitored by means of a Continuous Emission Monitoring Systems (CEMS) and demonstrated by periodic stack emissions tests or by monitoring fuel specifications. MEC II will be installing CEMS to measure CO and NO_x emissions in the Expansion Project's exhaust. Stack testing or fuel monitoring will be required for the other pollutants as specified by the MPCA in the Expansion Project's air permit. The Existing Facility is equipped with CEMS and has completed required testing.

5.1.3 Criteria Pollutant Impacts

5.1.3.1 Significant Impact Level Analysis

As part of the Expansion Project PSD permit application, air dispersion modeling was performed to demonstrate that the emissions from the Expansion Project will not cause or contribute to a violation of an ambient air quality standard or PSD increment. Preliminary modeling was performed using a modeling protocol that conforms to U.S. Environmental Protection Agency (EPA) standards to predict the maximum ambient concentrations of NO_2, CO, and particulate matter less than 10 microns (PM_{10}) resulting from the Expansion Project's emissions alone. These concentrations were compared to the PSD ambient air significant impact levels (SILs). The ambient impact significance levels serve as screening criteria to determine if further analyses are required to verify that the emissions will not cause or contribute to an exceedance of an ambient air quality standard or PSD increment. If all modeled concentrations are below their respective SILs, then further modeling for the

National and Minnesota Ambient Air Quality Standards (NAAQS and MAAQS, respectively) and PSD increment compliance is not required.

Preliminary modeling of the Expansion Project's $PM_{2.5}$ emissions was also completed. However, the $PM_{2.5}$ SIL was vacated and remanded to EPA by the United States Court of Appeals for the District of Columbia Circuit on January 22, 2013. EPA released guidance on May 20, 2014, which outlines the procedure for screening out of a $PM_{2.5}$ NAAQS and increment modeling analyses. This guidance was used for the Expansion Project.

Preliminary modeling of the Expansion Project's emissions alone yielded predicted annual NO_2, 1-hour CO, and 24-hour and annual PM_{10} concentrations below the PSD significant ambient impact levels; therefore, no further modeling is required for these pollutants and averaging periods. Twenty-four hour and annual $PM_{2.5}$ concentrations are also below the respective SIL values, which indicate that further modeling to assess $PM_{2.5}$ NAAQS is not necessary. One-hour NO_2 and 8-hour CO concentrations were above their SIL values; thus, further modeling to more thoroughly assess National Ambient Air Quality (NAAQS)/Minnesota Ambient Air Quality (MAAQS) compliance was performed for 1-hour NO_2 and 8-hour CO (see section 5.1.4). Table 5-3 summarizes the preliminary modeling results and compares the results to their respective SIL.

Table 5-3: Preliminary Modeling Results

Pollutant	Averaging Period	Predicted Ambient Concentration ($\mu g/m^3$)	PSD Significant Ambient Impact Level ($\mu g/m^3$)
NO_x	1-hour	26.20	7.52
	Annual	0.49	1
$PM_{2.5}$	24-hour	1.16	1.2
	Annual	0.06	0.3
PM_{10}	24-hour	1.56	5
	Annual	0.11	1
CO	1-hour	755.17	2,000
	8-hour	548.29	500

5.1.4 NAAQS Modeling

Table 5-3 shows that predicted concentrations are greater than the 1-hour NO_2 and 8-hour CO SILs. PSD guidelines require additional modeling be performed for the NAAQS and PSD increment standards for all combinations of pollutants and averaging periods greater than a SIL. As part of the air permit application, the Combined Facility sources along with nearby sources in the area will be modeled to determine compliance with the NAAQS and increment standards. However, increment standards specific to 1-hour NO_2 and 8-hour CO have not been defined in the Clean Air Act. Therefore it will not be necessary to evaluate increment compliance for 1-hour NO_2 and 8-hour CO. It is anticipated that modeling results for the NO_2 and CO NAAQS modeling analysis will demonstrate compliance with the 1-hour NO_2 and 8-hour CO NAAQS. A PSD permit cannot be issued by the MPCA until modeling demonstrates compliance with the applicable standards.

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

5.1.5 Air Emissions Risk Analysis

The Existing Facility completed an Air Emissions Risk Analysis (AERA) in accordance with MPCA technical guidance (*Facility Air Emissions Risk Analysis Guidance;* Version 1.0; September 2003) as part of the 2004 Site Permit. The results of the 2004 analysis demonstrated compliance with all applicable standards.

An AERA was conducted as part of the Expansion Project following the updated guidance, *Air Emissions Risk Analysis (AERA) Guidance*, April 2015. The purpose of the AERA is to assess the potential health risk attributed to air emissions from a given source. The AERA includes both quantitative and qualitative analyses. In the quantitative portion of the analysis, the potential incremental cancer risks and non-cancer hazard indices are estimated using procedures outlined in MPCA guidance and compared against thresholds established by MPCA in collaboration with the Minnesota Department of Health (MDH) and consistent with EPA guidelines. The qualitative portion of the analysis identifies and discusses items of potential interest that cannot be easily quantified. Detailed documentation for the AERA will be submitted to the MPCA for review. A summary of the AERA and its findings are presented here.

MPCA guidance no longer exempts natural gas-fired combustion units from review. Therefore, the AERA addressed emissions resulting from combustion of the natural gas in the Expansion Project's combustion turbine and HRSG duct burners. For completeness, the AERA calculated potential excess lifetime cancer risks and non-cancer hazard indices for the Combined Facility.

Since air dispersion modeling was performed for the project in AERMOD, the stack dispersion values in units of ($\mu g/m^3$)/(g/s) from AERMOD were used in the Risk Assessment Screening Spreadsheet (RASS) tool for all stack dispersion parameters: 1-hour, 3-hour, 8-hour, 24-hour, monthly, and annual values. Maximum one-hour emission rates were calculated based on the Combined Facility's potential to emit (PTE). These rates were multiplied by the maximum hourly impacts for each pollutant to assess acute exposures. Similarly, the annual PTE emission rates were multiplied by the maximum annual dispersion impacts for each pollutant to assess chronic impacts to human health. These exposure concentrations were then compared with pollutant-specific toxicity values supplied by the MPCA in the RASS tool. Hazard indices and cancer risks were then calculated. The results are summarized below.

Hazard indices were determined for acute, sub-chronic, and chronic inhalation exposures. A lifetime excess cancer risk was also determined. In order to assess non-inhalation exposure to chemicals for receptors such as residents, urban gardeners, or farmers, indirect screening-level hazards and cancer risks were estimated. The maximum impact is to a hypothetical farmer; these results are included in Table 5-4, along with the Acceptable Level as determined by the MPCA for noncancer hazard of 1.0 and lifetime excess cancer risk of one in 100,000 ($1x10^{-5}$). The results are high-end estimates calculated using conservative assumptions that tend to overestimate the actual risk and hazard. For example, the emissions used in the analysis are the Combined Facility's maximum potential-to-emit (PTE) and not estimated actual emissions. These are hypothetical maximum results and do not represent the site-specific risk and hazard to the public from operation of the Combined

Facility. Full results are provided in the AERA Report, an attachment to the air permit application.

Table 5-4: Preliminary AERA Results

Screening Scenario	Results	Acceptable Level
Acute Hazard Index	0.8	1.0
Sub-chronic Hazard Index	0.02	1.0
Chronic Hazard Index	0.2	1.0
Cancer Risk	3×10^{-6}	1×10^{-5}
Farmer Noncancer Hazard	0.6	1.0
Farmer Cancer Risk	9×10^{-6}	1×10^{-5}

5.1.6 Air Permitting Requirements

The Federal and MPCA air-permitting requirements anticipated for the Combined Facility are summarized in Section 11.0, Permits and Approval.

5.2 PUBLIC WATER SUPPLY

No groundwater wells have been or will be installed on site to serve the Combined Facility. Cooling water is supplied from effluent taken from the City of Mankato municipal wastewater treatment plant and piped through a dedicated line to the Existing Facility (See Figure 5 – Plant Water Usage). Service water for domestic uses such as drinking water, showers, toilets, sinks, and other incidental water needs is supplied by the municipal water supply system through a lateral service line (see Table 2-2). Additionally, the Existing Facility uses service water for fire protection and other operational uses. Service water also supplies demineralized water process equipment for boiler makeup. There is a demineralized water tank at the Existing Facility which stores water onsite so it can be utilized when needed for process makeup water. The tank allows operational flexibility to ensure that demineralized water is available when needed for operations while also allowing it to be filled at times without impacting the water supply for the City.

The Cities of Mankato and North Mankato maintain separate municipal water supply systems. Mankato has five groundwater wells located throughout the city, none are within two miles of the Existing Facility. North Mankato has four groundwater wells and likewise, they are more than two miles from the Existing Facility. Both municipalities have indicated that the Existing Facility is outside of the boundaries of the wellhead protection area. Therefore there will be no potential impacts to existing groundwater resources or water supplies that could affect public health and safety as a result of construction of the Expansion Project and operation of the Combined Facility.

5.3 TRAFFIC

At this point, the existing roadway network and site access road are adequate to serve the Combined Facility and no transportation improvements are anticipated for Expansion Project construction or operation of the Combined Facility. Present access to the site is provided from Fazio Lane off Summit Avenue via 3rd Avenue (County Road 5). The closest main highway serving the Existing Facility is US Highway 14 located approximately one-half mile to the south. A diamond intersection is located at the 3rd Avenue crossing providing a safe entrance and exit to and from the highway. There are no private residences along Summit Avenue or along the section of 3rd Avenue between Summit and Highway 14 that would be affected by traffic generated by the Expansion Project. Vehicles going to and from the

Existing Facility do not pass through the central business district or residential neighborhoods.

During normal operations, the Existing Facility employs approximately 17 full-time employees. After completion of the Expansion Project there will be two additional employees for a total of 19 fulltime employees for the Combined Facility. Natural gas is the primary fuel for the CTGs and is transported to the site via an underground lateral gas pipeline, which connects to the main natural gas pipeline approximately four miles east of the Existing Facility.

To ensure uninterrupted operation of the existing Facility and maintain full MISO capacity accreditation, fuel oil is stored on-site and burned as a back-up fuel in the existing CTG. The fuel oil is stored in an aboveground storage tank with a capacity of 350,000 gallons, which represents approximately 36 hours of uninterrupted electricity generation from the Existing Facility when the primary fuel is unavailable. Fuel oil is delivered to the site via tanker truck. In the event that a significant amount of fuel oil is used to ensure continued operations of the Existing Facility, tanker truck deliveries could be spaced over several days to refill the storage tank after the primary fuel supply has been restored. This would present a temporary increase in traffic on the local roadways. The Expansion Project CTG will not run on fuel oil and therefore will not require tanker truck deliveries or change the traffic conditions.

Existing traffic levels will increase temporarily during construction of the Expansion Project and will vary during different phases of the construction period. Construction of the Expansion Project will take place over a period of approximately 24 to 27 months and will employ as many as 300 construction workers during peak construction periods. It is anticipated that workers commuting to the site from the three-county area (Blue Earth, Nicollet, and Le Sueur) will fill most of the construction job needs. Construction traffic at the site will include the movement of work crews, delivery of construction equipment and materials, and support personnel.

Occasional large and/or slow-moving vehicles on local roadways (similar to the movement of existing farm equipment and machinery) may also temporarily impact traffic during the Expansion Project construction and could result in temporary lane closures and/or traffic rerouting. These temporary closures and rerouting would be coordinated with the City, Township, and County as appropriate.

Given the location of the Combined Facility in an industrial area on the edge of town and the capacity of existing highways and local roads serving the facility and surrounding area, vehicular traffic during construction and operation of the Combined Facility should not adversely affect existing traffic flows.

5.4 AIRCRAFT

The Federal Aviation Administration (FAA) requires notification of all structures with a height of greater than 200 feet above existing ground elevation or those with the potential to obstruct air navigation. FAA Form 7460-1, Notice of Proposed Construction or Alteration, requires identification of the exact coordinates and height of structures. Through review of this application, the FAA determines whether any interference with flight patterns will result in impacts and may require obstruction marking and lighting for aviation safety.

The tallest building structure at the Existing Facility is currently the CTG stack, which is just under 200 feet tall. The new CTG stack is anticipated to be the same height and therefore, no structures associated with the Expansion Project exceed the 200-foot threshold triggering FAA notification. The Mankato Municipal Airport, located approximately 3.7 miles to the northeast in Lime Township, is the closest active airport to the site (Figure 9). It is one of the busiest municipal airports in the state with two paved runways that accommodate personal, business/commercial, and instructional uses. Orientations of the two runways at the airport are such that the site is not located within the general flight paths for aircraft landing or takeoff. Furthermore, the airport is located on top of the river bluff and the base elevation of the airport (1,020 feet) is higher than the elevation of the top of the stacks (995 feet). Because of the distance from the airport and the orientation and elevation of the runways, the Combined Facility should not represent a potential impact to aircraft operations.

5.5 PLUMES

As flue gas is emitted from the stacks, the water vapor present in the flue gas can condense to form a visible steam plume. In addition, water vapor emitted from cooling towers can result in a similar, visible plume. The length and persistence of these visible plumes are influenced by the prevailing weather conditions such as temperature, relative humidity, and wind speed. The plumes are most persistent and visible during cold and damp weather, principally during the winter. On most days of the year, however, visible steam or vapor plumes, if present, disperse and evaporate after traveling only a moderate distance aloft.

The visible plumes from the stacks and from the cooling tower at the Existing Facility are not expected to impair visibility or safety on adjacent roadways. The plume rising from the HRSG stacks should dissipate well before reaching ground level. The cooling tower is designed to incorporate “high efficiency drift eliminators to minimize fogging and icing potential from the plant. Summit Avenue and 3rd Avenue, the nearest adjacent roadways, are at least 800 feet away from the cooling tower**.** The Existing Facility has not received any complaints concerning plumes from the facility and additional plumage is anticipated to be minimal.

6.0 Effects on Land Based Economies

The Cities of Mankato and North Mankato, with a combined population of 54,080, have experienced sustained growth over the past twenty years, evolving into a regional retail, manufacturing, health care, and trade center providing goods and services to the surrounding Counties of Blue Earth, Nicollet, and Le Sueur as well as other outlying areas of Southern Minnesota. As previously discussed in Section 4.5, construction of the Expansion Project and operation of the Combined Facility will provide positive economic benefits to Mankato and the surrounding area.

MEC I is the current owner of the property that contains the Existing Facility. The Combined Facility is located within an area zoned Class 3A – Commercial/Industrial/Public Utility and is situated on the southern portion of a former quarry. The construction of the Expansion Project will take place within the fence line of the Existing Facility on property owned by MEC I. The Expansion Project will require the temporary use of a small amount of land (approximately 15 acres) located outside the Existing Facility fence line for construction laydown and parking. Calpine intends to secure land use rights from a local property owner to accommodate the temporary construction. No additional property is required for operation of the Combined Facility. As described below, the Combined Facility will not affect the agricultural, forestry, or mining industries in the area nor will the Combined Facility adversely impact existing tourism.

6.1 AGRICULTURE

The Expansion Project will be located within the fence line of the Existing Facility. Additional land outside the fence line of the Existing Facility will be secured to serve as temporary construction laydown space and parking areas. This land may consist of agricultural land. However, adjacent vacant industrial land is also being strongly considered. The estimated construction time frame for the Expansion Project is approximately 24 to 30 months, which means the temporary construction laydown space, if located on agricultural land, would be used for two growing seasons. However, the amount of land needed for temporary construction space is small, less than 15 acres, compared to the amount of agricultural land in Blue Earth County. This temporary use of agricultural lands for construction laydown space would only result in a very minor decrease in agricultural production for a limited time. The Combined Facility would not result in permanent impacts to agricultural lands or crop production.

6.2 FORESTRY

The Expansion Project will be located within the fence line of the Existing Facility which is a developed site and will not result in the loss of trees or clearing of forest lands. Additional land outside the fence line will be leased by MEC II or its contractor from a local land owner for temporary construction laydown space and parking. Lands that would be leased by MEC II as temporary constructing laydown space are not targeting green space areas that could result in the significant clearing of trees or forest lands. The Combined Facility site is not located on or near commercial forestry lands. There will be no adverse effects to the forestry economy as a result of the Combined Facility.

6.3 TOURISM

The Combined Facility site is located in an existing industrial area and is not located on or near local tourist attractions. Construction of the Expansion Project will take place within the fence line of the Existing Facility. There will be some temporary construction laydown space located outside the Existing Plant fence line that will be used for construction staging and parking however it will be less than 15 acres of land and will not impact tourist attractions in the area. There will be no adverse effects to the tourism economy from the Combined Facility.

6.4 MINING

There will be no adverse effects to the mining economy from the Expansion Project. The Existing Facility site is a former limestone quarry that has been mined to completion and the Expansion Project will be located within the facility boundaries. There are mining resources present in the areas in and around Mankato including limestone quarries and aggregate mines near the facility. Approximately one mile north of the Existing Facility there is the Pilgrims Quarry, which is an active limestone mine owned and operated by OMG Midwest. Adjacent to the Pilgrims Quarry are parcels of land owned by Coughlan Companies, which owns and operates a variety of sand and aggregate mines in Minnesota. Additional land outside the fence line of the Existing Facility will be leased by MEC II or its contractor to serve as temporary construction laydown space and parking areas. This will likely be vacant industrial land and will not target lands with mining operations or mining resources. The continued operation of these existing mining facilities will not be impacted by the construction of the Expansion Project or the operation of the Combined Facility.

7.0 Archaeological and Historic Resources

The Expansion Project will include the construction of an additional CTG, HRSG, cooling tower cells and certain related equipment within the fence line of the Existing Facility. Information was requested from the State Historic Preservation Office (SHPO) about possible archeological, historical, or architectural resources located on or near the Expansion Project site. A response letter dated April 2, 2015 was received from SHPO indicating that no known or suspected archeological resources are present in the area that would be affected by the Expansion Project. Two historic architectural structures (farmsteads) were identified within Section 31 (see attached letter in Appendix B), which is the same section where the Existing Facility is located. The Expansion Project will be located within the fence line of the Existing Facility which is within a developed industrial area of the City of Mankato and would not impact either of these identified resources. Approximately 15 acres of land located outside the existing fence line will be secured from a local land owner for construction laydown and parking space. This temporary space will not be in close proximity to the historic properties. Based on these findings and due to the disturbed nature of the site from the previous construction activity for the Existing Facility, construction of the Expansion Project and operation of the Combined Facility will have no impact on archeological, historical, or architectural resources.

8.0 Effects on the Natural Environment

8.1 AIR QUALITY

The construction of the Expansion Project and operation of the Combined Facility are not anticipated to result in changes to air quality that would impact plants, animals or soils. As identified previously in Section 5, the projected impacts from the Combined Facility will comply with the primary and secondary NAAQS and PSD increment standards. EPA has set the primary standards to protect human health, and the secondary standards to protect public welfare, including that of visibility, plants, soils, and animals. The PSD increment standards prevent the degradation of air quality in areas with clean healthful air. Compliance with the secondary NAAQS will ensure that there are not adverse impacts to the types of soils and vegetation in the vicinity of the Combined Facility.

8.2 LAND

Site topography and an aerial photograph of the existing site conditions are provided in Figure 10. The Existing Facility site is approximately 25 acres in size and is located within an area currently zoned as Class 3A – Commercial/Industrial/Public Utility. The construction of the Expansion Project will take place within the fence line of the Existing Facility on property fully owned by MEC I. Previous uses of the site included an old limestone quarry and also a demolition waste landfill, both of which are now closed. A set of railroad tracks, no longer in use, runs along the south side of the site. A paved access road to the site (Fazio Lane) is provided from the south off Summit Avenue.

The Existing Facility currently contains one CTG, one HRSG with natural gas-fired duct burners, one steam turbine generator with an associated heat rejection system, and various associated machinery and equipment required for operation of the power plant. An outside storage area containing sanitary and storm sewer pipe and miscellaneous construction material is located on the east side of the site. The Expansion Project will add one natural gas-fired CTG, an additional HRSG, and related ancillary equipment (*e.g.,* four additional cooling tower cells and one emergency generator).

The Existing Facility site has been previously disturbed during facility construction and prior to that, by activities associated with past gravel and limestone mining activities and the demolition landfill. The disturbance for the construction of the Expansion Project will take place entirely within the boundaries of the Existing Facility site. Wooded areas exist on the east edge of the site along a drainage ditch, which receives stormwater runoff from the site and surrounding areas and flows northerly to the Minnesota River. Wooded areas also exist along the south side of the site along the railroad tracks. The construction of the Expansion Project or operation of the Combined Facility will not result in significant changes in land cover or land use at the facility.

MEC II is considering securing land to use as temporary construction laydown space or parking areas. The execution of the options to utilize these parcels would ultimately be decided by the contractor selected for the Expansion Project. Utilization of these adjacent properties as temporary construction space would not alter their use classification. In the event adjacent industrial properties are utilized for temporary construction space, a new temporary access road may be constructed to allow construction equipment to access the

facility directly from the adjacent property without going through the main gate. This could result in a minor amount of vegetation clearing (shrubs and trees) to create the new access point. However, overall the existing wooded areas located along the east and south sides of the site will remain in place with only minimal potential disturbance by the Expansion Project. These wooded areas will continue to serve as a buffer and visual barrier between the site and adjacent properties.

MEC I conducted a Phase I Environmental Site Assessment (ESA) and a limited Phase II investigation as part of the original construction to determine the potential for environmental liabilities associated with the site and adjacent properties. The Phase II study included a subsurface investigation that involved soil and groundwater sampling at five locations. Based on the results presented in the Phase II report, it was determined that no environmental hazards were evident at the site due to past land use that would require further action. The Expansion Project will be constructed within the areas originally investigated by the Phase I and Phase II ESA reports and no further ESA investigations are needed to support this construction.

Based on LiDAR data of the Existing Facility, ground elevation at the site is relatively constant with a base elevation of 800 feet mean sea level (MSL). The main area that differs from the base elevation is the existing stormwater pond in the northeast corner of the site with a bottom elevation of 784 feet MSL. The site previously had more variation in elevation prior to construction of the Existing Facility, which included significant earth moving as part of the cut and fill balance to bring the site to a level grade. Now that the site is flat and level, significant earth moving activities will not be needed for the construction the Expansion Project.

8.2.1 Subsurface Investigations

The site is situated on a topographic high point in the area that has been impacted by historic gravel and limestone quarrying operations. Based on bedrock geology mapping, the site is located within a small residual knob of Platteville limestone underlain by Jordan sandstone. The area surrounding the site was eroded during and after glacial times and consists of reworked sandstone and outwash sand and gravel deposits resulting from the flow through the glacial valley of the Minnesota River. The limestone bedrock quarry operation resulted in removal of most of the limestone down to the sandstone interface prior to construction of the Existing Facility.

Soil borings were collected as part of the initial construction effort. The information from the soil borings was used to aid in the design of the building and equipment foundations of the Existing Facility and also identified the depth to ground water which was approximately 20 feet below surface. There were recent soil borings conducted in 2015 to investigate and confirm the soil conditions at the site. The soil boring information will be used to aide in the design of the new features of the Expansion Project and to determine construction conditions and methods.

8.3 WATER RESOURCES

8.3.1 Floodplains

A review of the Federal Emergency Management Agency (FEMA) mapping done for Blue Earth County and the City of Mankato indicate that the Combined Facility is not located with a regulated 100-year floodplain area. Designated 100-year floodplain areas along the

Minnesota River within Blue Earth County and the City of Mankato were delineated in 1999 as part of FEMA's National Flood Insurance Program. Figure 11 shows 100-year floodplain areas within the general vicinity of the site. The 100-year floodplain elevations of the Minnesota River range from 774 to 775 feet MSL, which is approximately 25 feet below the base elevation of 800 feet MSL at the site which is also the final base elevation for the Combined Facility. The Expansion Project will be constructed at existing grade and will not result in undue risk of flooding or impacts to the 100-year floodplain.

8.3.2 Shoreland Protection Areas

Based on discussions with City of Mankato staff prior to construction of the Existing Facility, the drainage ditch running along the east side of the site was classified as a tributary stream in the Blue Earth County Shoreland Ordinance. As a result, structures must maintain a 50-foot setback from the top of the bank of the channel or a 10-foot setback from the top of the embankment if the embankment slope is greater than 10 degrees and further than 50 feet from the stream. These setback requirements were observed during the construction of the Existing Facility. The Expansion Project occurs within the fence line boundary, and will not encroach on the setbacks for the creek shoreland zone.

8.3.3 Wetlands

Based on visual observations made during site visits and review of existing wetland mapping conducted for the Existing Facility, there are no wetlands present within the fence line of the facility. Existing wetlands would not be impacted by the construction of the Expansion Project. Figure 12 shows the wetland areas identified on the NWI map within the general vicinity of the facility. These wetlands are confined to low outlying areas and are generally classified as seasonally flooded basins and inland shallow marshes. No existing wetlands would be impacted by the construction since the proposed Expansion Project is located within the Existing Facility footprint.

The DNR Public Waters Inventory map for Blue Earth County (revised 1996) also was reviewed for the presence of regulated waters and wetlands. The Minnesota River and an unnamed tributary to the north that flows along the north side of the landfill and into the Minnesota River are both classified as DNR protected watercourses. These water bodies will not be impacted by the construction of the Expansion Project. No other state-protected waters or wetlands are located within the general vicinity of the Combined Facility.

8.3.4 Groundwater

The Expansion Project does not require groundwater wells to be installed on site to serve the Combined Facility; therefore, no adverse impacts to groundwater resources are anticipated. Water for cooling water will continue to be supplied in the form of treated wastewater effluent (otherwise known as gray water) taken from the Mankato WWTP and piped through a dedicated line to the Combined Facility. Service water is supplied by the City of Mankato's municipal water supply system through the existing lateral service line and is used for steam cycle makeup and fire water, as well as for domestic uses such as drinking water, showers, toilets, sinks, and other incidental water needs.

As described in Section 5.2, the cities of Mankato and North Mankato maintain separate municipal water supply systems. Both municipalities have indicated that the facility is outside of the boundaries of the wellhead protection area for each city. Chemicals used at the Facility are stored indoors or within appropriate containment areas. Fuel oil storage

tanks and unloading areas are equipped with secondary containment in accordance with federal SPCC requirements. Due to the location of the Combined Facility compared to the local municipal groundwater supply areas, combined with the proper management of chemicals on site, there will be no potential impacts to existing groundwater resources or water supplies that could affect public health and safety as a result of construction of the Expansion Project and operation of the Combined Facility.

8.3.5 Stormwater Runoff and Management

Stormwater runoff from the Existing Facility currently flows overland to an existing stormwater pond located in the northeast corner of the site. The pond discharges to a ditch that flows along the east side of the site. Adjacent industrial properties to the south and east of the site also drain to the ditch, which flows in a north/northwesterly direction discharging to the Minnesota River. The stormwater pond was designed and constructed to contain and treat stormwater runoff from the overall Combined Facility. Due to the size of the pond and the underlying soil, discharges from the stormwater basin to the drainage ditch have been rare and typically occur only in April or during heavy rainfall events.

The Expansion Project will be constructed entirely within the fence line of the Existing Facility and as a result all disturbances associated with the construction will be on the current site. The prior construction effort brought the majority of the site to an even and level elevation of 800 feet MSL. The new CTG and HRSG units and associated enclosures will be built immediately to the north of the existing CTG enclosure (See Figure 4 – General Arrangement). This will result in disturbing roughly two acres of the site; however, this area is already a paved impervious surface and will only require the installation of new foundations and should not require significant earthwork or grading that could lead to possible stormwater runoff concerns. Construction of the new cooling tower cells will disturb a little more than one acre to the southwest of the existing cooling tower cells. This area is currently hard-packed gravel surface that is already flat and level, which will result in minimal required grading. Overall a little less than four acres of the Existing Facility site is expected to be disturbed for construction of the Expansion Project. After completion of construction, all stormwater runoff from the Combined Facility will be directed to the existing stormwater pond.

The Expansion Project will not result in an increase in impervious surface within the Existing Facility boundaries. Stormwater runoff from general plant areas (non-process areas) will be directed to the existing stormwater pond on the east side of the site, as shown on Figure 12. The stormwater pond was originally designed and constructed to treat runoff from the entire Combined Facility and will provide settling capacity and discharge rate control prior to discharging into the nearby drainage ditch. The stormwater pond and outlet have been designed to meet the City of Mankato's requirements for water retention areas for new development projects that create new impervious surfaces of one acre or greater. Due to the nature of the existing permeable soils and underlying bedrock material, the stormwater pond functions similar to an infiltration basin, retaining water for short periods of time and thus providing additional stormwater treatment and further reducing runoff volumes and peak discharge rates.

Stormwater runoff that comes into contact with the outdoor steam generator step-up transformer pad, combustion turbine pads and other process areas where there is potential for pollutant contamination by oils and other chemicals from pumps and motors, will be confined within curbed areas and drain to two area sump pump systems. The collected stormwater is then to be routed to the oil/water separator and recycled into the cooling

tower make-up water system. To ensure efficient operation of the oil/water separator, routine inspection and maintenance is performed and accumulated materials are cleaned out on an as-needed basis. All materials removed from the structure are properly managed and disposed of offsite in accordance with applicable local, state, and federal requirements.

The Combined Facility will continue to be properly maintained and good site housekeeping practices will be utilized to keep all road surfaces clean, reducing solids loading in stormwater runoff. Landscaped areas and natural vegetation buffer strips along the perimeter of the Combined Facility, which have low runoff potential, provide further treatment of stormwater runoff by filtering out nutrients and suspended solids and promoting infiltration into underlying permeable soils. The eastern one third of the Existing Facility site (approximately eight acres) that contains the stormwater pond and wooded areas will not be disturbed by the construction of the Expansion Project. This area of the Existing Facility site will be protected through runoff and erosion control measures as described in Section 8.3.5.2.

The proposed best management practices (BMPs) described above that will be implemented at the Combined Facility have proven to be effective methods of treating stormwater runoff and are management techniques typically recommended by the MPCA, watershed management organizations, and other water management and planning agencies. As a result, stormwater runoff from the Combined Facility will not adversely affect the flow rates or water quality in downstream receiving waters.

8.3.5.1 Storm Water Pollution Prevention Plan

The existing industrial Stormwater Pollution Prevention Plan (SWPPP) will be updated for the Combined Facility in compliance with coverage under Minnesota NPDES General Stormwater Discharge Permit MN R050000 for industrial activities. The updated SWPPP will identify potential pollutant sources at the Combined Facility, outline operating procedures for material handling activities, and describe controls and BMPs that will be implemented to minimize pollutants in stormwater runoff. In addition to the stormwater management provisions described above, management practices will also continue to include practices currently being used at the Existing Facility such as storage of chemicals indoors or within appropriate containment areas, good site housekeeping practices, and proper disposal of waste materials.

8.3.5.2 Erosion and Sediment Control

Since construction of the Expansion Project will disturb more than one acre of land (a little less than four acres of the site will be disturbed), a permit application for coverage under Minnesota NPDES General Stormwater Discharge Permit (MN R100001) for construction activities is required and will be submitted to the MPCA prior to construction. The permit application will certify that temporary and permanent erosion and sediment control plans have been prepared and implemented to prevent soil particles from being transported offsite. This general permit requires that runoff from a project's new impervious surfaces must be directed to an on-site stormwater treatment facility when development creates one or more acres of cumulative impervious surface. Construction of the Expansion Project will not increase the amount of impervious surface at the Combined Facility. The existing stormwater pond is designed in accordance with the criteria set forth in the General Permit for sedimentation/infiltration basins. The pond will be available to serve as a temporary sediment basin during construction.

MEC II will ensure that adequate measures are taken to minimize soil erosion and sedimentation on the site. Temporary erosion and sediment control measures will be maintained during construction and will remain in place until the Expansion Project has been completed. The site will be stabilized and vegetation will be reestablished as needed, which is expected to be limited based for the very small amount of vegetated areas that may be disturbed. In addition to the stormwater pond, control measures such as silt fence, staked hay bales, sediment filters and traps, erosion control matting, mulching, and crushed rock pads will also be used where applicable, specifically between the construction areas and the wooded eastern one third of the site that will not be disturbed by construction. The total disturbed areas from construction will be minimal; however, as needed, all disturbed areas of the site will be seeded and mulched as soon as practical where applicable. The contractor selected by MEC II will also develop a SWPPP and apply for coverage under the NPDES General Stormwater Discharge Permit for construction to cover stormwater management at the temporary laydown and parking space that is utilized.

8.3.6 Wastewater Discharges

The majority of water that will be utilized at the Combined Facility will be cooling water supplied by the City of Mankato WWTP plant. A small amount of service water (approximately five percent of the total water utilized) from the City of Mankato will also be utilized by the facility. The Combined Facility will be designed to maximize the existing water reuse and recycling measures and to minimize wastewater discharges. The Existing Facility has two separate discharge points – one each for process and domestic wastewater. Both discharge points ultimately end up at the City of Mankato WWTP. As discussed in Section 2.7 and shown on the water usage flow diagram (Figure 5), process wastewater consisting of cooling tower blowdown, reverse osmosis reject, and other minor low volume waste streams are all ultimately discharged to the City WWTP. The City WWTP discharges to the Minnesota River. The Combined Facility will continue to operate in the same manner as existing conditions and will not add or change wastewater flow pathways or discharge points.

The majority of process water that has been utilized is lost to the atmosphere through evaporation, which will account for approximately 75 percent of all water that comes into the Combined Facility (Figure 5). The remaining process water is discharged back to the City WWTP. As part of the original construction of the Existing Facility, MEC I constructed a process water treatment system including a phosphorus removal and dechlorination system prior to discharge to the City WWTP. This system is located at the City's WWTP site and will continue to be utilized during operation of the Combined Facility. MEC II will install upgrades as required at the WWTP to accommodate the Expansion Project.

Cooling water from the Mankato WWTP that is treated and routed to the Combined Facility would otherwise be discharged directly to the Minnesota River under the Mankato WWTP's existing NPDES permit. The wastewater generated from the Combined Facility will continue to be treated for phosphorus and chlorine removal prior to discharge, and as a result it is anticipated that phosphorus and total suspended solids loads to the Minnesota River will be reduced as a direct result of the Combined Facility's water use and discharge.

Domestic wastewater generated from the Combined Facility will be discharged directly to the City of Mankato's sanitary sewer system through a lateral service connection line. The amount of domestic water discharge will not change noticeably at the Combined Facility compared to existing conditions. This discharge is authorized by the City of Mankato and subject to appropriate discharge limits and monitoring requirements.

8.4 BIOLOGICAL RESOURCES

8.4.1 Vegetation

The Expansion Project will include the construction of additional power generating equipment and buildings within the fence line of the Existing Facility. There is no vegetation within fence line however there is some vegetation on the east side of the Mankato Energy Center property outside of the fence line, consisting mainly of forest and wetland cover types (see Figure 2). Construction activities for the Expansion Project will not impact the existing vegetation communities on Calpine property. The materials for the construction of the Expansion Project will be transported to the site on existing roads and construction activity will occur on land that is currently disturbed.

The Expansion Project will require the temporary use of a small amount of land (approximately 15 acres) located outside the Existing Facility fence line for construction laydown and parking. Calpine intends to secure land use rights from a local property owner to accommodate the temporary construction, which is currently planned for adjacent industrial lands. A small amount of vegetation may be temporarily cleared (less than one quarter of an acre) to create a walkway from the construction laydown area to the facility; however, significant vegetation removal will not be required. No additional property is required for operation of the Combined Facility. As a result there will be no significant clearing or loss of vegetation from construction or operations activities and therefore adverse impacts to vegetation will not occur.

8.4.2 Wildlife and Wildlife Habitat

The Existing Facility is a developed industrial property that does not provide habitat for wildlife and is located adjacent to other industrial properties. There are some forest and wetland habitats on the east side of the Calpine property outside of the fence line. There are significant areas of habitat including forest, grassland and wetland cover types located to the northwest of the Existing Facility, in the areas along the Minnesota River. These areas of habitat likely contain a variety of wildlife species including birds, mammals, reptiles and amphibians.

The activity associated with the construction of the Expansion Project would occur on land that is currently disturbed. The existing wildlife habitats located to the northeast of the Existing Facility would not be impacted or disturbed during the construction of the Expansion Project. Additionally, the Existing Facility is currently fenced, which includes the areas where the majority of the construction will take place. The fence prevents wildlife from entering or crossing through the Existing Facility and/or the areas where the Expansion Project will be constructed. Wildlife has been observed outside of the fence line adjacent to Calpine property, indicating surrounding wildlife has become accustomed to existing conditions at and near the Existing Facility. Some disturbance or displacement of wildlife may occur when heavy machinery or construction equipment is on site and operating. However, disturbance or avoidance of wildlife would only be temporary and would not result in measurable impacts to individual wildlife species or populations.

The Expansion Project will require the temporary use of a small amount of land (approximately 15 acres) located outside the Existing Facility fence line for construction laydown and parking. This is currently targeted for existing adjacent industrial properties and would not result in the loss of wildlife habitat or impacts to wildlife populations.

8.4.3 Sensitive Species and Habitats

The U.S. Fish and Wildlife Service (USFWS) and the Minnesota Department of Natural Resources (DNR) were contacted prior to construction of the Existing Facility (in 2004) about threatened and endangered plant and animal species that may possibly exist at or near the facility and may be affected by its construction and/or operation. According to correspondence with the USFWS and DNR, review of their records indicated that no rare, threatened or endangered species had been documented at the site. An updated query of the DNR records of sensitive, rare, threatened and/or endangered plants and animals near the facility is discussed in Section 9. The updated 2015 query included documented records of sensitive species and communities in the area; however, none are located on or immediately adjacent to the Existing Facility and the eastern one-third of the site will not be disturbed by the construction of the Expansion Project. Based on the findings related to the construction of the Existing Facility and the disturbed nature of the existing site and surrounding area, the Expansion Project should not adversely affect significant biological resources including plants, animals, and critical wildlife habitat areas.

9.0 Rare and Unique Natural Resources

A review of the Minnesota Natural Heritage Information System (NHIS) database was requested from the DNR to determine if rare plant communities or animal species, unique resources, or other significant natural features are known to occur on or near the site of the facility. As stated in a letter from the DNR dated May 19, 2015, results of the database search indicated that fifteen rare features consisting of animals (snakes, fish, and birds), animal assemblages (freshwater mussel concentration area) and natural plant communities (mesic prairie) are known to occur within the vicinity of the Existing Facility. The results of the NHIS search are summarized below in Table 9-1.

Table 9-1: NHIS Identified Species and Communities

Species		Federal Status	State Status
Vertebrate Animal			
Paddlefish	*Polyodon spathula*	NA*	Threatened
Blue Sucker	*Cycleptus elongates*	NA*	Special Concern
North American Racer	*Coluber constrictor*	NA*	Special Concern
Shovelnose Sturgeon	*Scaphirhynchus platorynchus*	NA*	Watchlist
Western Foxsnake	*Patherophis ramspotti*	NA*	Watchlist
Invertebrate Animal			
Rock Pocketbook	*Arcidens confragosus*	NA*	Endangered
Yellow Sandshell	*Lampsilis teres*	NA*	Endangered
Monkeyface	*Quadrula metanevra*	NA*	Threatened
Black Sandshell	*Ligumia recta*	NA*	Special Concern
Round Pigtoe	*Pleurobema sintoxia*	NA*	Special Concern
Hickorynut	*Obovaria olivaria*	NA*	Watchlist
Vascular Plants			
	Berula erecta	NA*	Threatened
Hair-like Beak-rush	*Rhynchospora capillacea*	NA*	Threatened
Animal Assemblage			
Freshwater Mussel Concentration Area		NA	NA
Native Plant Community			
Mesic Prairie (Southern) Type		NA	NA

*NA identifies a species that is not listed at the Federal or State level.

A discussion of the potential impacts of the Expansion Project and/or the Combined Facility on the species and communities identified in the NHIS search results is provided.

<u>Federally Listed Species</u>

No federally listed endangered or threatened species were identified by the NHIS search. The NHIS letter mentions that the U.S. Fish and Wildlife Service listed the Northern Long-eared Bat (*Myotis septentrionalis)* as threatened under the Endangered Species Act and implemented an interim 4(d) rule effective May 4, 2015, which generally prohibits purposeful taking of northern long-eared bats throughout the species' range. The Northern Long-eared Bat is also a state-listed species of special concern in Minnesota. The bat hibernates in caves and mines during the winter and roosts underneath bark or in cavities and crevices of trees. The northern long-eared bat was not identified as being in the vicinity of the facility in the NHIS query results. There will only be very limited clearing of trees (less than one acre) during the construction of the Expansion Project. Therefore no impacts to the northern long-eared bat are anticipated.

State Listed Species

Two mussel species listed as endangered within Minnesota, the Rock Pocketbook and Yellow Sandshell, were identified by the NHIS search. The only location that these two mussel species would only be found in close proximity to the facility would be within the Minnesota River. There is no habitat for these species present within the fence line of the facility. Construction of the Expansion Project will not impact the Minnesota River and as a result no effect will occur to either species.

Four species listed as threatened within Minnesota were identified by the NHIS search. Two of the species, the paddlefish and monkeyface, are both aquatic species that would only be found within the Minnesota River near the Existing Facility. These species will not be impacted as construction of the Expansion Project will not impact waterways. Two vascular plant species, the *Berula erecta* (no common name given) and the Hair-like Beak-rush, were also identified by the NHIS search. These species were previously documented north of the facility in habitats along the Minnesota River. The Expansion Project will be constructed within the fence line on a previously disturbed surface in an existing industrial area. Native habitats that may contain this species will not be disturbed and no impacts to these species would occur.

Four special concern species were identified by the NHIS search. Species of Special Concern are tracked, but have no legal status under Minnesota's endangered species rules. The Blue Sucker, the Black Sandshell, and Round Pigtoe, a fish and two mussel species, would only be found within the Minnesota River near the Existing Facility. Construction of the Expansion Project will not impact waterways and therefore no impacts to these species would occur. The habitat for the North American Racer, a snake species, is not present within the project boundaries, but was identified within the project vicinity. The project site is currently fenced, however the fencing does not prohibit the travel of reptiles. In order to avoid potential impacts to the species, exclusionary silt fencing will be utilized to create a boundary to reptile species between the working areas on the site and the stormwater pond and vegetation on the east side of the facility where reptiles or other wildlife may be present. Wildlife-friendly erosion control best management practices will be implemented to minimize impacts to wildlife that may be near the facility.

Three watch list species were identified by the NHIS search. Watch list species are tracked, but have no legal status. Two of the watch list species, the Shovelnose Sturgeon and Hickorynut, are aquatic fish and mussel species and would only be found within the Minnesota River which will not be impacted by Expansion Project or the Combined Facility. Similar to the North American Racer listed above, the habitat for the Western Foxsnake, a snake species, is not present within the project boundaries, but was identified within the project vicinity. As described above, exclusionary silt fencing will be utilized to create a boundary between working areas and the habitat on the east side of the facility along with the use of wildlife-friendly erosion control best management practices to limit potential impacts to the species.

Two communities were also identified within the vicinity of the project. A freshwater mussel concentration area was identified within the Minnesota River but will not experience impacts given the Expansion Project will not impact waterways. A native plant community, Mesic Prairie (Southern) Type, was also identified. The Expansion Project is being built on an existing, impervious surface, and will not disturb areas of native habitat that could potentially create impacts to the native plant community. A copy of the DNR NHIS letter and Index Report is provided in Appendix C.

In summary, there are some sensitive plant and animal species as well as native communities that can be found within Blue Earth County. However, the construction of the Expansion Project will take place within the fence line of the facility on a developed site within an industrial area. Native habitat areas or the species that utilize these habitats will not be disturbed or impacted by the Expansion Project or the Combined Facility.

10.0 Unavoidable Adverse Effects and Mitigative Measures

As discussed and documented within this application, the construction of the Expansion Project and the operation of the Combined Facility will not cause significant adverse effects to humans or the environment. As is common with developments of significant magnitude, there will be some unavoidable impacts. The Expansion Project and the Combined Facility have been designed to minimize potential impacts to the greatest practical extent. Furthermore, as listed in Table 11-1 in the next section, MEC II will obtain all federal, state, and local permits required for construction of the Expansion Project and operation of the Combined Facility.

Unavoidable impacts to the local community and natural environment are summarized below.

10.1 NOISE IMPACTS

Noise will be generated during construction of the Expansion Project and during operation of the Combined Facility. The Expansion Project will occur within the footprint of the Existing Facility which is located within an established industrial area on the edge of Mankato more than one-half mile from the nearest residential areas and approximately 3,500 feet from the nearest residential dwelling. Due to the planned noise mitigation measures that will be employed at the Combined Facility, other noise sources in proximity to the Combined Facility, and the distance to sensitive noise receptors, it is anticipated that noise generated due to construction and operation will not adversely affect the surrounding area. The Expansion Project will be designed to ensure the Combined Facility will comply with the Minnesota Noise Standards (Minnesota Rules 7030.0040) for all off-site receptors during normal operation.

10.2 VISIBLE PLUMES

Exhaust stacks associated with plant equipment, as well as the Existing Facility's cooling tower occasionally produce visible steam and vapor plumes. The length and persistence of these plumes are influenced by the prevailing weather conditions such as temperature, relative humidity, and wind speed. The plumes are most persistent and visible during cold and damp weather, principally during the winter. To date MEC I has never received a complaint related to the plumes at the facility. The impacts of these plumes are aesthetic, rather than environmental, and are not anticipated to noticeably increase with the Expansion Project.

10.3 AIR EMISSIONS

Air pollutant emissions will be generated as a result of combustion of fuels from several sources within the Combined Facility. The primary sources of combustion-related air pollutant emissions are the combined-cycle gas turbines and associated duct firing systems. Secondary sources of combustion-related emissions include the auxiliary boiler, bath heater, cooling tower, proposed emergency generator, and fire pump engine. These emissions will result in ambient impacts less than the applicable air quality standards and; therefore, will

not adversely impact public health and safety, plants, animals, or soils. Advanced emission control equipment will be designed and implemented at the Combined Facility to mitigate emissions to the air through the exhaust stacks and from other equipment. The mitigative measures planned for the Expansion Project include selective catalytic reduction downstream of the duct burners to reduce NO_x emissions from the CTGs and duct burners. An oxidation catalyst will also be used to reduce emissions of CO and VOCs.

Air pollutant emissions will be generated from the cooling towers at the site and from vehicles driving across facility haul roads. Air emissions from these sources will be sources of particulate emissions only. Particulate emissions from these sources are expected to be small relative to the combustion sources at the site. Air pollution controls are not planned for the cooling towers.

The emergency generator and fire pump will also generate air pollutant emissions. These sources are used for emergency purposes only and are expected to have relatively small emissions compared to the combustion sources at the site.

MEC II must obtain the required state and federal air permits prior to construction of the Expansion Project and operation of the Combined Facility and will comply with requirements to monitor and test air pollutant emissions to demonstrate compliance with established permit limits.

10.4 TRAFFIC

Overall, vehicle traffic levels in the area will temporarily increase during construction of the Expansion Project and will vary during different stages of the construction period, which is expected to last about 24 to 27 months. The local roadways have adequate capacity to accommodate the temporary increase in construction traffic. If needed, MEC II will also acquire permits that may be required from the Minnesota Department of Transportation (MnDOT) such as a Special Handling Permit (for oversized or overweight vehicles). MEC II will also coordinate with the City of Mankato and Blue Earth County as needed for use of the local roadways by construction vehicles. Operation of the Combined Facility will only add two new employees and minimal changes in deliveries or visitors which will not result in an impact to traffic flow or safety on local roadways. Instances where fuel oil will be used have been infrequent and are expected to continue to be rare, isolated, and of limited duration in the future. The new CTG will not utilize fuel oil as a backup fuel and therefore there will be no changes to this source of potential traffic with the Expansion Project.

10.5 WATER USAGE AND DISCHARGES

Stormwater discharges from construction of the Expansion Project and continued operations of the Combined Facility will flow into the existing Stormwater pond on the east side of the facility. This pond has the capacity to hold and treat additional stormwater runoff due to the Expansion Project. It is expected that the additional stormwater runoff will be minimal. MEC II will also obtain the required NPDES stormwater construction permit and employ measures to manage stormwater runoff during construction. No impacts to stormwater runoff or surface water bodies are anticipated from the Combined Facility.

MEC I has an existing contract with the Mankato WWTP to supply cooling water to the Existing Facility. All wastewater will continue to be discharged to the City of Mankato WWTP following the Expansion Project. MEC II will install upgrades as required at the WWTP to accommodate the Expansion Project. The Combined Facility will continue to operate and

utilize cooling water in the same manner as current conditions after the Expansion Project is constructed with the exception of the increased volume of water required at the Combined Facility.

11.0 Permits and Approvals

In addition to applying for a Site Permit in accordance with the Minnesota Power Plant Siting Act as documented herein, the Expansion Project will require numerous federal, state, and local permits and approvals for construction and operation of the Combined Facility. Anticipated permits and approvals are listed below in Table 11-1 and were discussed in previous sections of this permit application.

Table 11-1: Required Permits and Approvals

Unit of Government*	Type of Approval	Regulated Activity	Status
Federal			
FAA	Notice of Proposed Stack Construction	Stack height greater than 200 feet above ground level	To be provided, if needed. Stack anticipated to be less than 200 feet.
U.S. EPA	Acid Rain Permit	Title IV Acid Rain Certificate of Representation for the discharge of sulfur oxides	To be obtained
	Risk Management Plan/Process Safety Management (RMP/PSM)	Risk management plan is required for facilities possessing more than threshold quantities of regulated chemicals (e.g., anhydrous ammonia)	To be updated
	Conditionally Exempt Small Quantity Generator	Hazardous waste generation	The facility has an existing Hazardous Waste Generation license and will amend as necessary.
Federal Energy Regulatory Commission (FERC)	Exempt Wholesale Generator Self-Certification;	Provide documentation to FERC that entity is operating a power generating facility and selling electric energy at wholesale;	To be obtained
	Market-based Rate Authorization	Authorization to sell electric power at Market Based rates; granted to Exempt Wholesale Generators.	To be obtained
U.S. Fish and Wildlife Service	US Threatened and Endangered Species	Demonstrate that project development does not have the potential to disturb a listed species and/or provide mitigation for impacts	To be submitted to US EPA
State of Minnesota			
MISO	Approval as a Network Resource for Xcel	Generator interconnection and transmission access	To be amended
PUC	Power Plant Siting Permit	Review of potential human and environmental impacts associated with	Pending – Permit application

Unit of Government*	Type of Approval	Regulated Activity	Status
		the siting of a large electric power generating plant. Qualifies for alternative review process for facilities fueled by natural gas	submitted Aug-5-2015 (this document)
SHPO	Cultural Resources Review	Review of agency records for the presence of archeological, historical, or architectural resources at or near the site that may be affected by the project	Completed - Received comment letter dated Apr-2-2015
MDNR	Minnesota Natural Heritage Database Review	Review of the Minnesota Natural Heritage Information System database for the presence of any rare plant communities or animal species, unique resources, or other significant natural features at or near the site that may be affected by the project	Completed - Received comment letter dated May-19-2015
	State Threatened and Endangered Species	Demonstrate that project development does not have the potential to disturb a listed species and/or provide mitigation for impacts	To be submitted to US EPA
MPCA	NPDES/SDS General Stormwater Discharge Permit (MN R100001) for Construction Activities	Stormwater discharges associated with construction activities disturbing one or more acres of land	To be submitted
	NPDES/SDS General Stormwater Discharge Permit (MNR0534NJ) for Industrial Activities	Stormwater discharges associated with industrial activities at the Facility. Coverage under the permit requires preparation of a Stormwater Pollution Prevention Plan	Will be revised as necessary
	Air Emission Facility Permit (Combined Construction and Title V Operating)	Air emissions - permitting requirements associated with federal PSD new source review and NSPS requirements, and other applicable state/federal requirements	Amendment Pending – Permit application to be submitted Aug-24-2015
	Hazardous Waste Generator License	Hazardous waste generation	The facility has an existing EPA notice of Hazardous Waste Generation and will amend as necessary.
	Spill Prevention, Control and Countermeasure Plan	Aboveground storage of greater than 1,320 gallons of fuel oil; no changes as a result of Expansion Project	Update as needed
	Storage Tank Registration and Permitting	Anyone wishing to operate a new or existing regulated storage tank must register that tank with MPCA. Regulated storage tanks are those that are not otherwise exempt and that contain a regulated substance	To be obtained if needed for new tanks

Unit of Government*	Type of Approval	Regulated Activity	Status
	Facility Response Plan	Applicable for facilities that have oil storage greater than or equal to 42,000 gallons that transfers oil over water to/from vessels or has total oil storage greater than or equal to 1 million gallons and meets selected conditions	The facility has an existing plan that meets FRP requirements. To be amended as needed
MnDOT	Special Hauling Permit (Oversize/ Overweight)	For delivery of oversize and/or super loads of construction equipment and others to the property	To be obtained if needed
	Highway Occupancy Permits	MnDOT regulates and/or gives approval for the use and occupancy of highway right of way by utility facilities or private lines	To be obtained if needed
Local			
City of Mankato	Conditional Use Permit	Electric generating facility within areas zoned M-2, Heavy Industrial District	To be amended
	Building Permit	Site grading, development, construction, and occupancy approval	To be obtained
	Connections to municipal sewer and water as well as gray water from Waste Water Treatment Plant	Obtain approvals from City	To be amended
	Wetland No-Loss Application	Submit to City	Submitted as part of original construction, will update if needed.
Other			
Utilities	Utility Connection Permits and Approvals	Connections of Expansion Project related equipment to necessary utilities (e.g., water, wastewater, gas pipelines, transmission lines, telecommunications)	To be obtained as needed

12.0 References

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