



## **Environmental Assessment Mankato Energy Center Expansion Project**

In the Matter of Mankato Energy Center II, LLC's Application for a Site Permit for the  
345 MW Expansion of the Mankato Energy Center

**Docket No. IP6949/GS-15-620**



**Minnesota Department of Commerce  
Energy Environmental Review and Analysis  
February 2016**



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## **Abstract**

On August 5, 2015, Mankato Energy Center II, LLC (applicant) filed a site permit application with the Minnesota Public Utilities Commission (Commission) for the Mankato Energy Center expansion project. The applicant proposes to add a combustion turbine generator, a heat recovery steam generator, and associated equipment to the existing Mankato Energy Center (MEC) in Blue Earth County. This expansion of the MEC will allow for the production of an additional 345 megawatts of electrical power.

The applicant's proposed project requires a site permit from the Commission. Department of Commerce, Energy Environmental Review and Analysis (EERA) staff is responsible for conducting environmental review for site permit applications submitted to the Commission. Accordingly, EERA staff has prepared this environmental assessment (EA) for the project. This EA addresses the issues required in Minnesota Rule 7850.3700 and those identified in the Department's scoping decision of November 3, 2015.

Following release of this EA, a public hearing will be held in the project area. The hearing will be presided over by an administrative law judge from the Office of Administrative Hearings. Upon completion of the environmental review and hearing process, the record compiled on the site permit application will be presented to the Commission for a final decision. A Commission decision on the site permit application is anticipated in early 2016.

Persons interested in this project can place their names on the project mailing list by contacting Tracy Smetana, the Commission's public advisor, by email: [consumer.puc@state.mn.us](mailto:consumer.puc@state.mn.us), or by phone: 651-296-0406 (toll free: 1-800-657-3782).

Documents of interest for this project can be found on the State of Minnesota's eDockets system: <https://www.edockets.state.mn.us/EFiling/search.jsp>. Enter the year "15" and the number "620."

Documents of interest can also be found on the Department's website at: [www.mn.gov/commerce/energyfacilities/Docket.html?Id=34238](http://www.mn.gov/commerce/energyfacilities/Docket.html?Id=34238).

### **List of Preparers**

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## Acronyms, Abbreviations, and Definitions

AERA	Air Emissions Risk Analysis
ALJ	Administrative Law Judge
BACT	Best Available Control Technologies
Commission	Minnesota Public Utilities Commission
CN	Certificate of Need
CO	Carbon Monoxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
CTG	Combustion Turbine Generator
dB	Decibels
dBA	A-weighted Sound Level Recorded in Decibels
DNR	Minnesota Department of Natural Resources
Department	Minnesota Department of Commerce
EA	Environmental Assessment
EERA	Department of Commerce Energy Environmental Review and Analysis
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
HRSG	Heat Recovery Steam Generator
kV	Kilovolt
MEC	Mankato Energy Center
MGD	Million Gallons per Day
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NAC	Noise Area Classification
NERC	North American Electric Reliability Corporation
NLEB	Northern Long-Eared Bat
NESC	National Electrical Safety Code
NO <sub>x</sub>	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
PSD	Prevention of Significant Deterioration
SCR	Selective Catalytic Reduction
SPCC	Spill Prevention, Contingency, and Counter Measures
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compounds
WWTP	City of Mankato Wastewater Treatment Plant

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- Appendix B. Generic Site Permit Template
- Appendix C. Expansion Site Plan
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- Appendix E. Air Permit Amendment Application

## Summary

Mankato Energy Center II, LLC (applicant) proposes to expand the existing Mankato Energy Center (MEC) by adding a combustion turbine generator, a heat recovery steam generator, and associated equipment. This expansion of the MEC will allow for the production of an additional 345 megawatts of electrical power. The MEC was designed and constructed to accommodate this expansion.

In order to construct the proposed project, the applicant must obtain a site permit from the Minnesota Public Utilities Commission (Commission). The Commission's docket number for the site permit application is IP6949/GS-15-620. In addition to a site permit from the Commission, the project will require approvals (e.g., permits, licenses) from other state agencies, federal agencies, and local units of government.

Department of Commerce, Energy Environmental Review and Analysis (EERA) staff is responsible for conducting environmental review for site permit applications submitted to the Commission. The intent of this review is to ensure that citizens, local governments, agencies, and the Commission are aware of the potential human and environmental impacts of the project and possible mitigation measures. The Commission considers these impacts and mitigation measures when determining whether to issue a site permit for the project.

### **State Review Process**

EERA staff has prepared this environmental assessment (EA) for the Commission and for other agencies and entities that have permitting authority related to the project. This EA is also intended to assist citizens in providing guidance to the Commission and other decision-makers regarding the project. This EA evaluates the potential human and environmental impacts of the applicant's proposed project and possible mitigation measures.

The EA does not advocate or state a preference for the proposed project. The EA analyzes potential impacts and mitigation measures so that citizens, local governments, agencies, and the Commission can work from a common set of facts.

EERA staff initiated work on this EA by soliciting comments on: (1) the issues and impacts that should be evaluated in the EA, and (2) the mitigation measures to study in the EA. This process of soliciting comments on the contents of the EA is known as "scoping." EERA solicited comments through a public meeting on October 13, 2015, and a public comment period that ended October 27, 2015.

Based on the scoping comments received, the Department issued the scoping decision for this EA on November 3, 2015. The scoping decision details the impacts and mitigation measures that are analyzed in the EA. Once completed and issued, the EA is entered into the record for the site permit proceedings, so that it can be used by the Commission in making decisions about the project.

Upon completion of the EA, a public hearing will be held in the project area. The hearing will be presided over by an administrative law judge (ALJ) from the Office of Administrative Hearings. Members of the public will have an opportunity to speak at the hearing, present evidence, ask questions, and submit comments. The ALJ will provide a report to the Commission that summarizes the hearing proceedings and comments.

Upon completion of the environmental review and hearing process, the record will be presented to the Commission for a final decision. A decision by the Commission on a site permit for the project is anticipated in summer 2016.

#### **Potential Impacts of Proposed Project**

Impacts to human settlements are anticipated to be minimal. Aesthetic impacts are unavoidable but are anticipated to be incremental and minimal. Impacts to public health and safety are anticipated to be minimal. Air emissions are anticipated to be within all state and federal guidelines. Though the project will increase greenhouse gas emissions at the MEC, it is anticipated to reduce greenhouse gas emissions in Minnesota overall.

Impacts to land-based economies are anticipated to be minimal. Impacts to archaeological and historic resources are anticipated to be minimal. Impacts to the natural environment, including air resources, water resources, flora, and fauna are anticipated to be minimal. Impacts to rare and unique natural resources are anticipated to be minimal.

#### **Application of Siting Factors to Proposed Project**

The Commission is charged with locating large electric power generating plants in a manner that is “compatible with environmental preservation and the efficient use of resources” and that minimizes “adverse human and environmental impact[s]” while ensuring electric power reliability.<sup>1</sup> Minnesota Rule 7850.4100 lists 14 factors for the Commission to consider in its site permitting decisions.

The potential human and environmental impacts of the project, relative to the siting factors of Minnesota Rule 7850.4100, are anticipated to be minimal and mitigated by (1) the proposed location of the project, (2) the general conditions in section 4.0 of the Commission’s generic site permit template, and (3) the requirements of downstream permits.

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<sup>1</sup> Minnesota Statute 216E.02.



## 1.0 Introduction

This document is an environmental assessment (EA) that has been prepared for the Mankato Energy Center expansion project proposed by Mankato Energy Center II, LLC (applicant). This EA evaluates the potential human and environmental impacts of the applicant's proposed project and possible mitigation measures.

The EA is intended to facilitate informed decision-making by state agencies, particularly with respect to the goals of the Minnesota Environmental Policy Act – “to create and maintain conditions under which human beings and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of the state's people.”<sup>2</sup>

### 1.1 Proposed Project

The applicant proposes to expand the existing Mankato Energy Center (MEC) by adding a combustion turbine generator (CTG), a heat recovery steam generator (HRSG), and associated equipment. This expansion of the MEC will allow for the production of an additional 345 megawatts of electrical power. The MEC was designed and constructed to accommodate this expansion.

The project will use natural gas as a fuel source. Existing infrastructure installed for the MEC (e.g., electrical transmission, gas pipeline, water service) will be used for the project. The project is anticipated to be operational by July 1, 2018. The estimated project cost is between \$220 million and \$300 million dollars.

#### Project Location

The proposed project is located within the existing MEC, in the city of Mankato, in Blue Earth County (**Figure 1**). The MEC was designed and constructed to accommodate the project.

#### Project Need

The proposed project is needed to provide electrical power to meet the projected needs of Xcel Energy's electric power customers. The project was selected by the Minnesota Public Utilities Commission (Commission) to provide this power in a competitive resource acquisition process.

### 1.2 State of Minnesota Review Process

In order to construct the proposed project, the applicant must obtain a site permit from the Commission. The applicant submitted a site permit application to the Commission on August 5, 2015.<sup>3</sup> The Commission's docket number for this application is IP6949/GS-15-620. In addition to a site permit from the Commission, the project will require approvals (e.g., permits, licenses) from other state agencies, federal agencies, and local units of government (see Section 2.3).

In considering the applicant's site permit application, the Commission must determine whether a site permit can be issued, and, if so, what conditions should be included in the permit to mitigate potential

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<sup>2</sup> Minnesota Statute 116D.02.

<sup>3</sup> Mankato Energy Center II, LLC, Application for a Site Permit for the Proposed 345 MW Expansion of the Mankato Energy Center, August 5, 2015, eDockets Numbers [20158-113056-01](#), [20158-113056-02](#), [20158-113056-03](#), [20158-113056-04](#) [hereinafter Site Permit Application].

impacts of the project. To aid the Commission in these determinations, the Commission gets assistance from several state agencies, including the Department of Commerce (Department) and the Office of Administrative Hearings (OAH).

Department Energy Environmental Review and Analysis (EERA) staff is responsible for conducting environmental review for site permit applications submitted to the Commission. The intent of this review is to ensure that citizens, local governments, agencies, and the Commission are aware of the potential human and environmental impacts of a proposed project and possible mitigation measures. The Commission considers these impacts and mitigation measures when determining whether to issue a site permit.

The OAH, at the request of the Commission, provides an administrative law judge (ALJ) to conduct a public hearing for a proposed project. The ALJ facilitates the hearing to gather input on the project and mitigation measures appropriate for the project. The ALJ submits a report to the Commission which summarizes the input received during the hearing.

### **Environmental Review**

EERA staff has prepared this EA for the Commission, which has before it the applicant's site permit application, and for other agencies and entities that have permitting authority related to the project. Additionally, this EA has been prepared to assist citizens in providing guidance to the Commission and other decision-makers regarding the project. The EA evaluates the potential human and environmental impacts of the project and possible mitigation measures.

The EA does not advocate for a project or a specific mitigation measure. Rather, the EA analyzes potential impacts and mitigation measures such that citizens, local governments, agencies, and the Commission can work from a common set of facts.

EERA staff initiated work on this EA by soliciting comments on: (1) the issues and impacts that should be evaluated in the EA, and (2) the mitigation measures to study in the EA. This process of soliciting comments on the contents of the EA is known as "scoping." EERA solicited comments through a public meeting on October 13, 2015, and a public comment period that ended October 27, 2015.

Based on the scoping comments received, the Department issued the scoping decision for this EA on November 3, 2015 (**Appendix A**). The scoping decision details the impacts and mitigation measures that are analyzed in the EA. Once completed and issued, the EA is entered into the record for the site permit proceedings so that it can be used by the Commission in making decisions about the project.

### **Public Hearing**

After the EA is issued, an ALJ will conduct a public hearing for the project. The hearing will be held in the project area. Interested persons will have an opportunity at the hearing to ask questions, provide comments, and advocate for the mitigation measures that they believe are most appropriate for the project.

The ALJ will submit a report to the Commission which summarizes the input received during the public hearing. The Commission will use the ALJ report, the EA, and the entire record in deciding whether to issue a site permit for the project.

### 1.3 Organization of the Environmental Assessment

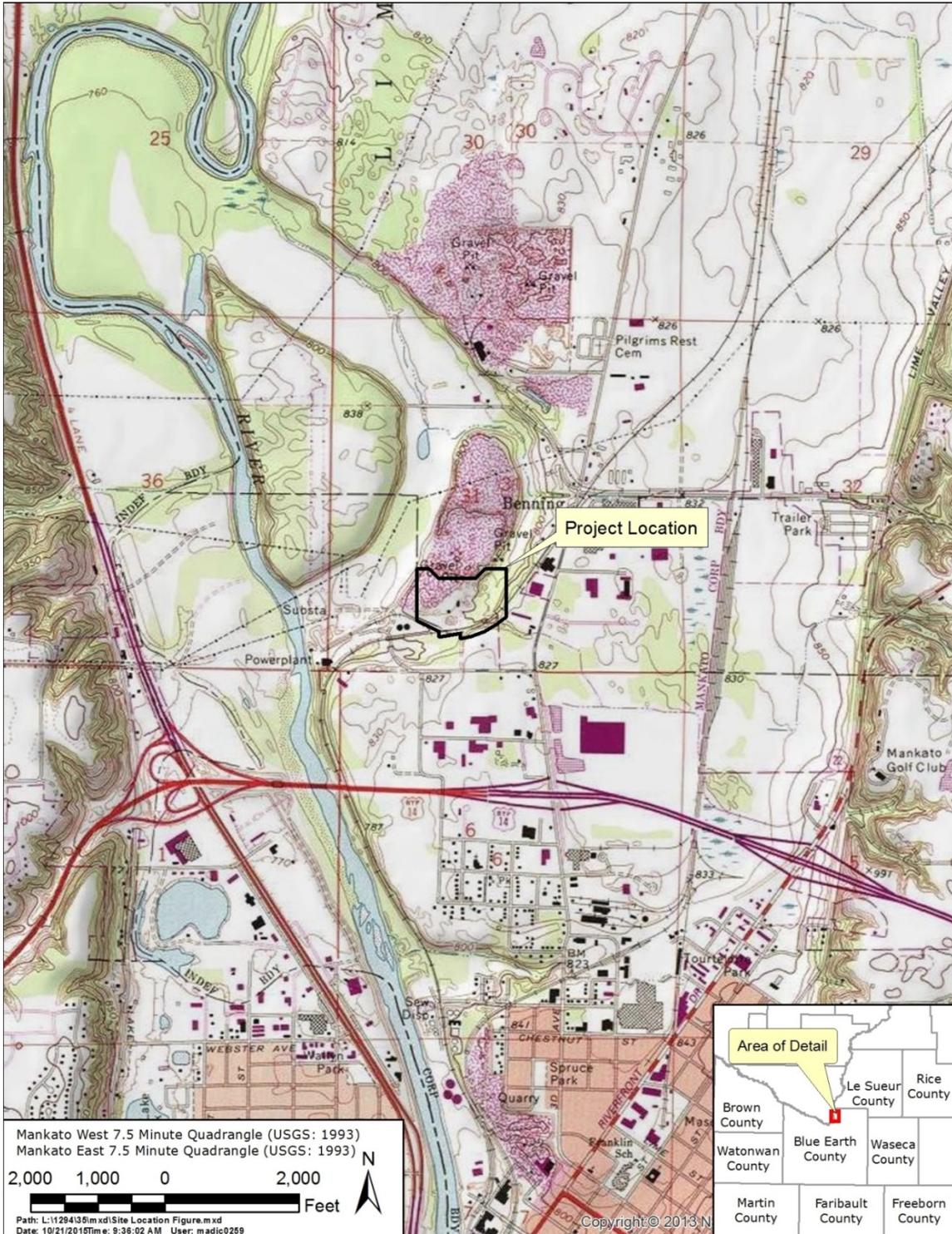
This EA addresses the issues required in Minnesota Rule 7850.3700 and those identified in the Department’s scoping decision of November 3, 2015 (**Appendix A**), and is organized as follows:

<b>Section 1.0</b>	<b>Introduction</b>	The introduction provides an overview of the proposed project, the State of Minnesota’s review process, and this EA.
<b>Section 2.0</b>	<b>Regulatory Framework</b>	Section 2.0 describes the regulatory framework associated with the project, including the Commission’s site permitting process and other permits and approvals required for the project.
<b>Section 3.0</b>	<b>Proposed Project</b>	Section 3.0 describes the Mankato Energy Center expansion project as proposed by the applicant. It also describes the engineering and construction of the project
<b>Section 4.0</b>	<b>Potential Impacts of the Proposed Project</b>	Section 4.0 analyzes the potential impacts of the proposed project to human and natural resources and identifies measures that could be implemented to avoid, minimize, or mitigate these impacts.
<b>Section 5.0</b>	<b>Application of Siting Factors</b>	Section 5.0 discusses the proposed project relative to the siting factors of Minnesota Rule 7850.4100.

### 1.4 Sources of Information

The primary source of information for this EA is the site permit application submitted by Mankato Energy Center II, LLC. Additional sources of information are indicated in footnotes. New and additional information has been included from the applicant. Information from prior EERA environmental review documents and other state agencies is included. Information was also gathered by a site visit.

Figure 1. Project Overview Map



## 2.0 Regulatory Framework

The Mankato Energy Center (MEC) expansion project requires a site permit from the Minnesota Public Utilities Commission (Commission). Additionally, the project will require approvals from other state and federal agencies with permitting authority for actions related to the project.

### 2.1 Certificate of Need

No person may construct a large energy facility in Minnesota without a certificate of need (CN) from the Commission.<sup>4</sup> An electric power generating plant is a large energy facility if it has capacity to generate 50,000 kilowatts or more.<sup>5</sup> The proposed project will have the capacity to generate 345 MW and thus is a large energy facility. However, a CN is not required for a large energy facility if the facility is selected in a bidding process established by the Commission.<sup>6</sup> The proposed project was selected in such a process by the Commission.<sup>7</sup> As a result, the project does not require a CN.

### 2.2 Site Permit

In Minnesota, no person may construct a large electric power generating plant without a site permit from the Commission.<sup>8</sup> A large electric power generating plant is defined as electric power generating equipment and associated facilities designed for and capable of operation at a capacity of 50,000 kilowatts or more.<sup>9</sup> The proposed project will have the capacity to generate 345 MW and therefore requires a site permit from the Commission.

The applicant submitted a site permit application to the Commission on August 5, 2015. The application was accepted as complete by the Commission on October 14, 2015. The applicant has indicated its intention to utilize the Power Plant Siting Act's alternative review process for the project. Because the project will be fueled solely by natural gas, the project is eligible for this process.<sup>10</sup> The alternative review process includes environmental review and a public hearing, and typically takes six to nine months to complete.

### Environmental Review

Applications to the Commission for site permits are subject to environmental review conducted by Department of Commerce, Energy Environmental Review and Analysis (EERA) staff.<sup>11</sup> Projects proceeding under the alternative review process require the preparation of an environmental assessment (EA).<sup>12</sup> An EA is a document which describes the potential human and environmental impacts of the proposed project and possible mitigation measures. The Department of Commerce determines the scope of the EA. The EA must be completed and made available prior to the public

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<sup>4</sup> Minnesota Statute 216B.243.

<sup>5</sup> Minnesota Statute 216B.2421.

<sup>6</sup> Minnesota Statute 216B.2422, Subd. 5(b).

<sup>7</sup> Order Approving Power Purchase Agreement with Calpine, Approving Power Purchase Agreement with Geronimo, and Approving Price Terms with Xcel, February 5, 2015, Docket No. E-002/CN-12-1240, eDockets Number [20152-107070-01](#).

<sup>8</sup> Minnesota Statute 216E.03.

<sup>9</sup> Minnesota Statute 216E.01.

<sup>10</sup> Minnesota Statute 216E.04, Subd. 1.

<sup>11</sup> Minnesota Statute 216E.04, Subd. 5.

<sup>12</sup> Id.

hearing for the project.

On October 13, 2015, Commission staff and EERA staff held a joint public information and EA scoping meeting in the city of Mankato. The purpose of the meeting was to provide information to the public about the proposed project, to answer questions, and to allow the public an opportunity to suggest impacts and mitigation measures that should be considered in the EA for the project. Three persons attended the meeting; these persons made no comments regarding the project.<sup>13</sup>

A comment period followed the public meeting and was open through October 27, 2015. Comments were received from one person and two state agencies.<sup>14</sup> These comments did not identify specific impacts or mitigation measures to study in the EA.

The Minnesota State Historic Preservation Office noted that, based on its review of the project, there were no archaeological or historic resources in the project area that would be impacted by the project.<sup>15</sup>

The Minnesota Department of Transportation (MnDOT) noted that the project did not appear to impact MnDOT right-of-way.<sup>16</sup> MnDOT indicated that consideration should be given to the movement of oversize/overweight equipment for the project, and that the applicant should coordinate with MnDOT if such equipment is transported on local highways.<sup>17</sup>

After consideration of the site permit application and public comments received during the scoping process, the deputy commissioner of the Department of Commerce issued a scoping decision on November 3, 2015 (**Appendix A**). The scoping decision identifies the resources, potential impacts, and mitigation measures that are evaluated in this EA. EERA staff provided notice of the scoping decision to those persons on the project mailing list.

### **Public Hearing**

Upon completion of the EA, a public hearing will be held in the project area.<sup>18</sup> The hearing will be presided over by an administrative law judge (ALJ) from the Office of Administrative Hearings. Members of the public will have an opportunity to speak at the hearing, present evidence, ask questions, and submit comments. The ALJ will provide a report to the Commission that summarizes the hearing proceedings and comments.

Comments received during the hearing on the EA become part of the record in the proceeding. EERA staff will respond to comments on the EA during the hearing comment period, but staff is not required to revise or supplement the EA document.<sup>19</sup> Upon completion of the environmental review and hearing process, the record will be presented to the Commission for a final decision. A decision by the Commission on a site permit for the project is anticipated in summer 2016.

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<sup>13</sup> Comments on Scope of Environmental Assessment, eDockets Number [201510-115183-01](#).

<sup>14</sup> Id.

<sup>15</sup> Id.

<sup>16</sup> Id.

<sup>17</sup> Id.

<sup>18</sup> Minnesota Statute 216E.04, Subd. 6.

<sup>19</sup> Minnesota Rule 7850.3800, Subp. 5.

### **Permit Decision**

The Commission is charged with selecting sites for electric power generating plants that minimize adverse human and environmental impacts while ensuring electric power system reliability and integrity.<sup>20</sup> Site permits issued by the Commission may include conditions specifying construction and operation standards. The Commission's generic site permit template for large electric power generating plants is included in **Appendix B**.<sup>21</sup>

Minnesota Statute Section 216E.03, subdivision 7(b) identifies 12 considerations that the Commission must take into account when evaluating sites for electric power generating plants.<sup>22</sup> Minnesota Rule 7850.4100 lists 14 factors for the Commission to consider when making a decision on a site permit:<sup>23</sup>

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

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<sup>20</sup> Minnesota Statute 216E.02.

<sup>21</sup> Generic Site Permit Template for a Large Electric Power Generating Plant, Minnesota Public Utilities Commission, February 8, 2016, eDockets Number [20162-118074-02](#).

<sup>22</sup> Minnesota Statute 216E.03, Subd. 7.

<sup>23</sup> Minnesota Rule 7850.4100.

At the time the Commission makes a final decision on a site permit, the Commission must determine whether the EA and the record created at the public hearing address the issues identified in the scoping decision.<sup>24</sup>

The Commission is charged with making a final decision on a site permit within 60 days after receipt of the ALJ's report.<sup>25</sup> A final decision must 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.<sup>26</sup>

If issued a site permit by the Commission, the applicant may exercise the power of eminent domain to acquire land for the project.<sup>27</sup>

### **2.3 Other Permits and Approvals**

A site permit from the Commission is the only state permit required for the siting of the project. The Commission's site permit supersedes local planning and zoning and binds state agencies.<sup>28</sup> Thus, state agencies are required to participate in the Commission's permitting process to aid the Commission's decision-making and to indicate sites that are not permissible.<sup>29</sup>

This said, various federal, state, and local permits may be required for activities related to the construction and operation of the project. All permits subsequent to the Commission's issuance of a site permit and necessary for the project (commonly referred to as "downstream permits") must be obtained by a permittee. **Table 1** includes a list of downstream permits that may be required for the project.

#### **Federal Approvals**

The U.S. Environmental Protection Agency (EPA) regulates potential impacts to human health and the environment through a variety of permit and approvals.<sup>30</sup> The EPA's authority extends to multiple activities including emissions to air and water and the handling of hazardous wastes.

The U.S. Federal Energy Regulatory Commission (FERC) regulates the interstate transport of electricity, natural gas, and oil.<sup>31</sup> FERC regulates the wholesale sale of electricity in interstate commerce.

The U.S. Fish and Wildlife Service (USFWS) requires permits for the taking of threatened or endangered species.<sup>32</sup> The USFWS encourages consultation with project proposers to ascertain a project's potential to impact these species and to identify mitigation measures for the project generally.

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<sup>24</sup> Minnesota Rule 7850.3900.

<sup>25</sup> Id.

<sup>26</sup> Id.

<sup>27</sup> Minnesota Statute 216E.12.

<sup>28</sup> Minnesota Statute 216E.10.

<sup>29</sup> Id.

<sup>30</sup> U.S. Environmental Protection Agency, Our Mission and What We Do, <http://www2.epa.gov/aboutepa/our-mission-and-what-we-do>.

<sup>31</sup> U.S. Federal Energy Regulatory Commission, What FERC Does, <http://www.ferc.gov/about/ferc-does.asp>.

<sup>32</sup> U.S. Fish and Wildlife Service, Endangered Species, <http://www.fws.gov/ENDANGERED/permits/index.html>.

**Table 1. Potential Permits and Approvals<sup>33</sup>**

Jurisdiction	Permit
<b>Federal Approvals</b>	
U.S. Environmental Protection Agency	Acid Rain Permit; Risk Management Plan; Hazardous Waste Generation
Federal Energy Regulatory Commission	Exempt Wholesale Generator Self-Certification; Market-Based Rate Authorization
U.S. Fish and Wildlife Service	Threatened and Endangered Species Consultation
<b>State of Minnesota Approvals</b>	
Department of Natural Resources	Threatened and Endangered Species Consultation
Minnesota Pollution Control Agency	NPDES/SDS Stormwater Permit; Air Emission Facility Permit; Hazardous Waste Generator License; Storage Tank Registration and Permitting
Minnesota Department of Transportation	Special Hauling Permit
<b>Local Approvals</b>	
County, City	Conditional Use Permit; Building Permit; Sewer Connections

**State Approvals**

The Minnesota Department of Natural Resource (DNR) regulates potential impacts to Minnesota’s natural resources.<sup>34</sup> Similar to USFWS, DNR encourages consultation with project proposers to ascertain a project’s potential to impact state-listed threatened and endangered species and possible mitigation measures.

The Minnesota Pollution Control Agency (MPCA) regulates potential impacts to public health and the environment.<sup>35</sup> A national pollutant discharge elimination system / sanitary disposal system (NPDES/SDS) stormwater permit is required for stormwater discharges from construction sites and industrial facilities. An air permit is required for regulated facilities to ensure compliance with a variety of state and federal air quality requirements. The MPCA also regulates generation, handling, and storage of hazardous wastes.

<sup>33</sup> Site Permit Application, Section 11.

<sup>34</sup> Minnesota Department of Natural Resources, About the DNR, <http://www.dnr.state.mn.us/aboutdnr/index.html>.

<sup>35</sup> Minnesota Pollution Control Agency, About MPCA, <http://www.pca.state.mn.us/index.php/about-mPCA/index.html>.

A permit from the Minnesota Department of Transportation (MnDOT) is required for the transport and delivery of equipment that is oversize or overweight.<sup>36</sup>

### **Local Approvals**

The Commission's site permit supersedes local planning and zoning regulations and ordinances.<sup>37</sup> However, permittees must obtain local approvals necessary for proper local government functioning – e.g., the safe use of local roads; the inclusion of infrastructure on local government maps.

## **2.4 Applicable Codes**

The applicant's proposed project must meet the requirements of the National Electrical Safety Code (NESC).<sup>38</sup> The code is designed to protect human health and the environment. It also ensures that electrical generating equipment and associated facilities are built from materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided that routine maintenance is performed.

The applicant must also comply with North American Electric Reliability Corporation (NERC) standards.<sup>39</sup> NERC standards define the reliability requirements for planning and operating the electrical transmission grid in North America.

## **2.5 Issues Outside the Scope of the Environmental Assessment**

In accordance with the scoping decision for this EA (**Appendix A**), the following topics are not addressed in this document:

- No-build alternative.
- Issues related to project need, size, type, or timing.
- Any site alternative not specifically identified for study in the scoping decision.

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<sup>36</sup> Minnesota Department of Transportation, Overdimension Permits, <http://www.dot.state.mn.us/cvo/oversize>.

<sup>37</sup> Minnesota Statute 216E.10.

<sup>38</sup> Minnesota Statute 326B.35 (requiring utilities to comply with the most recent edition of the NESC when constructing new facilities or reinvesting capital in existing facilities); see also Appendix B, Section 4.3.1, Generic Site Permit Template.

<sup>39</sup> Appendix B, Section 4.3.1, Generic Site Permit Template.

## 3.0 Proposed Project

The applicant proposes to expand the existing Mankato Energy Center (MEC) by adding a combustion turbine generator, a heat recovery steam generator, and associated equipment. This expansion of the MEC will allow for the production of an additional 345 megawatts of electrical power. This section describes the applicant's proposed project, project construction, and project costs.

### 3.1 Project Description

The applicant's proposed expansion of the Mankato Energy Center (MEC) includes a new combustion turbine generator (CTG), a new heat recovery steam generator (HRSG), and associated equipment. The CTG will use natural gas as a fuel. The HRSG will supply high pressure steam to the MEC's existing steam turbine. The project will use cooling water from the city of Mankato's wastewater treatment plant (WWTP). Electrical power produced by the project will be transmitted to the existing Wilmarth substation.

#### Mankato Energy Center Site

The MEC is located in the city of Mankato in Blue Earth County. The plant is located on a portion of an old limestone quarry which was converted to a landfill.<sup>40</sup> The landfill is now closed. Construction of the plant began in 2004, and the MEC became operational in May 2006.<sup>41</sup> The MEC site is approximately 25 acres in size (**Figure 2**).<sup>42</sup>

The MEC was permitted by the Minnesota Environmental Quality Board in 2004 as a combined cycle electric generating plant with two CTGs, two HRSGs, and one steam turbine.<sup>43</sup> The facilities for the plant were sized to accommodate these components.<sup>44</sup> However, only one CTG and one HRSG were ultimately constructed.<sup>45</sup> Thus, the MEC, as it currently exists, is a site specifically designed for the applicant's proposed expansion. The addition of a CTG and HRSG would complete the power plant and site as it was originally planned.

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<sup>40</sup> Site Permit Application, Section 2.4

<sup>41</sup> Additional Project Information from Applicant, January 27, 2016, eDockets Number [20161-117736-01](#) [hereinafter Additional Project Information from Applicant].

<sup>42</sup> Site Permit Application, Section 2.4.

<sup>43</sup> Site Permit Application, Section 2.3.

<sup>44</sup> Id.

<sup>45</sup> Id.

Figure 2. Mankato Energy Center Site



### **Power Generation Systems**

Currently, the MEC is a combined cycle electric generating plant with one CTG, one HSRG, and a steam turbine (**Figure 3**).<sup>46</sup> The plant generates electrical power through the mechanical turning of the CTG and the steam turbine. This power generation configuration is known as a “1 X 1” combined cycle power plant – it has one CTG and one HSRG, with the steam from the HSRG driving one steam turbine. The applicant’s proposed expansion would change the MEC into a 2 X 1 configuration.<sup>47</sup> The expanded plant would have two CTGs and two HSRGs, with steam from two HSRGs driving one steam turbine (**Figure 4**).

**Figure 3. Mankato Energy Center<sup>48</sup>**



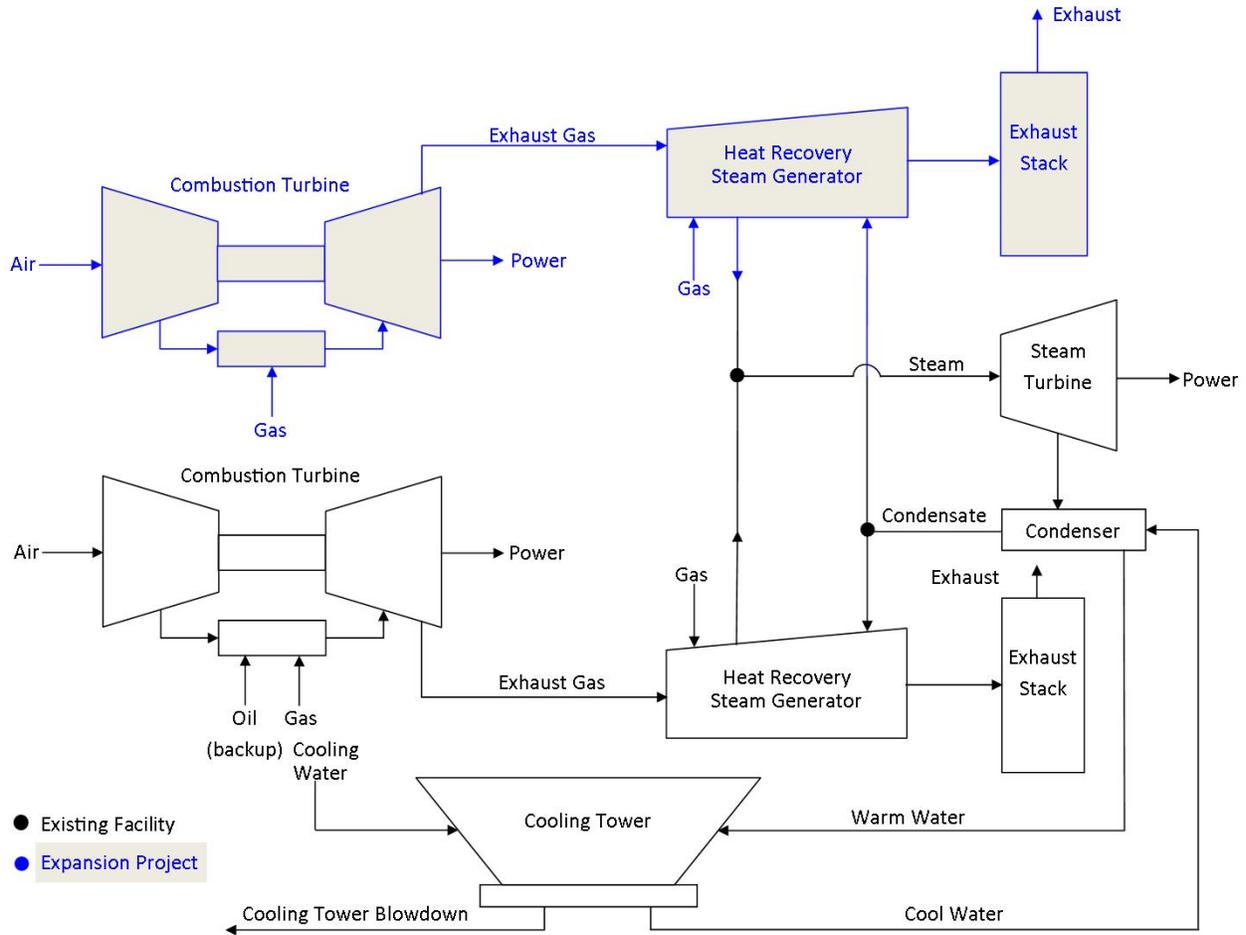
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<sup>46</sup> Site Permit Application, Section 2.7.

<sup>47</sup> Id.

<sup>48</sup> View looking south of combustion turbine generator, heat recover steam generator, and exhaust stack.

**Figure 4. Power Generation Schematic for Mankato Energy Center**



The applicant's proposed expansion of the MEC includes (Figure 5, Appendix C):<sup>49</sup>

- A natural-gas fired combustion turbine generator;
- A heat recover steam generator with natural gas-fired duct burners;
- Four new cooling tower cells;
- A step-up transformer and associated switchgear;
- An emergency diesel generator (if necessary); and
- Expansion of plant support systems, e.g., fire suppression, steam piping, electrical systems.

The CTG will be a natural-gas fired F-Class turbine with low nitrogen oxide (low-NO<sub>x</sub>) combustors.<sup>50</sup> Electrical output of the CTG will be approximately 200 MW. Exhaust gas from the CTG will be directed

<sup>49</sup> Site Permit Application, Section 2.7.

to the new HSRG. The HSRG will be a triple-pressure, reheat type steam generator designed to supply high pressure steam appropriate for the existing steam turbine at the MEC.<sup>51</sup> The HSRG will have a selective catalytic reduction (SCR) system to reduce NO<sub>x</sub> emissions.<sup>52</sup> The HSRG will also use an oxidation catalyst to reduce emissions of carbon monoxide (CO) and volatile organic compounds (VOC).<sup>53</sup> Exhaust gases from the CTG and HSRG will be directed to an exhaust stack, similar to the existing stack at the MEC.

**Figure 5. Proposed Mankato Energy Center Expansion**



The expansion project does not require a new steam turbine. The steam turbine at the MEC is sized to accommodate the additional steam from a 2 X 1 power plant configuration.<sup>54</sup> With steam from the new HSRG, the steam turbine will have the capacity to produce an additional 150 MW of electrical power.<sup>55</sup>

<sup>50</sup> Site Permit Application, Section 2.7.3.

<sup>51</sup> Id.

<sup>52</sup> Id.

<sup>53</sup> Id.

<sup>54</sup> Site Permit Application, Section 2.7.5.

<sup>55</sup> Id.

The MEC does not operate continuously and generates power only when needed by the electrical transmission grid.<sup>56</sup> As a result, the MEC generates approximately 15 percent of its maximum potential power production over the course of a year.<sup>57</sup> It is anticipated that the MEC will operate similarly with the expansion project.

### **Fuel Supply**

The expansion project will be fueled solely with natural gas.<sup>58</sup> Natural gas is delivered to the MEC by a 20 inch pipeline, approximately four miles in length.<sup>59</sup> The pipeline is sized to support the natural gas requirements of the expanded MEC; thus, no new gas pipeline will be required for the expansion project.<sup>60</sup>

### **Water Supply and Use**

The expansion project will use water for two primary purposes: (1) cooling water and (2) service water. Cooling water is required to dissipate the waste heat generated by the CTGs and HSRGs. This waste heat is first transferred to a condenser and then to a multi-cell evaporative cooling tower (**Figure 6**).<sup>61</sup> Cooling water is provided to the cooling tower through a pipeline from the Mankato wastewater treatment plant (WWTP).<sup>62</sup> This water is treated wastewater effluent from the WWTP. The cooling water will continue to be supplied by the Mankato WWTP for the expansion project.

There are currently eight cooling tower cells. The expansion project will require the addition of four more cells, resulting in a total of 12 cooling tower cells (**Figure 5**).<sup>63</sup> This addition will increase the tower's ability to dissipate heat and will increase water evaporation from the tower. The additional evaporative water loss will require approximately 74 percent more cooling water from the Mankato WWTP.<sup>64</sup> The applicant has indicated that they will work with the Mankato WWTP to upgrade existing pumps or install new pumps to supply additional cooling water needed for the expansion project.<sup>65</sup>

Service water is potable water from the Mankato municipal water system.<sup>66</sup> Service water is used for domestic purposes (e.g., drinking water, showers) and other plant related purposes.<sup>67</sup> Service water use is substantially less than cooling water use and is not anticipated to increase significantly with the expansion project.<sup>68</sup>

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<sup>56</sup> Site Permit Application, Section 2.3.

<sup>57</sup> Id.

<sup>58</sup> Site Permit Application, Section 2.7.1.

<sup>59</sup> Id.

<sup>60</sup> Id.

<sup>61</sup> Site Permit Application, Section 2.7.8.

<sup>62</sup> Site Permit Application, Section 2.7.6.

<sup>63</sup> Site Permit Application, Section 2.7.8.

<sup>64</sup> Site Permit Application, Section 2.7.6, Table 2-1.

<sup>65</sup> Site Permit Application, Section 2.7.6.

<sup>66</sup> Site Permit Application, Section 2.7.7.

<sup>67</sup> Id.

<sup>68</sup> Id.

**Figure 6. Existing Cooling Tower at Mankato Energy Center<sup>69</sup>**



### **Electrical Interconnection**

Electricity currently generated at the MEC by the CTG and steam turbine proceeds through step-up transformers, to a switchyard, and then to the Wilmarth substation (**Figure 7**).<sup>70</sup> Electricity from the CTG is stepped up to 115 kV and transmitted at this voltage to the substation. Electricity from the steam turbine is stepped up 345 kV and transmitted to the substation.

For the expansion project, a new 115 kV step-up transformer will be installed to commute the power produced by the new CTG.<sup>71</sup> A breaker, disconnect, and dead end structure will be added to the switchyard.<sup>72</sup> A new 115 kV electrical line, approximately 300 feet in length, will be added to connect the switchyard to the Wilmarth substation (**Figure 7**).

The Wilmarth substation was constructed to accommodate electrical interconnections for the MEC as originally conceived – i.e., as a 2 X 1 power plant configuration. Thus, no substation upgrades will be needed to accommodate the power generated from the expansion project.<sup>73</sup>

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<sup>69</sup> View looking northeast.

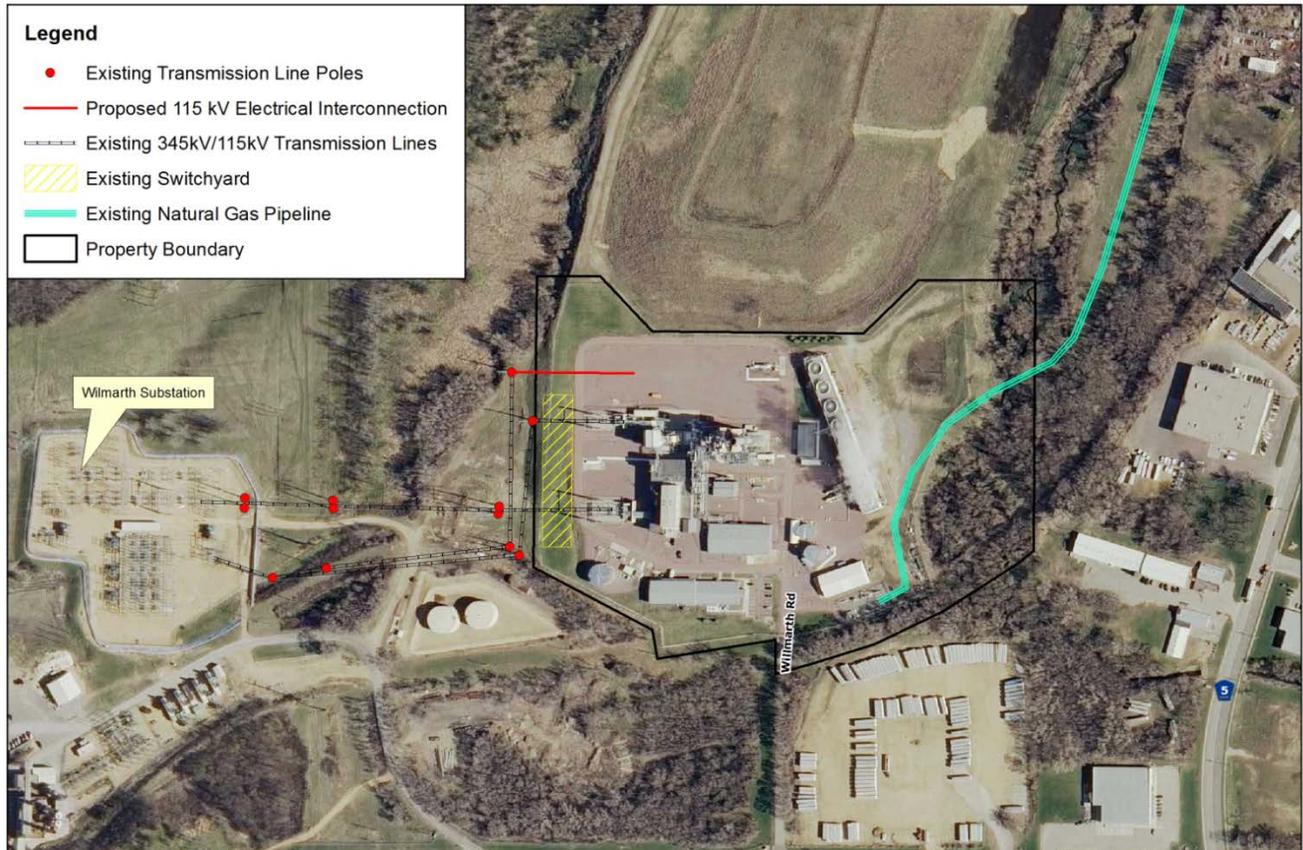
<sup>70</sup> Site Permit Application, Sections 2.7.11, 2.7.12, and 2.7.13.

<sup>71</sup> Id.

<sup>72</sup> Id.

<sup>73</sup> Id.

**Figure 7. Electrical Interconnection at Mankato Energy Center**



### 3.2 Project Construction

Construction of the project would not begin until all federal, state, and local approvals have been obtained. Construction is anticipated to begin in 2016; however, the construction timeline is dependent upon a number of factors including the receipt of all approvals, weather, and the availability of labor and materials.

The applicant will employ a contractor to design and construct the expansion project to meet all of the applicant’s engineering requirements and all state, local, and federal requirements.<sup>74</sup> Construction of the project will involve foundation work, steel erection, and the delivery and installation of heavy equipment.<sup>75</sup> Improvements will be made to the existing cooling tower and gas delivery systems.<sup>76</sup> Existing water pumps at the Mankato WWTP will be upgraded for the project.<sup>77</sup>

The expansion project will, at various points in the construction process, be “tied in” to existing MEC systems – including the main steam system, hot and cold reheats, the low pressure steam system, and a

<sup>74</sup> Additional Project Information from Applicant.

<sup>75</sup> Site Permit Application, Section 4.3.

<sup>76</sup> Additional Project Information from Applicant.

<sup>77</sup> Site Permit Application, Section 2.7.6.

variety of water and instrumentation systems.<sup>78</sup> Cold commissioning will begin as project completeness allows.<sup>79</sup> Hot operational testing will follow to properly clean and operate all systems.<sup>80</sup> The final steps will be to interconnect the steam systems of the existing MEC with the expansion project and fine tune operation of a 2 x 1 combined cycle configuration.<sup>81</sup>

### 3.3 Project Costs

The estimated total cost for project construction is between \$220 and \$300 million dollars.<sup>82</sup> The applicant indicates that this cost range may fluctuate until the project's commercial operation date has been finalized.<sup>83</sup> Annual operating costs for the expansion project are anticipated to be between \$3.5 and \$5 million dollars.<sup>84</sup>

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<sup>78</sup> Additional Project Information from Applicant.

<sup>79</sup> Id.

<sup>80</sup> Id.

<sup>81</sup> Id.

<sup>82</sup> Site Permit Application, Section 2.8.

<sup>83</sup> Id.

<sup>84</sup> Id.



## 4.0 Potential Impacts of the Proposed Project

This section discusses the resources, potential impacts, and possible mitigation measures associated with the proposed Mankato Energy Center expansion project. Impacts can be positive or negative, short or long term. Impacts can vary in duration and intensity, by resource and across geographies. Some impacts may be avoidable; some may be unavoidable but can be mitigated; others may be unavoidable and unable to be mitigated.

### Potential Impacts and Mitigation

This section analyzes potential impacts of the expansion projects on various resources. Impacts are given context through discussion of their duration, size, intensity, and location. This context is used to determine an overall resource impact level. Impact levels are described in this section using qualitative descriptors. These descriptors are not intended as value judgments, but rather as a means to both ensure a common understanding among readers and compare resource impacts between alternatives.

- **Minimal.** Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts may, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short-term.
- **Moderate.** Moderate impacts alter an existing resource condition or function, and are generally noticeable or predictable for the average observer. Effects may be spread out over a large area making them difficult to observe, but can be estimated by modeling or other means. Moderate impacts may be long-term or permanent to common resources, but are generally short- to long-term for rare and unique resources.
- **Significant.** Significant impacts alter an existing resource condition or function to the extent that the resource is severely impaired or cannot function. Significant impacts are likely noticeable or predictable for the average observer. Effects may be spread out over a large area making them difficult to observe, but can be estimated by modeling. Significant impacts can be of any duration, and may affect common and rare and unique resources.

This section also discusses possibilities to avoid, minimize, or mitigate specific impacts. These actions are collectively referred to as mitigation.

- **Avoid.** Avoiding an impact means it is eliminated altogether by moving or not undertaking parts or all of a project.
- **Minimize.** Minimizing an impact means to limit its intensity by reducing project size or moving a portion of the project from a given location.
- **Mitigate.** Impacts that cannot be avoided or minimized could be mitigated. Impacts can be mitigated by repairing, rehabilitating, or restoring the affected environment, or compensating for it by replacing or providing a substitute resource elsewhere.

### Regions of Influence

Potential impacts to human and environmental resources are analyzed in this EA within specific spatial bounds or regions of influence (ROI). The ROI for each resource is the geographic area within which the project may exert some influence; it is used in this EA as the basis for assessing the potential impacts to

each resource as a result of the project. Regions of influence vary with the resource being analyzed and the potential impact. The ROI for resources analyzed in this EA are summarized in **Table 2**.

The ROI for most human and environmental resources is the site of the Mankato Energy Center (MEC). Resources at the site could be impacted by the construction and operation of the expansion project. Other resources may be impacted at a greater distance from the project. In this EA, the following ROI will be used for these resources:

- **One thousand five hundred feet.** A distance of 1,500 ft. from the project will be used as the ROI for analyzing potential aesthetic, noise, and land use impacts as well as potential impacts to public safety from water vapor plumes. These impacts may extend outside of the 1,500 ft. distance, but are anticipated to diminish relatively quickly such that potential impacts outside of this distance would be minimal.
- **One mile.** A distance of one mile from the project will be used as the ROI for analyzing potential impacts to archaeological and historic resources and to rare and unique species.

Direct impacts to archaeological and historic resources are anticipated to occur, if at all, within the MEC site. However, indirect impacts may extend beyond the site. For example, a historic resource may be impacted by power generating equipment near, but not directly next to, the resource. Direct impacts to rare and unique species are anticipated to occur, if they occur, within the MEC site. However, indirect impacts to rare and unique species may extend beyond the site, particularly for wildlife species. Wildlife may move throughout a project area and may be impacted by limitations on their movement and their ability to access cover, food, and water.

- **Project area.** The project area, defined generally as the city of Mankato and Blue Earth County, will be used as the ROI for analyzing potential impacts to cultural values, socioeconomics, public services, air quality, and tourism and recreation. These are resources for which impacts may extend throughout the project area.

**Table 2. Regions of Influence for Human and Environmental Resources**

Type of Resource	Specific Resource / Potential Impact to Resource	Region of Influence (ROI)
<b>Human Settlements</b>	Displacement	Site
	Aesthetics, Noise, Zoning and Land Use Compatibility	1,500 Feet
	Socioeconomics, Cultural Values, Public Services	Project Area
<b>Public Health and Safety</b>	Fire / Electrical	Site
	Water Vapor Plumes	1,500 Feet

Type of Resource	Specific Resource / Potential Impact to Resource	Region of Influence (ROI)
	Air Quality	Project Area
<b>Land-Based Economies</b>	Agriculture, Forestry, Mining	Site
	Tourism and Recreation	Project Area
<b>Archaeological and Historic Resources</b>	---	One Mile
<b>Natural Environment</b>	Water Resources, Soils, Flora, Fauna	Site
<b>Rare and Unique Species</b>	---	One Mile

**Summary of Potential Impacts of the Proposed Project**

Impacts to human settlements as a result of the project are anticipated to be minimal. Aesthetic impacts are unavoidable but are anticipated to be incremental and minimal. Impacts to public health and safety are anticipated to be minimal. Air emissions are anticipated to be within all state and federal guidelines. Though the project will increase greenhouse gas emissions at the MEC, it is anticipated to reduce greenhouse gas emissions in Minnesota overall by displacing more greenhouse gas intensive fuels (e.g., coal) and facilitating wind and solar power generation.

Impacts to land-based economies are anticipated to be minimal. Impacts to archaeological and historic resources are anticipated to be minimal. Impacts to the natural environment, including air resources, water resources, flora, and fauna are anticipated to be minimal. Impacts to rare and unique natural resources are anticipated to be minimal.

The Commission, if it issues a site permit for the project, can require the permittee to use specific mitigation measures or require that certain mitigation thresholds or standards be met through permit conditions (see **Appendix B**).

**4.1 Environmental Setting**

The MEC expansion project is proposed to be located within the MEC, in the city of Mankato, Blue Earth County. The MEC site is approximately 25 acres in size and is zoned for commercial / industrial / public use (**Figure 2**).<sup>85</sup> The MEC was permitted in 2004 as a 2 X 1 combined cycle electric generating plant. The facilities for the plant were sized to accommodate a 2 X 1 combined cycle plant. However, only a 1 X 1 combined cycle plant was constructed. Consequently, the MEC has a level, graveled area within the site that is undeveloped and would be used for the expansion project (**Figure 8**).

The MEC is located in an industrial area in the northern part of the city of Mankato. Adjacent properties are industrial and manufacturing facilities including Xcel Energy’s Wilmarth electric generating plant and

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<sup>85</sup> Site Permit Application, Section 4.1.

substation, scrap metal operations, and a U.S Postal Service mail processing facility.<sup>86</sup> The MEC site is just south of an old limestone quarry that was converted to a landfill. The landfill is now closed. The nearest residential area is approximately one-half mile to the south of the MEC, on the south side of U.S. Highway 14.<sup>87</sup>

**Figure 8. Area within Mankato Energy Center for Expansion Project**



The MEC is located on the northern edge of a large urban/suburban area that includes the city of Mankato – a city of approximately 40,000 residents – and the city of North Mankato. The project area includes multiple roads and highways including U.S. Highway 169 and U.S. Highway 14. Areas to the north and east of the MEC consist mainly of agricultural and conservation lands.<sup>88</sup>

The MEC is located approximately 1,800 feet east of the Minnesota River in the Minnesota River valley (**Figure 1**). The river and river bottoms provide wildlife habitat and recreational opportunities.<sup>89</sup>

#### **4.2 Socioeconomic Setting**

The project area has a median household income that is generally less than the median for the State of Minnesota (**Table 3**). The percentage of the population below the poverty level is generally higher in the project area than in the state as a whole (**Table 3**).

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<sup>86</sup> Id.

<sup>87</sup> Id.

<sup>88</sup> Id.

<sup>89</sup> Id.

The economy in south central Minnesota, including the project area, is relatively diverse with the four largest industries, by employment, being professional and business services, manufacturing, trade, and health services.<sup>90</sup> In 2012, south central Minnesota produced approximately \$24.7 billion dollars in goods and services, accounting for about four percent of Minnesota’s \$567.8 billion dollar economy.<sup>91</sup> The three largest industries, by economic output, are manufacturing, professional and businesses services, and agriculture.<sup>92</sup>

**Table 3. Socioeconomic Characteristics of Project Area<sup>93</sup>**

Location	Population	Median Household Income (dollars)	Population Below Poverty Level (percent)
Minnesota	5,457,173	\$59,836	11.5
Blue Earth County	65,385	\$49,935	19.2
City of Mankato	40,411	\$41,171	27.0
City of North Mankato	13,432	\$61,672	6.7

### 4.3 Human Settlements

Large electric power generating plants have the potential to negatively impact human settlements through a variety of means. A power plant could change the aesthetics of a project area, introduce new noise sources, or displace residences or businesses.

Impacts to human settlements resulting from the MEC expansion project are anticipated to be minimal. No residences or businesses will be displaced by the project; impacts to aesthetics are anticipated to be incremental and minimal. Noise levels are anticipated to increase as a result of the project, but are projected to remain within Minnesota state noise standards. Impacts to public services are anticipated to be minimal. The project is compatible with existing and future land uses. Impacts related to construction of the project are anticipated to be minimal and temporary.

#### **Aesthetics**

Aesthetic and visual resources include the physical features of a landscape such as land, water, vegetation, animals, and manmade structures. The relative value of these visual resources in a given area depends on what individuals perceive as being beautiful or aesthetically pleasing. Viewers’

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<sup>90</sup> Economic Composition of the South Central Region of Minnesota: Industries and Performance, <http://www.extension.umn.edu/community/economic-impact-analysis/reports/docs/2014-South-Central-MN.pdf>.

For this report, south central Minnesota is defined as the 11 counties represented by the Region Nine Development Commission, including Blue Earth County.

<sup>91</sup> Id.

<sup>92</sup> Id.

<sup>93</sup> U.S. Census Bureau, State and County QuickFacts, <http://quickfacts.census.gov/qfd/>.

perceptions are based on their psychological connection to the viewing area and their physical relationship to the view, including distance to physical features, perspective, and duration of the view. Landscapes which are, for the average person, harmonious in form and use are generally perceived as having greater aesthetic value. Infrastructure which is not harmonious with a landscape or negatively impacts existing features of a landscape could negatively affect the aesthetics of an area.

The MEC expansion project is proposed to be built within the MEC site, which is itself within an industrial area of the city of Mankato.<sup>94</sup> The industrial area encompasses approximately 500 acres and includes industrial and manufacturing facilities including waste processing, scrap metal operations, a construction company, and a household hazardous waste collection site.<sup>95</sup> The MEC site is relatively lower than the surrounding topography with a landfill berm along the northern edge of the site.<sup>96</sup> U.S. Highway 14 is approximately one-half mile south of the MEC site. Immediately to the west is the Wilmarth electric generating station, an electric generating plant built in the 1940s and since converted to burn municipal solid waste.<sup>97</sup> Further west, approximately 1,800 feet from the MEC site, is the Minnesota River. The closest residential neighborhood is approximately two-thirds of a mile south of the MEC site, south of U.S. Highway 14.<sup>98</sup>

The existing MEC consists of buildings ranging in height from 30 to 120 feet.<sup>99</sup> The tallest existing structure at the site is the emissions stack, which is approximately 200 feet tall. The MEC expansion project will be a mirror image of the existing plant, and thus structures will be very similar in size. The tallest structure installed as a result of the expansion project will be a second emissions stack, approximately 200 feet in height.

Water vapor in emissions from the MEC stack, under certain meteorological conditions, can condense to form a plume that is visible in the project area (**Figure 9**).<sup>100</sup> Similarly, water vapor from the MEC cooling towers can result in a plume that is visible in the project area.<sup>101</sup> Plumes are most persistent and visible during cold and damp weather.<sup>102</sup> Generally plumes, if present, disperse and evaporate fairly quickly.<sup>103</sup>

### Potential Impacts

Aesthetic impacts due to the MEC expansion project are anticipated to be minimal. The expansion project is harmonious with the existing landscape; it places like with like – it is the construction of an electric generating plant on the site of an existing electric generating plant. Further, any aesthetic impacts associated with the expansion will be incremental. The expansion project will introduce a new emissions stack; however the aesthetic impact of this second stack is anticipated to be incremental and minimal. Similarly, the expansion project will cause an increase in water vapor plumes, but the impact of these plumes is anticipated to be incremental and minimal. Because of the topography of the MEC site and screening by trees and other industrial facilities, the expansion project is anticipated to have limited visibility in the project area.

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<sup>94</sup> Site Permit Application, Section 4.4.

<sup>95</sup> Id.

<sup>96</sup> Id.

<sup>97</sup> Id.

<sup>98</sup> Site Permit Application, Section 4.2.

<sup>99</sup> Site Permit Application, Section 4.4.

<sup>100</sup> Id.

<sup>101</sup> Id.

<sup>102</sup> Id.

<sup>103</sup> Id.

**Figure 9. Water Vapor Plumes at Mankato Energy Center<sup>104</sup>**



### **Mitigation**

Aesthetic impacts as a result of the project are anticipated to be minimal; thus, no mitigation measures are proposed.

### **Noise**

Noise can be defined as unwanted sound. Noise is measured in units of decibels (dB) on a logarithmic scale. The A weighted decibel scale (dBA) corresponds to the sensitivity range for human hearing. A noise level change of 3 dBA is barely perceptible to average human hearing while a 5 dBA change in noise level is noticeable.

All noises produced by the project must be within Minnesota noise standards (**Table 4**). These standards are promulgated by the Minnesota Pollution Control Agency (MPCA). The standards are organized by the type of environment where the noise is heard (Noise Area Classification, NAC) and the time of day. The noise standards are expressed as a range of permissible dBA within a 1-hour period;  $L_{50}$  is the dBA that may be exceeded 50 percent of the time within an hour, while  $L_{10}$  is the dBA that may be exceeded 10 percent of the time within 1 hour.

The primary noise receptors in the project area are neighboring industrial properties.<sup>105</sup> These industrial properties are in noise area classification three (NAC 3). The nearest residential area is approximately

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<sup>104</sup> View looking east.

3,500 feet south of the MEC, south of U.S. Highway 14. Noise levels at the MEC site boundary are currently in the range of 63 to 67 dBA when the plant is operating.<sup>106</sup> These noise levels are within state noise standards for industrial properties.<sup>107</sup>

**Table 4. Minnesota Noise Standards<sup>108</sup>**

Noise Area Classification (NAC)	Daytime		Nighttime	
	L <sub>50</sub>	L <sub>10</sub>	L <sub>50</sub>	L <sub>10</sub>
1 – Residential	60	65	50	55
2 – Commercial	65	70	65	70
3 – Industrial	75	80	75	80

**Potential Impacts**

Potential noise impacts from the project fall into two categories: (1) noise impacts due to construction and (2) noise impacts due to operation of the expanded MEC. For both of these categories, noise impacts are anticipated to be minimal and within state noise standards.

**Construction Noise**

Construction noise sources are anticipated to include trucks, cranes, excavating equipment, pneumatic tools, and cleaning equipment.<sup>109</sup> Construction of the project will involve foundation work, steel erection, and the delivery and installation of heavy equipment.<sup>110</sup> Though construction noises are unavoidable, they are anticipated to be temporary in nature.<sup>111</sup> The applicant indicates that construction noise impacts will be mitigated by:<sup>112</sup>

- Controlling the extent and duration of significant noise generating activities during construction.
- Limiting the duration of the overall construction period by contracting for sufficient construction resources and through efficient scheduling of construction activities.

Commission site permits require that construction noise impacts be limited to daytime working hours (**Appendix B**). Based on the temporary nature of construction noises, the industrial setting of the MEC, the applicant’s proposed mitigation measures, and the substantial distance to the nearest residential area, noise impacts due to construction of the project are anticipated to be minimal.

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<sup>105</sup> Site Permit Application, Section 4.3.

<sup>106</sup> Id.

<sup>107</sup> Id.

<sup>108</sup> Minnesota Rule 7030.0040. Standards expressed in dBA. Day time is 7:00 a.m. – 10:00 p.m.; night time is 10:00 p.m. – 7:00 a.m.

<sup>109</sup> Site Permit Application, Section 4.3.

<sup>110</sup> Id.

<sup>111</sup> Id.

<sup>112</sup> Id.

### **Operation Noise**

The MEC's power generating equipment produces noise when in operation. This equipment includes the CTG, HSRG, steam turbine, cooling tower cells, and electrical transformers.<sup>113</sup> Noise levels at the MEC site boundary are currently in the range of 63 to 67 dBA when the plant is operating.<sup>114</sup> Noise levels at the MEC site when the plant is not in operation are generally in the range of 50 to 55 dBA.<sup>115</sup>

The applicant modeled and estimated operational noise levels for the MEC with the expansion project (**Appendix D**). This modeling indicates that noise levels at the MEC site boundary, with the expansion project, will be approximately 73 dBA. This noise level is within state noise standards for industrial properties. It is an incremental increase of approximately 6 to 10 dBA over current operational noise levels at the plant.

### **Mitigation**

Noise impacts from the project are anticipated to be minimal and within Minnesota noise standards. Commission permits require compliance with these standards (**Appendix B**). However, this does not mean that noise impacts would not occur. Operation of the expanded MEC will increase noise levels in the project area. Even if noise levels are within state standards, persons near the plant – e.g., persons in or near the industrial near in which the MEC is located – would likely notice an increase in noise level. Operational noise impacts are mitigated, to a great extent, by the location of the MEC (away from persons and residential receptors) and by the fact that impacts will be incremental.

### **Displacement**

Displacement is the removal of a residence or commercial building to facilitate the construction and operation of a power plant. There are no residences or commercial buildings within the MEC site that must be removed to construct the MEC expansion project. The only buildings within the site are those required for operation of the MEC.

No displacements are anticipated as a result of the project; no mitigation measures are proposed.

### **Economics**

The MEC expansion project will take approximately 24 to 27 months to construct.<sup>116</sup> The project will employ up to 250 construction workers.<sup>117</sup> Once in operation, the applicant anticipates adding two employees, for a total of 19 full time employees at the plant.<sup>118</sup>

### **Potential Impacts**

Economic impacts resulting from the project are anticipated to be positive. The project will provide construction jobs for persons in the project area – e.g., welders, pipefitters, carpenters.<sup>119</sup> The wages associated with these jobs will positively impact the regional economy. The project will result in increased purchasing of local goods and services during construction and, to some extent, during

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<sup>113</sup> Id.

<sup>114</sup> Id.

<sup>115</sup> Site Permit Application, Appendix A.

<sup>116</sup> Site Permit Application, Section 4.5.

<sup>117</sup> Id.

<sup>118</sup> Id.

<sup>119</sup> Id.

operation of the expanded plant.<sup>120</sup> Indirect positive impacts will accrue due to the improved load-serving capability of the electric transmission grid.

Potential negative economic impacts are anticipated to be minimal. Disruptions of local business due to construction of the project are anticipated to be minimal. Though the population below the poverty level in the project area, as a percentage of residents, is relatively greater than the state average (**Table 3**), no low-income or minority population is anticipated to be negatively and differentially impacted by the project.

### **Mitigation**

Economic impacts resulting from the project are anticipated to be positive; thus, no mitigation measures are proposed.

### **Cultural Values**

Cultural values are those community beliefs and attitudes which provide a framework for community unity and animate community actions. Cultural values are informed, in part, by history and heritage. The project area has been home to a variety of persons and cultures. In the early to mid-1800s, the area was populated primarily by Dakota Sioux. The city of Mankato was established in 1852 at the confluence of the Minnesota and Blue Earth Rivers.<sup>121</sup> North Mankato was established in 1898.<sup>122</sup> Settlers of these cities were of German, Welsh, Norwegian, Swedish, Irish, and Scottish heritage.<sup>123</sup>

Cultural values are also informed by the work and recreation of residents and by geographical features. The cities of Mankato and North Mankato have become a regional center for commerce, education, health care, and industry.<sup>124</sup> Persons in the project area have various recreational opportunities. The city of Mankato, and the project area generally, host multiple events each year, including the Deep Valley Homecoming, Mahkato Pow-Wow, and Minnesota River Ramble.<sup>125</sup>

### **Potential Impacts**

No impacts to cultural values are anticipated as a result of the project. The project will not adversely impact the work or recreation of residents in the project area that underlie the area's cultural values. Nor will it adversely impact geographical features that inform these values.

### **Mitigation**

No impacts to cultural values are anticipated as a result of the project; thus, no mitigation measures are proposed.

### **Public Services**

Power plants are large infrastructure projects that have the potential to negatively impact public services, e.g., roads, utilities, emergency services. These impacts are typically temporary in nature, e.g., the inability to fully use a road or utility while construction is in process. However, impacts can be long term if they change the project area in such a way that public service options are foreclosed or limited.

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<sup>120</sup> Id.

<sup>121</sup> Mankato History, <http://visitgreatermankato.com/mankato/explore/history/>.

<sup>122</sup> Id.

<sup>123</sup> Blue Earth County History, <http://www.bechshistory.com/museum/bec-history>.

<sup>124</sup> Site Permit Application, Section 4.6.

<sup>125</sup> Annual Mankato Events, <http://visitgreatermankato.com/mankato/visit/events/major-events/>.

Temporary impacts to public services resulting from the MEC expansion project are anticipated to be minimal. Long-term impacts to public services are not anticipated.

### **Roads and Highways**

The primary highways in the project area are U.S. Highway 169 and U.S. Highway 14. The MEC site is located approximately one-half mile north of U.S. Highway 14, off of the Summit Avenue exit.<sup>126</sup> The total distance from U.S. Highway 14 to the MEC entrance is approximately 0.75 miles.<sup>127</sup> No road or highway improvements are required for the project.<sup>128</sup>

Impact to roads and highways due to the project are anticipated to be minimal and temporary. Minor, temporary impacts to road or highway usage may occur during transportation of large equipment to the MEC site, e.g., traffic delays.<sup>129</sup> These impacts can be minimized through coordination with roadway authorities. No impacts to roads and highways are anticipated after the project has been constructed.

### **Airports**

The Mankato Municipal Airport is located approximately 3.7 miles northeast of the MEC site in Lime Township, Blue Earth County.<sup>130</sup> The airport is one of the busiest municipal airports in the state with two runways that accommodate personal, business, and commercial flights.<sup>131</sup>

Tall structures can impact airport operations if they are within airport safety zones. Different classes of airports have different safety zones depending on several characteristics, including runway dimensions, classes of aircraft accommodated, and navigation systems. These characteristics determine the necessary takeoff and landing glide slopes, which in turn determine the safety zones.

No impacts to the Mankato Municipal Airport are anticipated as a result of the project. The orientation of the runways at the airport is such that the MEC is not within takeoff and landing glide slopes.<sup>132</sup> Further, the airport is located at an elevation (1,200 feet) that is higher than the elevation of the top of the emissions stack at the MEC (995 feet).<sup>133</sup> Because of the distance from the airport to the MEC, the orientation of the airport's glide slopes, and the elevation of the airport relative to the MEC, no impacts to the airport are anticipated as a result of the project.

### **Water Utilities**

Water and sewer service are provided to the MEC by the city of Mankato.<sup>134</sup> Cooling water for the MEC is provided from the city's municipal wastewater treatment plant (WWTP).<sup>135</sup> Service water is provided through the city's municipal water supply.<sup>136</sup> The MEC expansion project will increase the use of wastewater for cooling (see Section 4.8). The applicant has indicated that they will work with the

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<sup>126</sup> Site Permit Application, Section 3.1.

<sup>127</sup> Id.

<sup>128</sup> Id.

<sup>129</sup> Site Permit Application, Section 5.3.

<sup>130</sup> Site Permit Application, Section 5.4.

<sup>131</sup> Id.

<sup>132</sup> Id.

<sup>133</sup> Id.

<sup>134</sup> Site Permit Application, Section 4.8.2.

<sup>135</sup> Site Permit Application, Section 5.2.

<sup>136</sup> Id.

Mankato WWTP to upgrade existing pumps or install new pumps to supply the additional cooling water needed.<sup>137</sup> Increases in municipal water use are not anticipated.

No adverse impacts to water utilities in the project area are anticipated as a result of the project. The expansion project will not impact water supplies in the project area.<sup>138</sup> Pumping capacity at the Mankato WWTP will be upgraded as a result of the project.

### **Electric Utilities**

Electrical service in the project area is provided by Xcel Energy and regional electric cooperatives.<sup>139</sup> The project will provide additional electrical generation in the project area. This electrical power may be used in the project area or distributed to other areas via the electric transmission system. No adverse impacts to electrical service are anticipated as a result of the project; no mitigation measures are proposed.

### **Natural Gas Utilities**

Natural gas service in the project area is provided by CenterPoint Energy.<sup>140</sup> The project will utilize an existing, dedicated natural gas pipeline (see Section 3.1). The pipeline is sized to support the natural gas requirements of the expansion project. No new gas pipeline will be required for the expansion project.<sup>141</sup> No adverse impacts to natural gas service are anticipated as a result of the project; no mitigation measures are proposed.

### **Emergency Services**

Emergency services are provided to the MEC and the project area by the city of Mankato.<sup>142</sup> Impacts to emergency services in the project area could result from (1) an inability to communicate that there is an emergency or (2) an inability to respond to an emergency.

No impacts to communication systems are anticipated as a result of the project; therefore, no impacts to the community's ability to communicate regarding an emergency are anticipated. During construction of the project, there may be temporary impacts to roads which could impede responses to an emergency, e.g., traffic delays. However, these impacts are anticipated to be minimal. No impacts to emergency services are anticipated once the project is operational; no mitigation measures are proposed.

### **Zoning and Land Use Compatibility**

Electric power generating plants have the potential to adversely impact existing land uses and to be incompatible with future land uses. The MEC is located in an area zoned as commercial / industrial / public utility by the city of Mankato.<sup>143</sup> The MEC is a site specifically designed for the proposed expansion project. Accordingly, the project is consistent with existing and future land uses and no impacts to these land uses are anticipated as a result of the project.

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<sup>137</sup> Site Permit Application, Section 2.7.6.

<sup>138</sup> Site Permit Application, Section 5.2.

<sup>139</sup> Electric Utility Service Areas, <http://www.mngeo.state.mn.us/eusa/index.html>.

<sup>140</sup> CenterPoint Energy, Where We Serve, <http://www.centerpointenergy.com/en-us/corporate/about-us/company-overview/where-we-serve>.

<sup>141</sup> Site Permit Application, Section 3.2.

<sup>142</sup> Site Permit Application, Section 4.8.4.

<sup>143</sup> Site Permit Application, Section 2.4.

#### 4.4 Public Health and Safety

Electric power generating plants have the potential to negatively impact public health and safety – during construction and operation. As with any project involving heavy equipment, power generation systems, and high voltage transmission lines, there are safety issues to consider. Potential health and safety impacts related to construction of the project include injuries due to falls, equipment use, and electrocution. Potential health impacts related to the operation of the project include health impacts from air emissions, water emissions, fire, and electrocution.

Impacts to public health and safety resulting from the MEC expansion project are anticipated to be minimal. Potential construction related impacts are anticipated to be minimal. Potential impacts related to air and water emissions are anticipated to be minimal. Though the project will increase greenhouse gas emissions at the MEC, it is anticipated to reduce greenhouse gas emissions in Minnesota overall. Potential impacts due to water vapor plumes from the plant are anticipated to be minimal. Potential impacts due to fire or electrocution at the plant are anticipated to be minimal.

##### Air Emissions

Air emissions of many types – including those from the combustion of carbon-based fuels to produce electrical power – have the potential to impact public health. Health impacts can range from relatively minor annoyances such as coughing or itching eyes, to more severe impacts that require emergency-room visits and hospital admissions.<sup>144</sup> To avoid and minimize these impacts, the U.S. Environmental Protection Agency (EPA) has promulgated National Ambient Air Quality Standards (NAAQS).<sup>145</sup> These standards are designed to protect human health and the environment.<sup>146</sup> The responsibility for meeting these standards in Minnesota falls to the MPCA, which, through a state implementation plan, designs and implements means to control air pollutants.<sup>147</sup>

In order to ensure that NAAQS are met, the EPA requires major new stationary sources of air emissions to demonstrate that they will not cause a violation of the NAAQS.<sup>148</sup> In Minnesota, major new stationary sources must obtain a prevention of significant deterioration (PSD) permit from the MPCA. A PSD permit may allow certain air pollutants to increase in an area (referred to as the “PSD increment”), but must prevent air quality from deteriorating below the level set by the NAAQS.<sup>149</sup>

In addition to meeting NAAQS and PSD requirements, certain new facilities must also demonstrate, through an air emissions risk analysis (AERA), that the potential health risks associated with their air emissions are within state guidelines.<sup>150</sup>

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<sup>144</sup> Air Quality in Minnesota – 2015 Report to the Legislature, Minnesota Pollution Control Agency, <http://www.pca.state.mn.us/index.php/about-mPCA/legislative-resources/legislative-reports/air-quality-in-minnesota-reports-to-the-legislature.html>.

<sup>145</sup> National Ambient Air Quality Standards (NAAQS), <http://www3.epa.gov/ttn/naaqs/criteria.html>.

<sup>146</sup> Id.

<sup>147</sup> Minnesota State Implementation Plan (SIP), <http://www.pca.state.mn.us/index.php/air/air-quality-and-pollutants/general-air-quality/state-implementation-plan/minnesota-state-implementation-plan-sip.html>.

<sup>148</sup> Prevention of Significant Deterioration Basic Information, <http://www.epa.gov/nsr/prevention-significant-deterioration-basic-information>.

<sup>149</sup> Id.

<sup>150</sup> Air Emissions Risk Analysis (AERA), <http://www.pca.state.mn.us/index.php/air/air-monitoring-and-reporting/air-emissions-modeling-and-monitoring/air-emission-risk-analysis-aea/air-emissions-risk-analysis-aea.html>.

Air emissions may include greenhouse gases – gases that, upon release to the atmosphere, warm the atmosphere and surface of the planet, leading to alterations in the earth’s climate.<sup>151</sup> Because warming of the planet and changes in the earth’s climate result in adverse human and environmental impacts, the State of Minnesota has established goals to reduce greenhouse gas emissions.<sup>152</sup> The state has a goal of reducing greenhouse gas emissions to 15 percent below 2005 emission levels by 2015 and to 30 percent below 2005 emission levels by 2025.<sup>153</sup>

### **Potential Impacts**

The MEC, as it exists now, is fueled by natural gas with fuel oil as a backup.<sup>154</sup> The MEC expansion project will be fueled solely with natural gas.<sup>155</sup> The combustion of these fuels will result in the emission of combustion by-products that have the potential for public health impacts.<sup>156</sup> With appropriate mitigation measures, these emissions are anticipated to be within all state and federal standards and guidelines. Additionally, though the project will increase greenhouse gas emissions at the MEC, it is anticipated to reduce greenhouse gas emissions in Minnesota overall. As a result, public health impacts due to air emissions from the project are anticipated to be minimal.

### ***National Ambient Air Quality Standards and Prevention of Significant Deterioration***

Estimated potential annual emissions of air pollutants from the MEC expansion project are shown in **Table 5**. Because a number of air pollutants have the potential to be emitted in amounts greater than their respective PSD thresholds, the project is subject to PSD review and permitting (**Table 5**).<sup>157</sup> The applicant has submitted an application to the MPCA for an amendment of the MEC’s current air permit (**Appendix E**).

Air dispersion modeling conducted by the applicant indicates that emissions from the project will not cause a violation of NAAQS and will not increase air pollutants in the area beyond the allowable PSD increment.<sup>158</sup> A PSD permit cannot be issued by the MPCA until the applicant demonstrates that the project, with appropriate mitigation measures, complies with all state and federal standards.<sup>159</sup> Accordingly, impacts to public health resulting from the project’s impact on ambient air quality are anticipated to be minimal and within all state and federal standards.

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<sup>151</sup> Greenhouse Gas Emissions Reduction, Biennial Report to the Minnesota Legislature, January 2015, <https://www.pca.state.mn.us/sites/default/files/lraq-2sy15.pdf> [hereinafter Greenhouse Gas Emissions Reduction Report].

<sup>152</sup> Id.

<sup>153</sup> Id.

<sup>154</sup> Site Permit Application, Section 5.1.

<sup>155</sup> Id.

<sup>156</sup> Id. Other emission sources at the MEC include auxiliary boilers, a diesel-fueled fire pump, a bath heater, and a proposed emergency generator.

<sup>157</sup> Site Permit Application, Section 5.1.2.

<sup>158</sup> Site Permit Application, Sections 5.1.3 and 5.1.4.

<sup>159</sup> Id.

**Table 5. Estimated Potential Annual Air Emissions and PSD Thresholds<sup>160</sup>**

Air Pollutant	Combined Facility Post-Project Potential Emissions (tons per year)	Expansion Project Potential Emissions (tons per year)	PSD Major Modification Threshold (tons per year)
Particulate Matter (PM)	192.91	58.71	25
PM Less Than 10 Microns (PM <sub>10</sub> )	175.08	52.76	15
PM Less Than 2.5 Microns (PM <sub>2.5</sub> )	173.20	52.14	10
Sulfur Dioxide (SO <sub>2</sub> )	98.58	30.46	40
Nitrogen Oxides (NO <sub>x</sub> )	354.01	167.44	40
Volatile Organic Compounds (VOC)	647.02	382.58	40
Carbon Monoxide (CO)	1,266.03	768.64	100
Lead	0.52	0.01	0.6
Carbon Dioxide Equivalent (CO <sub>2</sub> e)	3,094,401	1,576,725	75,000
Beryllium	3.91 x 10 <sup>-4</sup>	4.24 x 10 <sup>-5</sup>	0.004
Mercury	3.07 x 10 <sup>-3</sup>	9.20 x 10 <sup>-4</sup>	0.1
Sulfuric acid mist	14.88	4.58	7

***Air Emissions Risk Analysis***

In accordance with MPCA guidance, the applicant has conducted an air emissions risk analysis (AERA) to assess potential health impacts attributable to the project.<sup>161</sup> These are potential impacts to residents in the project area who could be affected directly by pollutants from the project (e.g., inhalation, deposition), as opposed to being affected by changes in ambient air quality generally. Using air dispersion modeling and several exposure scenarios, cancer and non-cancer health risks can be estimated and quantified using indices.<sup>162</sup> These indices are then compared to thresholds established by the MPCA and the Minnesota Department of Health.<sup>163</sup>

The applicant’s AERA indicates that potential health risks to residents in the project area due to air emissions are within state guidelines (**Table 6**).<sup>164</sup> The greatest cancer risk is to a person in the project area who is outdoors continuously (modeled in the AERA as a “farmer”). The estimated risk to such persons is 0.9 additional lifetime cancers per 100,000 persons.<sup>165</sup> This risk is slightly less than the state

<sup>160</sup> Site Permit Application, Section 5.1.2, Table 5-1. Potential emissions based on continuous full power operation of the MEC (or expansion project). Actual emissions are anticipated to be substantially less; see Site Permit Application, Section 2.3 (discussing that the MEC operates only when needed by the electrical transmission grid and indicating actual power production at approximately 15 percent of potential production).

<sup>161</sup> Site Permit Application, Section 5.1.5.

<sup>162</sup> Id.

<sup>163</sup> Id.

<sup>164</sup> Id.

<sup>165</sup> Id.

risk guideline of one additional lifetime cancer in 100,000 persons.<sup>166</sup> The estimates in the AREA are conservative in that they assume maximum potential emissions from the MEC rather than estimated actual emissions.<sup>167</sup>

In sum, the MEC, with the expansion project, has the potential to impact the health of residents in the project area through air emissions; however, these impacts are anticipated to be within state guidelines and minimal.

**Table 6. Air Emission Risk Analysis Results<sup>168</sup>**

Screening Scenario	Risk Analysis Result	State Guideline / Threshold
Acute Hazard Index	0.8	1.0
Sub-chronic Hazard Index	0.02	1.0
Chronic Hazard Index	0.2	1.0
Cancer Risk	$3 \times 10^{-6}$	$1 \times 10^{-5}$
Farmer Non-cancer Hazard	0.6	1.0
Farmer Cancer Risk	$9 \times 10^{-6}$	$1 \times 10^{-5}$

***Greenhouse Gases and Global Warming***

The accumulation of greenhouse gases in the atmosphere and associated warming of the planet is leading to a variety of adverse human and environmental impacts – including more severe droughts and floods, more heat related illnesses, and a decrease in food security.<sup>169</sup> Though a variety of gases contribute to the greenhouse effect, the most prominent greenhouse gas is carbon dioxide.<sup>170</sup>

In 2012, approximately 154 million carbon dioxide equivalent (CO<sub>2</sub>e) tons of greenhouse gases were emitted in Minnesota.<sup>171</sup> The electric utility sector was responsible for approximately 31 percent of this total, or about 48 million tons CO<sub>2</sub>e.<sup>172</sup>

Between 2005 and 2012 Minnesota greenhouse gas emissions declined by 11 million tons CO<sub>2</sub>e, or approximately seven percent.<sup>173</sup> During this period, emissions from the electric utility sector declined by approximately 17 percent (**Figure 10**). This decline was due to utilities switching to less greenhouse gas intensive fuels, such as natural gas, and the increased use of renewable energy sources (e.g., wind, solar).<sup>174</sup>

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<sup>166</sup> Id.

<sup>167</sup> Id.

<sup>168</sup> Site Permit Application, Section 5.1.5, Table 5-4.

<sup>169</sup> Minnesota and Climate Change: Our Tomorrow Starts Today, Minnesota Environmental Quality Board, [www.eqb.state.mn.us](http://www.eqb.state.mn.us).

<sup>170</sup> Id.

<sup>171</sup> Greenhouse Gas Emissions Reduction Report.

<sup>172</sup> Id.

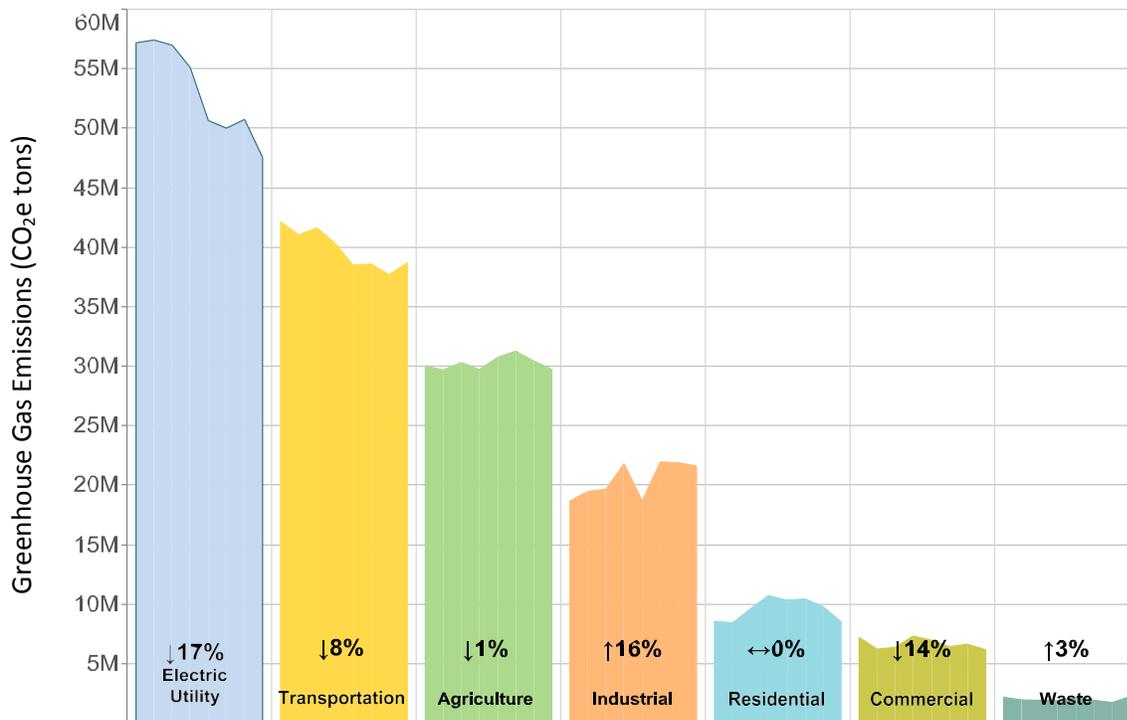
<sup>173</sup> Id.

<sup>174</sup> Id.

With the expansion project, the MEC will have the potential to emit approximately 3 million tons CO<sub>2</sub>e per year.<sup>175</sup> Because the MEC operates only when needed by the electrical transmission grid, actual greenhouse gas emissions are anticipated to be approximately 15 percent of this potential, or about 450,000 tons CO<sub>2</sub>e annually.<sup>176</sup>

Looking solely at the expansion project and emissions from the MEC, the project will increase greenhouse emissions at the MEC – approximately doubling current greenhouse gas emissions from the MEC.<sup>177</sup> Thus, the project would appear to contribute to global warming and associated human and environmental impacts. However, looking at the role of the MEC in the electric utility sector in Minnesota, the increased use of natural gas at the MEC and the displacement of more greenhouse gas intensive fuels (e.g., coal) combined with the ability of the MEC to facilitate additional wind and solar power generation is anticipated to reduce greenhouse gas emissions in Minnesota.<sup>178</sup> Though the displacement of more greenhouse gas intensive fuels and the addition of wind and solar power generation depend on a variety of actions by multiple actors, trends in electric utility emissions from 2005 to 2012 indicate that these activities will occur.<sup>179</sup> Thus, the project is anticipated to reduce greenhouse gas emissions in Minnesota overall and may reduce potential human and environmental impacts associated with global warming.

**Figure 10. Minnesota Greenhouse Gas Emission Changes by Economic Sectors: 2005-2012<sup>180</sup>**



<sup>175</sup> Site Permit Application, Section 5.1.2.

<sup>176</sup> Site Permit Application, Section 2.3 (discussing actual power production versus potential power production at the MEC).

<sup>177</sup> Site Permit Application, Section 5.1.2.

<sup>178</sup> Greenhouse Gas Emissions Reduction Report.

<sup>179</sup> Id. See also, Natural Gas, Renewables Projected to Provide Larger Shares of Electricity Generation, U.S. Energy Information Administration, <https://www.eia.gov/todayinenergy/detail.cfm?id=21072>.

<sup>180</sup> Greenhouse Gas Emissions Reduction Report.

## Mitigation

Potential health impacts of air emissions can be mitigated by technologies and processes that minimize emissions of certain pollutants. MPCA's PSD permit will require that the MEC employ best available control technologies (BACT).<sup>181</sup> The applicant indicates that it will use several emission control strategies, including:<sup>182</sup>

- Using natural gas to fire the turbines to minimize NO<sub>x</sub>, sulfur dioxide, and particulate emissions.
- Using dry low NO<sub>x</sub> combustors to minimize the formation of nitrogen oxides in combustion turbines.
- Using select catalytic reduction to reduce nitrogen oxides in combustion turbine exhaust.
- Use of catalytic oxidation to reduce CO, VOC, and organic air pollutant emissions from combined cycle system exhaust gas.
- Limiting operation of the emergency generator and fire pump, as practicable, to less than 100 hours per year.
- Installing high efficiency mist eliminators to reduce cooling tower drift rates and minimize particulate matter emissions from cooling towers.
- Use of energy efficient designs, processes, and practices.

Through the PSD permitting process, the MPCA may require mitigation measures in order to ensure that the project meets all air emissions standards and guidelines.

## Water Vapor Plumes

When exhaust gases are emitted from the stacks, the water vapor present in the exhaust gas can condense to form a visible plume.<sup>183</sup> Water vapor emitted from the cooling towers can also result in a visible plume (**Figure 9**).<sup>184</sup> The length and persistence of these plumes are influenced by prevailing weather conditions such as temperature, relative humidity, and wind speed.<sup>185</sup> The plumes are most persistent and visible during cold and damp weather.<sup>186</sup> The plumes, when present, disperse and evaporate fairly quickly and typically travel only short distances.<sup>187</sup>

## Potential Impacts

Water vapor plumes from the MEC have the potential to impair visibility and/or create icy areas on nearby roadways. However, because plumes are anticipated to dissipate before reaching roadways, potential impacts to health and safety due to plumes are anticipated to be minimal.

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<sup>181</sup> Site Permit Application, Section 5.1.2.

<sup>182</sup> Id.

<sup>183</sup> Site Permit Application, Section 5.5.

<sup>184</sup> Id.

<sup>185</sup> Id.

<sup>186</sup> Id.

<sup>187</sup> Id.

Water vapor plumes from the HRSG stacks will form approximately 200 feet above ground level. When emitted at this height the plumes are anticipated to dissipate before reaching ground level.<sup>188</sup> The cooling towers are not as tall as the HRSG stacks; however, they utilize drift eliminators to minimize water vapor emissions that can cause fogging and icing.<sup>189</sup> Summit Avenue and 3<sup>rd</sup> Avenue, the nearest local roads, are approximately 800 feet from the MEC.<sup>190</sup> U.S. Highway 14 is approximately 0.75 miles from the MEC.<sup>191</sup> Based on these distances and the rate at which water vapor plumes typically evaporate and dissipate, impacts to these roadways are anticipated to be minimal. The applicants note that plumes from the MEC to date have not impacted visibility or roadway safety.<sup>192</sup> Water vapor plumes associated with the MEC expansion project will be incremental and impacts from the expanded MEC are anticipated to be minimal.

### **Mitigation**

Impacts to public health and safety as a result of the MEC's water vapor plumes are anticipated to be minimal; thus, no mitigation measures are proposed.

### **Water Emissions**

Water used at the MEC and rainfall at the site could become polluted with oils, chemicals, and other substances used for power production at the MEC. If polluted waters are not properly treated or handled, their discharge into the environment could result in impacts to public health. However, because waters at the MEC are treated and handled to minimize the discharge of pollutants, impacts to public health due to water emissions are anticipated to be minimal.

### **Potential Impacts**

Process wastewater, i.e., wastewater from power systems, is collected and treated and then discharged to the Mankato WWTP.<sup>193</sup> The Mankato WWTP, after further treatment, discharges to the Minnesota River in accordance with its NPDES/SDS permit.<sup>194</sup> No changes in this process are anticipated as a result of the project. Discharges from the MEC – through the Mankato WWTP – are not anticipated to change as a result of the project and are not anticipated to adversely impact public health.

Domestic wastewater from the MEC is discharged to the city of Mankato sanitary sewer system.<sup>195</sup> This discharge is monitored by the city and subject to pollutant discharge limits. No changes are anticipated to this process and no impacts to the Mankato sanitary sewer system or to public health are anticipated.

Stormwater from the power production areas of the MEC is treated to separate oil and water – oil is shipped off-site for disposal; water is recycled as cooling water makeup.<sup>196</sup> Stormwater from non-power production areas is routed to an existing stormwater basin.<sup>197</sup> Stormwater flows from this basin through

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<sup>188</sup> Id.

<sup>189</sup> Id.

<sup>190</sup> Id.

<sup>191</sup> Site Permit Application, Section 3.1.

<sup>192</sup> Site Permit Application, Section 5.5 (noting that the MEC has received no complaints to date concerning water vapor plumes).

<sup>193</sup> Site Permit Application, Section 2.7.9.

<sup>194</sup> Site Permit Application, Section 8.3.6

<sup>195</sup> Id.

<sup>196</sup> Site Permit Application, Section 8.3.5.

<sup>197</sup> Id.

a drainage ditch to the Minnesota River.<sup>198</sup> Discharges from the basin are regulated by an NPDES/SDS permit.<sup>199</sup> No changes in the handling of stormwater are anticipated as a result of the project. No public health impacts are anticipated as a result of stormwater from the project.

### **Mitigation**

Impacts to public health and safety as a result of water emissions from the MEC are anticipated to be minimal; thus, no mitigation measures are proposed.

### **Fire and Electrocutation**

The power generation equipment at the MEC and the equipment proposed for the expansion project combust natural gas at high pressure and temperature and convert this heat energy to electrical power. As a result, there is a risk of fire or explosion and a risk of electrocution. However, because of systems and controls in place at the MEC, because access to the MEC is controlled, and because the MEC is relatively distant from populated areas (approximately one-half mile), the risk to public health and safety from these potential accidents is anticipated to be minimal.

Potential impacts due to safety risks at the MEC are minimized by a number of controls at the MEC including training, personal protective equipment, and signage.<sup>200</sup> All employees participate in on-going safety training.<sup>201</sup> All employees, contractors, and visitors are required to use appropriate personal protection equipment, e.g., hard hats, safety glasses, safety harnesses.<sup>202</sup> Employees are trained in the proper use of this equipment.<sup>203</sup> The MEC utilizes signage to identify hazards at the facility and the locations of safety equipment.<sup>204</sup>

The MEC is equipped with a security system and a fire suppression system.<sup>205</sup> The fire suppression system includes a diesel-fueled fire pump.<sup>206</sup> The city of Mankato provides any fire, police, or rescue services needed at the MEC.<sup>207</sup> Accordingly, public health impacts from a potential fire at the MEC are anticipated to be minimal.

The MEC utilizes step-up transformers and electrical switchgear to commute the electrical power generated at the MEC to the Wilmarth substation (see Section 3.1). The switchgear includes circuit breakers and relays that de-energize electrical equipment should a structure or conductor fall to the ground or should electrical equipment otherwise fail. Accordingly, public health impacts resulting from electrocution at the MEC are anticipated to be minimal.

### **Mitigation**

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

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<sup>198</sup> Id.

<sup>199</sup> Id.

<sup>200</sup> Additional Project Information from Applicant.

<sup>201</sup> Id.

<sup>202</sup> Id.

<sup>203</sup> Id.

<sup>204</sup> Id.

<sup>205</sup> Site Permit Application, Section 4.8.4.

<sup>206</sup> Site Permit Application, Section 2.7.10.

<sup>207</sup> Site Permit Application, Section 4.8.4.

## 4.5 Land-Based Economies

Electric power generating plants have the potential to impact land-based economies. Power plants require a dedicated physical area on the landscape to accommodate power generation equipment. The use of this area for power generation can prevent or otherwise limit use of the landscape for other purposes and can adversely impact land-based economies.

Impacts to land-based economies as a result of the project are anticipated to be minimal. The project will be located within the existing MEC.<sup>208</sup> No additional land is required for operation of the expanded MEC. The project will require the temporary use of approximately 15 acres outside of the MEC site for construction of the project.<sup>209</sup> The applicant anticipates securing land from a local property owner for this use.<sup>210</sup> Once the project is constructed, this land would be returned to its current use.

### **Agriculture**

Impacts to agriculture as a result of the project are anticipated to be minimal. There is no agricultural land within the MEC site. The project will require the use of approximately 15 acres outside of the MEC site for construction of the project. This land will be agricultural land or vacant industrial land.<sup>211</sup> If agricultural land were used, it would be unavailable for cultivation for approximately two growing seasons (24-30 months).<sup>212</sup> After this time, the land would be returned to agricultural use. Impacts to agriculture as a result of the project are anticipated to be minimal; thus, no mitigation measures are proposed.

### **Forestry**

No impacts to forestry are anticipated as a result of the project. There is no forested land within the MEC site. No forested land will be used for construction of the project. No mitigation measures are proposed.

### **Mining**

No impacts to mining are anticipated as a result of the project. There are no mining operations or resources within the MEC site. There are mining operations and resources in the project area including limestone quarries and aggregate mines.<sup>213</sup> These operations and resources are at a distance from the MEC site and will not be impacted by the construction or operation of the project.<sup>214</sup> No mitigation measures are proposed.

### **Recreation and Tourism**

No impacts to recreation and tourism are anticipated as a result of the project. The MEC is located in an industrial area away from recreational features and tourism attractions.<sup>215</sup> There are parks in the

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<sup>208</sup> Site Permit Application, Section 6.0.

<sup>209</sup> Id.

<sup>210</sup> Id.

<sup>211</sup> Site Permit Application, Section 6.1.

<sup>212</sup> Id.

<sup>213</sup> Site Permit Application, Section 6.4.

<sup>214</sup> Id.

<sup>215</sup> Site Permit Application, Section 6.3.

project area used for recreation, but these parks are located at a distance from the MEC site and their use will not be impacted by the project.<sup>216</sup> No mitigation measures are proposed.

#### **4.6 Archaeological and Historic Resources**

Electric power generating plants have the potential to impact archaeological and historic resources. Archaeological resources can be impacted by the disruption or removal of such resources during the construction of a plant. Historic resources can be impacted by locating a plant in a manner that impairs or decreases the historic value of the resources.

Impacts to archaeological and historic resources resulting from the project are anticipated to be minimal. There are no archaeological or historic resources within the MEC site.<sup>217</sup> A review of records at the State Historic Preservation Office indicates that there are two historic farmsteads within the section where the MEC is located (Section 31, Lime Township).<sup>218</sup> No impacts to these farmsteads are anticipated as a result of the project. No mitigation measures are proposed.

#### **4.7 Air Resources**

Emissions from electric power generating plants can adversely impact air quality with concomitant impacts to persons, flora, and fauna. Potential impacts to air quality as a result of the project are discussed in Section 4.4. EPA air emission standards are protective of public health and public welfare, including the welfare of flora and fauna.<sup>219</sup> As the MEC must comply with these standards, impacts to air resources are anticipated to be minimal, and no impacts to flora or fauna are anticipated due to air emissions from the MEC. No mitigation measures beyond those discussed in Section 4.4 are proposed.

#### **4.8 Water Resources**

Electric power generating plants have the potential to impact water resources in several ways. Construction of the project will require the movement and removal of soils. This handling of soils can result in soil erosion and changes in water flow patterns such that water resources are adversely impacted. Operation of the MEC requires water for cooling (see Section 3.1). The use of water for cooling could remove water from the ecosystem. This removal could have adverse impacts on water resources, flora, and fauna. Operation of the MEC could result in the emission of pollutants to waterbodies; such emissions could adversely impact water quality and habitat for flora and fauna.

Impacts to water resources as a result of the project are anticipated to be minimal. Soil erosion and construction related impacts to water resources are anticipated to be minimal. The project will increase the MEC's use of cooling water; however, the water used for cooling is wastewater from the Mankato WWTP. Accordingly, the impact of increased cooling water use on water resources is anticipated to be minimal. Emissions of pollutants to waterbodies are anticipated to be minimal and within all applicable standards; thus, impacts to water resources due to potential pollutants are anticipated to be minimal.

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<sup>216</sup> Parks, City of Mankato, <http://www.mankatomn.gov/city-services-a-z/city-services-n-z/parks>.

<sup>217</sup> Site Permit Application, Section 7.0.

<sup>218</sup> Id.

<sup>219</sup> Site Permit Application, Section 8.1.

### **Surface Waters**

The MEC site contains no waterbodies or watercourses. There is a stormwater basin (detention pond) located in the northeast corner of the site (**Figure 11**).<sup>220</sup> The basin was designed and constructed to contain stormwater from the MEC as originally proposed, i.e., with the MEC expansion project.<sup>221</sup> The basin discharges to a drainage ditch on the east side of the site.<sup>222</sup> This drainage ditch is a tributary of the Minnesota River.<sup>223</sup> The river itself is located approximately 1,800 feet west of the MEC site.

### **Construction**

Impacts to surface waters could occur due to construction activities. These activities could expose and disturb soils, increasing erosion and the potential for sediment to reach surface waters. Construction of the project will disturb approximately four acres.<sup>224</sup> Though there are no surface waters at the site, disturbed soils could move, via rainfall events, to the stormwater basin and through the drainage ditch.

Impacts to surface waters as a result of project construction are anticipated to be minimal and can be mitigated. Construction of the CTG and HSRG will impact approximately two acres of a paved, impervious surface and will not require substantial earth movement or grading (**Figure 8**).<sup>225</sup> Construction of new cooling tower cells will impact approximately one acre of a flat, gravel surface.<sup>226</sup> Substantial earth movement or grading will not be required for these cells.<sup>227</sup> The applicant indicates that it will employ several erosion and sediment control measures during construction of the project, including silt fences, hay bales, matting, and mulching.<sup>228</sup> The stormwater basin at the MEC will collect and filter stormwater during construction of the project.<sup>229</sup> The project will require an NPDES/SDS stormwater construction permit from the MPCA (see Section 2.3). This permit may require specific mitigation measures to minimize potential impacts to water resources resulting from construction of the project. Commission site permits require permittees to minimize soil erosion and associated impacts on surface waters (**Appendix B**).

### **Operation**

Impacts to surface waters could occur due to the use of water for cooling at the MEC and to emissions of pollutants from the MEC. These potential operational impacts are anticipated to be minimal.

### ***Evaporative Loss of Cooling Water***

There are currently eight cooling tower cells at the MEC. The expansion project will require the addition of four more cells, resulting in a total of 12 cooling tower cells (see Section 3.1). This addition will increase the tower's ability to dissipate heat and will increase water evaporation from the tower. When running at full power, the MEC currently has the potential to evaporate 3.48 million gallons per day (MGD).<sup>230</sup> With the expansion project, the MEC will have the potential to evaporate 6.04 MGD.<sup>231</sup>

<sup>220</sup> Site Permit Application, Section 8.3.

<sup>221</sup> Id.

<sup>222</sup> Id.

<sup>223</sup> Id.

<sup>224</sup> Id.

<sup>225</sup> Id.

<sup>226</sup> Id.

<sup>227</sup> Id.

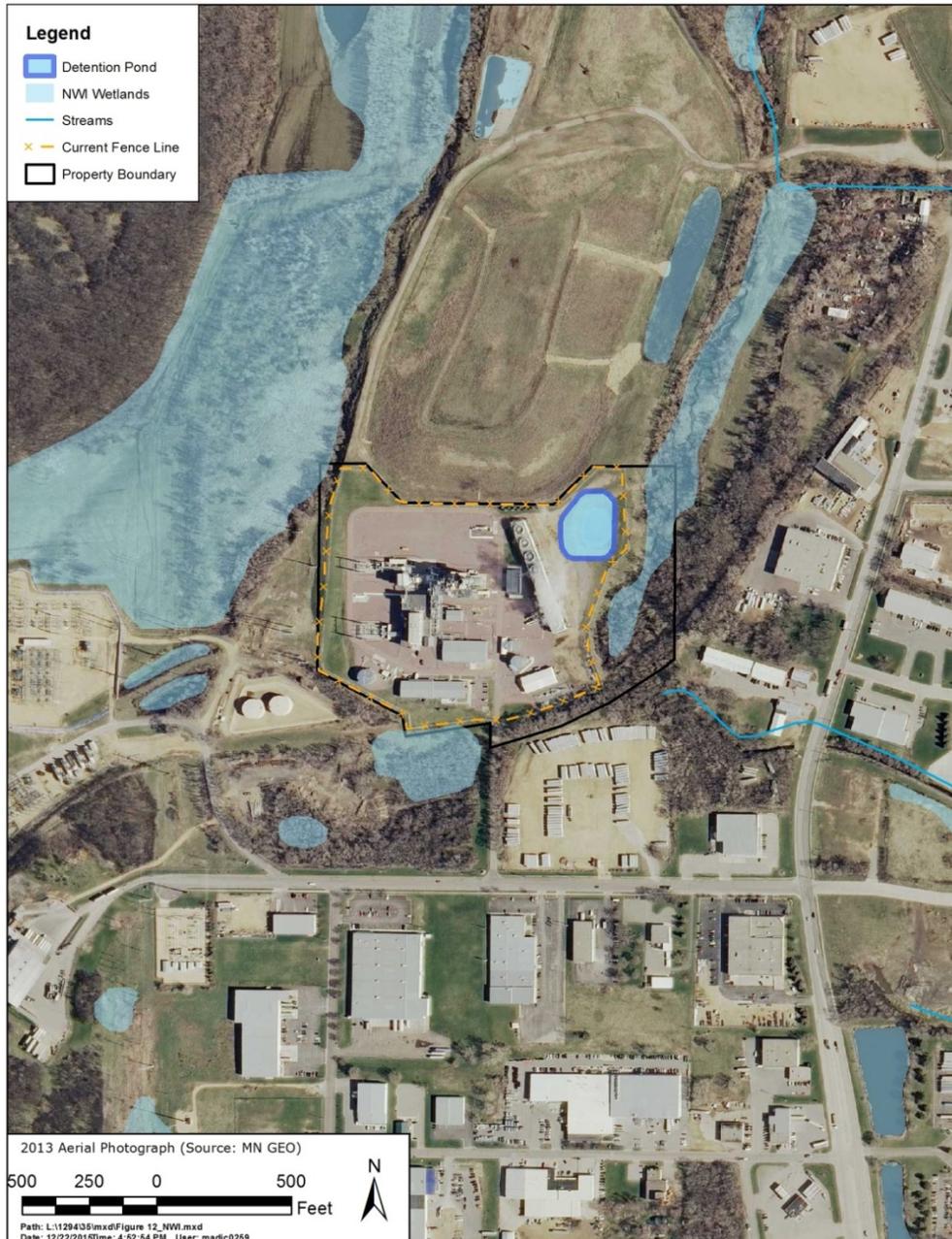
<sup>228</sup> Id.

<sup>229</sup> Id.

<sup>230</sup> Site Permit Application, Section 2.7.6.

Because the MEC does not run continuously, its average daily water evaporation is considerably less – approximately one-tenth of its maximum potential evaporation.<sup>232</sup> On average, the MEC evaporates 0.34 MGD; with the expansion project, the MEC will evaporate, on average, approximately 0.47 MGD.<sup>233</sup>

**Figure 11. Water Resources**



231 Id.  
232 Id.  
233 Id.

The wastewater used for cooling at the MEC, were it not lost to evaporation, would be discharged by the Mankato WWTP to the Minnesota River.<sup>234</sup> The Mankato WWTP treats and discharges, on average, approximately 7.0 MGD.<sup>235</sup> Thus, evaporation from the MEC, with the expansion project, will remove approximately 6.7 percent of the WWTP's average discharge to the Minnesota River.<sup>236</sup>

The evaporative loss of cooling water from the MEC could impact water resources and ecosystems by removing water otherwise available to ecosystems in the project area. However, the potential impacts of evaporative losses from the MEC are anticipated to be minimal. First, the cooling water used at the MEC is wastewater. Thus, it is water that has already provided ecosystem services to humans, flora, and fauna. Second, the evaporative loss from the MEC and resulting reduction in discharge from the Mankato WWTP is not anticipated to impact the Minnesota River or the habitat it provides for flora and fauna. The evaporative loss is insignificant compared with the flow volume of the Minnesota River.<sup>237</sup> Thus, though evaporation from cooling towers at the MEC will remove water from the water systems and ecosystems in the project area, the impacts of this removal are anticipated to be minimal.

### ***Emissions to Surface Waters***

Water used at the MEC and rainfall at the site could become polluted with oils, chemicals, and other substances used at the MEC. If these polluted waters are not properly treated or handled, their discharge could impact surface waters in the project area. However, because waters at the MEC are treated and handled to minimize the discharge of pollutants, impacts to surface waters are anticipated to be minimal.

Process wastewater, i.e., wastewater from power systems, is collected and treated and then discharged to the Mankato WWTP.<sup>238</sup> The Mankato WWTP, after further treatment, discharges to the Minnesota River.<sup>239</sup> No changes in this process are anticipated as a result of the project. Accordingly, the handling of process wastewater at the MEC is not anticipated to impact surface waters.

Stormwater from the power production areas of the MEC is treated to separate oil and water – oil is shipped off-site for disposal; water is recycled as cooling water makeup.<sup>240</sup> Stormwater from non-power production areas is routed to the stormwater basin.<sup>241</sup> Discharges from the basin are regulated by an NPDES/SDS permit.<sup>242</sup> No changes in the handling of stormwater are anticipated as a result of the project. The project will not increase the amount of impervious surface within the MEC site.<sup>243</sup> The applicant indicates that it will maintain the MEC site in good order and keep road surfaces clean to minimize potential pollutants in stormwater.<sup>244</sup> The applicant also indicates that it will maintain

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<sup>234</sup> Site Permit Application, Section 8.3.6.

<sup>235</sup> City of Mankato, Plant History, <http://www.mankatomn.gov/city-services-a-z/city-services-n-z/wastewater-treatment/plant-history>.

<sup>236</sup>  $(0.47 \text{ MGD} / 7.0 \text{ MGD}) = 0.067$ .

<sup>237</sup> A minimum flow for the Minnesota River at Mankato is approximately 3,000 cubic feet per second, or about 1,940 MGD (see National Weather Service, Advanced Hydrologic Prediction Service, <http://water.weather.gov/ahps2/hydrograph.php?wfo=mpx&gage=MNKM5>).

<sup>238</sup> Site Permit Application, Section 2.7.9.

<sup>239</sup> Site Permit Application, Section 8.3.6

<sup>240</sup> Id.

<sup>241</sup> Id.

<sup>242</sup> Id.

<sup>243</sup> Site Permit Application, Section 8.3.5.

<sup>244</sup> Id.

vegetation buffers along the perimeter of the MEC to minimize stormwater impacts on surface waters.<sup>245</sup>

The MEC utilizes and stores liquids (e.g., fuel, chemicals) that could, if released, mix with stormwater or otherwise flow to the stormwater basin. The applicant indicates that such liquids are stored within appropriate containment areas.<sup>246</sup> Handling and unloading areas are equipped with secondary containment.<sup>247</sup> The MEC has a spill prevention, contingency, and countermeasure (SPCC) plan.<sup>248</sup> The plan identifies staff responsible for maintenance and inspection of storage tanks, steps to take in the event of a release, locations of spill response supplies at the MEC, and notification and communication responsibilities.<sup>249</sup> The MEC has a risk management plan for the storage of ammonia at the MEC.<sup>250</sup> The plan is similar to the SPCC and includes details specific to the proper handling of ammonia.<sup>251</sup>

In sum, impacts to surface waters due to emissions of potential pollutants are anticipated to be minimal. Impacts are avoided and minimized by facilities and processes in place at the MEC.

### **Floodplains**

The MEC site is located outside of the 100-year floodplain, as identified by the Federal Emergency Management Agency (**Figure 12**).<sup>252</sup> The 100-year floodplain elevation is approximately 25 feet below the base elevation of the MEC.<sup>253</sup> Thus, no impacts to the 100-year floodplain or to development near the floodplain are anticipated as a result of the project. No mitigation measures are proposed.

### **Groundwater**

The MEC is located on a portion of an old limestone quarry which was converted to a landfill.<sup>254</sup> The landfill is now closed and the site was reworked to construct the MEC. The project does not require any groundwater wells.<sup>255</sup> Cooling water will continue to be supplied by the Mankato WWTP; service water will continue to be supplied by the city of Mankato's municipal water system.<sup>256</sup>

### **Potential Impacts**

Impacts to groundwater as a result of the project are anticipated to be minimal. Potential impacts to groundwater from the project could occur through (1) surface water impacts and (2) impacts directly to groundwater resulting from concrete foundations.

Because surface waters are hydrologically connected to groundwater, impacts to surface waters can lead to impacts to groundwater. Soils underlying the MEC site are fairly permeable, and the MEC sits atop a former quarry.<sup>257</sup> Thus, any pollutants in surface waters are likely to percolate downward into

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<sup>245</sup> Id.

<sup>246</sup> Site Permit Application, Section 8.3.4.

<sup>247</sup> Id.

<sup>248</sup> Additional Project Information from Applicant.

<sup>249</sup> Id.

<sup>250</sup> Id.

<sup>251</sup> Id.

<sup>252</sup> Site Permit Application, Section 8.3.1.

<sup>253</sup> Id.

<sup>254</sup> Site Permit Application, Section 2.4

<sup>255</sup> Site Permit Application, Section 8.3.4.

<sup>256</sup> Id.

<sup>257</sup> Site Permit Application, Section 8.3.5.

groundwater. As discussed above, impacts to surface waters at the MEC are anticipated to be minimal. Accordingly, impacts to groundwater are anticipated to be minimal.

**Figure 12. Floodplains**



Direct impacts to groundwater could occur as a result of project construction and the placement of concrete foundations. Some portion of the soluble components of the concrete could leach into groundwater prior to the setting and hardening of the concrete. Because of the relatively low solubility of concrete components, direct impacts to groundwater are anticipated to be minimal.

## Mitigation

Impacts to groundwater can be mitigated by measures to prevent impacts to surface waters (discussed above).

## Wetlands

There are no wetlands within the MEC site (**Figure 11**).<sup>258</sup> There are wetlands in the project area, but these areas would not be impacted by the project. Accordingly, no impacts to wetlands are anticipated as a result of the project; no mitigation measures are proposed.

## 4.9 Flora

Electric power generating plants have the potential to impact flora through the removal or disturbance of vegetation during construction. Potential impacts to flora due to the project are anticipated to be minimal.

There is no flora within the MEC site.<sup>259</sup> There are treed areas to the south and east of the site (**Figure 2**). Construction within the MEC site will not impact flora. The applicant indicates that materials for construction of the project will be transported on existing roads.<sup>260</sup> The project will require temporary use of approximately 15 acres outside of the MEC site for construction laydown and parking.<sup>261</sup> This land will be agricultural land or vacant industrial land.<sup>262</sup> The applicant indicates that some clearing of flora may be necessary to create a walkway from the construction laydown area to the MEC site.<sup>263</sup> Commission site permits require that permittees minimize impacts to flora (**Appendix B**). In sum, impacts to flora as a result of the project are anticipated to be minimal; no mitigation measures are proposed.

## 4.10 Fauna

Electric power generating plants have the potential to impact fauna through a variety of means including displacement and habitat loss. Potential impacts to fauna due to the project are anticipated to be minimal.

The MEC site is an industrial property that does not include habitat for fauna.<sup>264</sup> Fencing around the site prevents many species from entering or crossing the site.<sup>265</sup> There are forest and wetland habitats to the east of the MEC site; there are forest, grassland, and wetland habitats northwest of the site along the Minnesota River.<sup>266</sup> These habitats are outside of the MEC site and away from possible, temporary construction laydown areas and will not be impacted by the project. Some species in the project area may be disturbed or displaced by construction noise. Any such impacts are anticipated to be temporary and are not anticipated to impact wildlife populations. On whole, impacts to fauna as a result of the project are anticipated to be minimal; no mitigation measures are proposed.

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<sup>258</sup> Site Permit Application, Section 8.3.3.

<sup>259</sup> Site Permit Application, Section 8.4.1.

<sup>260</sup> Id.

<sup>261</sup> Id.

<sup>262</sup> Site Permit Application, Section 6.1.

<sup>263</sup> Site Permit Application, Section 8.4.1.

<sup>264</sup> Site Permit Application, Section 8.4.2.

<sup>265</sup> Id.

<sup>266</sup> Id.

#### 4.11 Rare and Unique Natural Resources

Impacts to rare and unique natural resources (flora and fauna) from the project could result from ecosystem changes, introduction of invasive species, and habitat loss. Potential impacts to rare and unique natural resources due to the project are anticipated to be minimal.

##### Flora

A review of natural resource databases indicates that there is one rare plant community in the project area – a mesic prairie (**Table 7**). In addition to this rare plant community, there are two rare plant species in the project area – *Berula erecta* and Hair-like Beak-rush (**Table 7**). The mesic prairie community and these rare plant species are distant from the MEC site; the two rare species are found in habitats along the Minnesota River.<sup>267</sup>

##### Fauna

A review of natural resource databases indicates that there is one animal assemblage area, eleven rare and unique animal species, and habitat for an additional species in the project area (**Table 7**). The majority of the rare and unique species are associated with the Minnesota River. The river contains the animal assemblage area – a freshwater mussel concentration area – as well as several fish (Paddlefish, Blue Sucker, Shovelnose Sturgeon) and mussel species (Rock Pocketbook, Yellow Sandshell, Monkeyface, Black Sandshell, Round Pigtoe, Hickorynut). The only animal species not confined to the Minnesota River are two snake species – the North American Racer and Western Foxsnake.

The Northern Long-Eared Bat (NLEB) is found throughout eastern and central North America.<sup>268</sup> The bats hibernate in caves and mines during winter months and roost in forested areas during summer months.<sup>269</sup> The NLEB was listed by the USFWS as a threatened species on April 2, 2015. The primary reason for the listing is the rapid decline in NLEB populations due to white nose syndrome, a fungal disease that has quickly spread throughout the species' range.<sup>270</sup> Because of this disease, other possible causes of NLEB mortality may now be important factors affecting the viability of NLEB populations in the United States.<sup>271</sup> One such cause is the loss or degradation of summer roosting habitat (trees).

##### Potential Impacts

Impacts to rare and unique species due to the project are anticipated to be minimal. The MEC site contains no habitat for rare and unique species and is located away from such habitat in the project area. Impacts to water resources as a result of the project are anticipated to be minimal (see Section 4.8). Thus, impacts to rare and unique species associated with the Minnesota River are anticipated to be minimal.

The two rare snake species in the project area could cross through the MEC site. In doing so, they could be impacted by construction activities. The applicant indicates that it will use exclusionary silt fencing to prevent movement of these species across the site and will use wildlife friendly erosion control practices to mitigate potential impacts to these species.<sup>272</sup> Impacts to trees as a result of the project are

<sup>267</sup> Site Permit Application, Section 9.0.

<sup>268</sup> USFWS Endangered Species, Northern Long-Eared Bat, <http://www.fws.gov/midwest/endangered/mammals/nleb/>.

<sup>269</sup> Id.

<sup>270</sup> Id.

<sup>271</sup> Id.

<sup>272</sup> Site Permit Application, Section 9.0.

anticipated to be minimal (see Section 4.9). Thus, impacts to potential roosting habitat for the NLEB are not anticipated.

**Mitigation**

Impacts to rare and unique species due to the project are anticipated to be minimal. Impacts to two rare snake species in the project area could be mitigated by exclusionary fencing and wildlife friendly erosion control practices.

**Table 7. Rare and Unique Species in Project Area<sup>273</sup>**

Type	Common Name	Scientific Name	Federal Status	State Status
Plant Community	Mesic Prairie	---	None	None
Plant	---	<i>Berula erecta</i>	None	Threatened
Plant	Hair-like Beak-rush	<i>Rhynchospora capillacea</i>	None	Threatened
Animal Assemblage	Freshwater Mussel Concentration Area	---	None	None
Fish	Paddlefish	<i>Polyodon spathula</i>	---	Threatened
Fish	Blue Sucker	<i>Cycleptus elongates</i>	---	Special Concern
Fish	Shovelnose Sturgeon	<i>Scaphirhynchus platorynchus</i>	---	Watchlist
Mussel	Rock Pocketbook	<i>Arcidens confragosus</i>	---	Endangered
Mussel	Yellow Sandshell	<i>Lampsilis teres</i>	---	Endangered
Mussel	Monkeyface	<i>Quadrula metanevra</i>	---	Threatened
Mussel	Black Sandshell	<i>Ligumia recta</i>	---	Special Concern
Mussel	Round Pigtoe	<i>Pleurobema sintoxia</i>	---	Special Concern
Mussel	Hickorynut	<i>Obovaria olivaria</i>	---	Watchlist
Reptile	North American Racer	<i>Coluber constrictor</i>	---	Special Concern
Reptile	Western Foxsnake	<i>Patherophis ramspotti</i>	---	Watchlist
Bat	Northern Long-Eared Bat	<i>Myotis septentrionalis</i>	Threatened	Special Concern

<sup>273</sup> Site Permit Application, Section 9.0, Table 9-1; USFWS Endangered Species, Northern Long-Eared Bat, <http://www.fws.gov/midwest/endangered/mammals/nleb/>.

## 5.0 Application of Siting Factors to the Proposed Project

The Power Plant Siting Act requires the Commission to locate electric power generating plants in a manner that is “compatible with environmental preservation and the efficient use of resources” and that minimizes “adverse human and environmental impact[s]” while ensuring electric power reliability.<sup>274</sup> Minnesota Statute Section 216E.03, subdivision 7(b) identifies considerations that the Commission must take into account when designating power plant sites.<sup>275</sup>

Minnesota Rule 7850.4100 lists 14 factors for the Commission to consider in its site permitting decisions, including effects on human settlements, effects on public health and safety, and effects on the natural environment (**Figure 13**).<sup>276</sup> In this section, the information gathered by EERA staff during the environmental review process, as presented in this EA, is applied to these factors.

The discussion here focuses first of the first 12 siting factors of Minnesota Rule 7850.4100 (factors A through L). Siting factors M and N – the unavoidable and irreversible impacts of the project – are discussed at the end of this section.

There are three siting factors which are not relevant to the project and are not discussed further here. These are:

- The use of existing rights-of-way, division lines, and boundaries (factor H);
- The use of existing infrastructure rights-of-way (factor J);
- Costs which are dependent on design and route (factor L).

Factors H and J are relevant solely to the routing of transmission lines. Factor L is relevant only when there is more than one design and/or route with costs that can be compared. The only design for the project is the applicant’s proposed design.

### 5.1 Siting Factors and Elements

Some of the siting factors in Minnesota Rule 7850.4100 describe a resource in relatively succinct terms, e.g., effects on archaeological and historic resources. Other siting factors are more descriptive and include a list of factor elements, i.e., parts that make up the sum of the whole factor. For example, the factor “effects on human settlements” includes the factor elements displacement, noise, aesthetics, cultural values, recreation, and public services. Finally, there are siting factors that are relatively succinct, but for which elements have been identified through the scoping process and analyzed in this EA. For example, the factor “public health and safety” includes the elements air emissions, water vapor plumes, water emissions, and fire and electrocution.

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<sup>274</sup> Minnesota Statute 216E.02.

<sup>275</sup> Minnesota Statute 216E.03, Subd. 7.

<sup>276</sup> Minnesota Rule 7850.4100.

**Figure 13. Factors Considered by the Commission for Electric Power Generating Plant Site Permits**

In determining whether to issue a site permit for a large electric power generating plant, the Commission shall consider the following factors of Minnesota Rule 7850.4100:

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

## 5.2 Siting Factors for Which Impacts are Anticipated to be Minimal

There are several siting factors for which impacts are anticipated to be minimal with the general conditions in section 4.0 of the Commission's generic site permit template (**Appendix B**). These are:

- Effects on human settlements (factor A);
- Effects on public health and safety (factor B);
- Effects on land-based economies (factor C);

- Effects on archaeological and historic resources (factor D);
- Effects on the natural environment (factor E);
- Effects on rare and unique natural resources (factor F).

### **5.3 Siting Factors for Which Impacts are Anticipated to be Minimal to Moderate, and Which May Require Special Conditions to Mitigate**

There are no siting factors for which impacts are anticipated to be minimal to moderate with the general conditions in section 4.0 of the Commission's generic site permit template (**Appendix B**). Thus, there are no impacts that require special conditions in a Commission site permit in order for the impacts to be mitigated. As discussed in this EA, impacts of the project are minimized and mitigated by its location, by processes already in place at the MEC, and by permits other than the Commission's site permit, e.g., MPCA air permit.

### **5.4 Siting Factors that are Well Met**

There are several siting factors that do not describe a resource or impact but rather indicate the state's interest in efficient design and use of resources, particularly the state's limited land resources. For the applicants' proposed project, these factors are well met:

- Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity (factor G);
- Use of existing large electric power generating plant sites (factor I);
- Electrical system reliability (factor K).

The project utilizes an existing large electric power generating plant site, the MEC site (see Section 3.1). This location maximizes energy efficiencies and mitigates adverse environment effects (see Section 4). The project will ensure reliable electrical power for projected electrical needs within the state (see Section 1.1).

### **5.5 Unavoidable Impacts**

Electric power generating plants are large infrastructure projects that have the potential for adverse human and environmental impacts. As discussed in this EA, the impacts associated with the MEC expansion project are anticipated to be minimal. Despite being minimal, there are some impacts that cannot be avoided.

The project will utilize natural gas to create electrical energy. The use of natural gas – a limited, carbon feedstock – is unavoidable. Air emissions are unavoidable. Though public health risks associated with the project are anticipated to be within state guidelines, the emission of additional combustion by-products into the air will increase the risk of adverse public health impacts. Air emissions will include carbon dioxide, a greenhouse gas. Though the project will increase greenhouse gas emissions at the MEC, it is anticipated to lower greenhouse gas emissions in Minnesota overall.

Aesthetic impacts are unavoidable. The project will introduce a new emissions stack and additional water vapor plumes into the project area. Temporary construction-related impacts cannot be avoided. These include construction noise and increased traffic near the MEC site.

## **5.6 Irreversible and Irretrievable Commitments of Resources**

The commitment of a resource is irreversible when it is impossible or very difficult to redirect that resource to a different future use. An irretrievable commitment refers to the use or consumption of a resource such that it is not recoverable for later use by future generations.

The commitment of land for the MEC expansion project is likely an irreversible commitment. In general, land utilized for electric power generating plants remains in use by these plants for a relatively long period of time. Repurposing the land for a different future use is possible; however, it would require substantial resources to do so.

There are few commitments of resources associated with the project that are irretrievable. These commitments include the steel, concrete, and carbon (e.g., natural gas) resources committed to the project, though it is possible that the steel could be recycled at some point in the future. Labor and fiscal resources required for the project are also irretrievable commitments.