Site Permit Application

Mankato Energy Center
Mankato, Minnesota

Docket No. 04-76-PPS CALPINE

Submitted by

Mankato Energy Center, LLC
A Wholly Owned Subsidiary of
Calpine Corporation

Wenck

March 2004

CALPINE

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March 3, 2004

Mr. Robert Schroeder, Chair
Minnesota Environmental Quality Board
658 Cedar Street, Room 300
St. Paul, MN 55155

Re: Docket No. 04-76-PPS CALPINE
Site Permit Application - Alternative Review Process
Mankato Energy Center Combined Cycle Natural Gas Power Plant

Dear Mr. Schroeder:

Mankato Energy Center, LLC (Mankato Energy), a wholly owned subsidiary of Calpine Corporation, hereby makes application to the Minnesota Environmental Quality Board (EQB) for a Site Permit pursuant to the Power Plant Siting Act, Minnesota Statutes 116C.51 to 116C.69 and Minnesota Rules 4400 for the proposed Mankato Energy Center to be located near Mankato, Minnesota.

The Mankato Energy Center will consist of two combined cycle combustion turbines equipped with supplemental duct firing, two heat recovery steam generators, and a single steam turbine generator (the Project). The maximum generating capacity of the Project will be 655 megawatts at summer ambient conditions. The primary fuel will be natural gas. Low sulfur distillate oil will be fired for up to 875 hours per year to ensure uninterrupted operation of the Project.

In accordance with Minnesota Rules 4400.2000, Subp. 2, Mankato Energy submitted written notification to the EQB on February 18, 2004 of its intent to process of the application under the alternative review procedures provided for in Minnesota Rules 4400.2000 to 4400.2950. As stated in the letter of intent, Mankato Energy will also be filing a separate application with the EQB at a later for a pipeline route permit for the associated natural gas pipeline under the alternative partial exemption process specified in Minnesota Rules 4415.0035.

Enclosed are three copies of the site permit application and a disk containing an electronic version of the document in PDF format for posting on the EQB's website (Minnesota Rules 4400.1025, Subp. 1 and 2). Also enclosed is a copy of the application that was submitted to the Minnesota Public Utilities Commission (MPUC) on March 2, 2004 for a Certificate of Need (CON) for that portion of the Project that is not already statutorily exempt from the CON process pursuant to Minn. Stat.§§ 216B.243; 216B.2422, subd. 5(c). Also enclosed, per the requirements of Minnesota Statutes Chapter 116C.69, Subd. 2, is a check in the amount of $30,000.00 made payable to the Minnesota Environmental Quality Board, which represents the initial 25 percent portion of the Site Permit application processing fee for the Mankato Energy Center.

We understand that the EQB's new rules relating to environmental review at the CON stage, which require the EQB to prepare an environmental report, have been adopted. The new rules also provide for the consolidation of public hearings and environmental review for both the CON and the Site Permit. We believe this Project lends itself to that approach, and we request that the EQB pursue consolidation.

In order to meet our contractual obligations to provide electrical power to Xcel Energy by June 2006, we must start construction by this fall. We have had discussions with your staff about the feasibility of working through the permitting process in time to meet the construction schedule. We appreciate their willingness to work with us and to coordinate their efforts with the MPUC, the Minnesota Department of Commerce, and the Minnesota Pollution Control Agency to process our application as quickly and efficiently as possible.

We look forward to working with you and your staff in the coming months. Please contact Jason Goodwin by phone at 832.476.4463 or by email at jgoodwin@calpine.com if you have any questions or require additional information.

Sincerely,
MANKATO ENERGY CENTER, LLC

James J. Shield
Vice President, Business Development

Enclosures

cc: George Johnson, EQB

Site Permit Application

Mankato Energy Center
Mankato, Minnesota

Docket No. 04-76-PPS CALPINE

Wenck File #1294-01

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March 2004

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1.0 Introduction

1.1 BACKGROUND

The Minnesota Public Utilities Commission ("PUC" or "Commission") approved the resource planning process proposed by Northern States Power Company d/b/a Xcel Energy, in Docket E-002/RP-00-787, *In the Mater of Northern States Power Company's Application for Approval of its 2000-2014 Resource Plan*, Order Approving Xcel Energy's 2000-2014 Resource Plan. A part of that approved process included a solicitation of proposals to increase its supply portfolio by 1,000 megawatts ("MW"). To meet this objective, on December 6, 2001 Xcel Energy issued a Request for Supply Proposals with Power Deliveries Beginning 2005-2009 (the "RFP"). The RFP outlined the baseload and peaking supply needs of Xcel Energy for the period at issue, and encouraged potential bidders to propose any type of resource that they believed would enhance Xcel Energy's supply portfolio beginning in 2005 and extending into the year 2009.

Calpine Corporation ("Calpine")[1] responded to the RFP on March 14, 2002, with a bid of approximately 280 MW baseload capacity (based on winter ambient conditions) and approximately 360 MW in initial peaking capacity (based on winter ambient conditions) with step increases in the peaking portion of the proposal of approximately 180 MW in the latter years of the timeframe set by Xcel Energy in the RFP.

On June 19, 2003, Calpine was notified that it had been selected by Xcel Energy for negotiation of a purchased power agreement ("PPA"). The negotiations, which are expected to be completed in the very near future, contemplate the sale by Calpine and purchase by Xcel Energy of up to 290 MW baseload capacity (based on winter ambient conditions) and 85 MW of peaking

[1] **Calpine is the parent company of Mankato Energy Center, LLC, which is the project company organized to own the Mankato Energy Center. There are places in this Application where Calpine and Mankato Energy Center, LLC are apparently used interchangeably. However, the intent is to be accurate in describing which entity may have been responsible for a certain action.**

capacity (year round availability). The baseload capacity will be generated by a natural gas-fired combined cycle power plant. The peaking capacity will be generated by supplementally firing the duct burners associated with the same source. The portion of the power plant that will supply this electric energy is statutorily exempt from the Certificate of Need process pursuant to Minnesota Statutes 216B.243; 216B.2422, subd.5(c). The PUC agreed with this characterization in its order dated February 6, 2004, *In the Matter of the Application of Calpine Corporation for a Certificate of Need for a Large Electric Generating Facility*, Order Granting Exemptions from Filing Requirements and Limiting Scope (the "Exemption Order").

In order to achieve certain construction and operational efficiencies, conserve resources (land, water, labor, materials, etc.), and meet the expected energy growth needs in Minnesota in a timely manner, Calpine proposes to configure the power plant that will supply power to Xcel Energy larger than would be required solely to satisfy its obligations under the PPA. The power supply obligations under the PPA will be met with a power plant configured with one combustion turbine generator, one heat recovery steam generator, one steam turbine generator, one condenser, one multi-cell cooling tower, and certain other appurtenant pieces of machinery and equipment that are required for a safe and efficient operating power plant in the configuration described.[2] Calpine proposes to add one additional combustion turbine generator and one additional heat recovery steam generator to the facility. The same steam turbine generator, condenser, cooling tower, and appurtenant machinery and equipment used for the supply of Commission-approved power will be used to supply the additional power that is intended for sale to wholesale customers. It is the additional equipment and associated generating capacity (approximately 355 MW (winter) and 325 MW (summer) of capacity) that require a Certificate of Need.[3]

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[2] **The power plant configuration consisting of one combustion turbine generator ("CT"), one heat recovery steam generator {"HRSG"), one steam turbine generator ("ST"), and other appurtenant pieces of machinery and equipment described above is commonly referred to as a "1x1" configuration (meaning one CT/HRSG and one ST) or sometimes as a "1x1x1" configuration (meaning one CT, one HRSG, and one ST).**

[3] **The type of power plant proposed by Calpine is commonly referred to as a "2x1" configuration or sometimes as a "2x2x1" configuration.**

1.2 PROJECT OVERVIEW

Mankato Energy Center, LLC ("Mankato Energy"), a wholly owned subsidiary of Calpine Corporation, proposes to develop, construct, and operate a 2x1 natural gas-fired combined cycle power plant to be known as the Mankato Energy Center ("Facility" or "Project") at a location in Blue Earth County, just north of the current Mankato city limits in Lime Township. Pursuant to the terms of the Joint Resolution for Orderly Annexation between Lime Township and the City of Mankato that was executed on November 12, 1997, once the Facility has received the appropriate permits and approvals, the City of Mankato will annex the land comprising the Facility site.

The Facility, scheduled to be operational by mid-2006, will be capable of generating approximately 655 MW of electric power at summer ambient conditions. This generating capacity includes both baseload capacity (approximately 505 MW) and peaking capacity (approximately 150 MW) to be obtained from power augmentation equipment, i.e., duct firing and steam injection. The operation of the power plant in both baseload and peaking modes is described in more detail in Section 2.

The major equipment associated with the Facility includes the following:

- Two natural gas-fired combined cycle combustion turbine generators capable of using low sulfur distillate oil for a back-up fuel.
- Two heat recovery steam generators each equipped with natural gas-fired duct burners.
- One steam turbine generator/condenser.
- One multi-cell mechanical draft cooling tower.

Natural gas will be delivered to the Facility through a new lateral distribution pipeline to be installed to serve the Facility from the existing Northern Natural Gas interstate pipeline located approximately 3.2 miles to the east of the site. Electricity generated at the Facility will be carried through new overhead transmission line to Xcel Energy's adjacent Wilmarth Substation located 1,000 feet west of the site where the electricity will enter the transmission grid. Mankato

Energy will enter into negotiations with both Northern Natural Gas and MISO to develop interconnection agreements upon approval of the Facility.

1.3 REGULATORY PROCESS

In 1973 the Minnesota Legislature passed the Power Plant Siting Act (Minnesota Statues 116C.51-116C.69) requiring that any person who wants to build a large electric power generating plant or high voltage transmission line is first required to obtain approval from the Minnesota Environmental Quality Board ("EQB") for a specific site for the plant or specific route for the transmission line. The EQB first adopted rules for power plant siting in 1974, and since then, the rules have been amended several times and are now found at Minnesota Rules Chapter 4400. Consistent with state policy, the rules are intended to locate large electric generating facilities in an orderly manner while minimizing adverse human and environmental impacts.

In accordance with the Energy Security and Reliability Act passed by the Minnesota Legislature in 2001 to address anticipated energy shortages in the coming years, the EQB recently amended their rules regulating proposed large energy facilities (power plants of 50 megawatts or more and transmission lines of 100 kilovolts or more) and administration of permits. The new Chapter 4400 rules went into effect on February 17, 2003, and are intended to streamline the environmental review and permitting process for siting new power plants and routing transmission lines to ensure that electric energy needs are met and fulfilled in an orderly, timely, and environmentally sound manner.

1.3.1 Alternative Review

There are provisions in the law (Minnesota Statutes 116C.575) and new rules (Minnesota Rules Chapter 4400.2000--4400.2950) that allow certain projects to be reviewed and approved in a shorter, alternative process than required under the full permitting process. For example under the alternative permitting process: a shorter environmental assessment is required instead of an

environmental impact statement; the applicant does not have to propose any alternative sites to the preferred site; a more informal hearing is required instead of a contented case hearing; and a final decision must be made by the EQB within six months of receiving a complete application as compared to 12 months under the full permitting process. A schematic prepared by the EQB showing the alternative permitting process is included in Appendix A.

Pursuant to Minnesota Rules 4400.2000, Subp.1.B, Mankato Energy's proposed 655 MW (at summer ambient conditions) natural gas-fired power plant qualifies for review under the alternative permitting process because it is a large electric power generating plant that is fueled by natural gas. Mankato Energy provided written notice to the EQB on February 18, 2004 of its intent to submit a site permit application for review under the alternative permitting process as provided for in the Minnesota Rules. This notice was provided in compliance with the requirements of Minnesota Rules 4400.2000, Subp. 2, which requires applicants to provide at least a ten-day notice before submitting an application for a project to the EQB.

1.3.2 Site Permit Application Requirements

In accordance with Minnesota Rules 4400.2100, which define the contents of the application for projects that qualify for the alternative review process, the following general information is included in this site permit application:

- Information on proposed ownership of the facility, permit applicant, and current landowners.
- Alternative sites considered and rejected.
- Description of the facility and all associated equipment including size, type, and cost.
- Engineering and operational design.
- Future site expansion and generating capacity possibilities.
- Identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility.
- Description of the proposed site and environmental setting.

- Effects of the facility on the human environment and natural environment that will be used in preparing the environmental assessment.
- Listing and brief description of federal, state, and local permits that may be required for the project.
- Documentation that a Certificate of Need application has been submitted to the PUC.

1.3.3 Environmental Assessment

Under the alternative review process, the EQB is responsible for preparing the environmental assessment. The environmental assessment will contain information on potential human and environmental impacts associated with the proposed project, and it is the only state environmental review document that is required to be prepared by the EQB. The EQB will determine the scope of the environmental assessment shortly after submittal of the site permit application based the information provided in the application itself as well as input received during a public meeting that will be held by the EQB to solicit comments regarding the scope of the environmental assessment.

Once the environmental assessment has been completed, a public hearing will be held by the EQB to review the document. The public hearing does not need to be conducted by an administrative law judge as is required by the full permitting process, but instead will conducted by EQB staff. Written comments received within ten days after the public hearing will also be considered and included in the record. As stated above, a final decision on the site permit must be made by the EQB within six months from the time the application is accepted, however, the EQB may extend this time limit for up to three months for just cause or upon agreement of the applicant.

1.3.4 Certificate of Need

A Certificate of Need from the PUC is required for all new power plants over 50 MW before the EQB can issue a Site Permit. Questions regarding the need for, and the size, type, and timing of new facilities, are ones that fall within the jurisdiction of the PUC. A project requiring a Site

Permit must first apply for a Certificate of Need with the PUC before submitting a Site Permit application to the EQB. Mankato Energy submitted a Certificate of Need application to the PUC on March 2, 2004 for the additional equipment and associated generating capacity associated with the wholesale power production of the plant (that portion of the Project that is not already statutorily exempt from the Certificate of Need process). A copy of the Certificate of Need application has been provided to the EQB.

Recent amendments to the EQB's environmental review rules addressing the matter of environmental review at the Certificate of Need stage before the PUC for proposed large electric facilities require that the EQB prepare an environmental report (Minnesota Rules 4410.7010 to 4410.7070). The EQB has four months to complete the environmental report from the time a copy of the Certificate of Need application is received. The new rules also allows the PUC and EQB to consolidate the Certificate of Need and site permitting proceedings and hold one public hearing if it is agreed upon by the both parties that consolidation is feasible, more efficient, and may further the public interest.

Furthermore, the new rules also recognize that in the event the applicant for a Certificate of Need also applies to the EQB at the same time for a Site Permit for a specific site and the project qualifies for the alternative review under Part 4400.2000, the EQB may elect to prepare an environmental assessment in lieu of the environmental report required under Parts 4410.7010 to 4410.7070. Mankato Energy is submitting the Certificate of Need and Site Permit applications in a roughly concurrent timeframe (i.e. within a few days) and has requested that the two proceedings be combined and that one environmental review document be prepared by the EQB.

2.0 Project Description

2.1 OWNERSHIP

The proposed Facility will be built, owned, and operated by Mankato Energy Center, LLC ("Mankato Energy"), a wholly owned subsidiary of Calpine Corporation ("Calpine"), an independent power producer.

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

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Midwest Power Region
Calpine Corporation
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Pasadena, Texas 77507
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Email jgoodwin@calpine.com

2.2 PERMITTEE

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

2.3 SIZE AND TYPE

Mankato Energy proposes to build a power plant (the "Facility") capable of producing approximately 655 megawatts of electricity (at summer ambient conditions) using natural gas-fired combustion turbines in a combined cycle configuration. Low sulfur distillate oil will be used as a back-up fuel to ensure uninterrupted operation of the Facility. The Facility will be designed to include two combustion turbine generators, two heat recovery steam generators equipped with natural gas-fired duct burners, one steam turbine generator with associated heat rejection system, and various appurtenant machinery and equipment required for a safe and efficient operating power plant. A simplified process flow diagram for the combined cycle turbines associated with the Facility is shown in Figure 3.

Cooling and process water will be supplied by treated wastewater effluent taken from the municipal wastewater treatment system, located approximately one mile due south of the Facility site on the east bank of the Minnesota River. The municipal wastewater will be treated prior to delivery to the Facility at a new treatment facility that is anticipated to be located on land adjacent to the existing municipal treatment plant. Cooling water and low-volume wastewater will be discharged to the Minnesota River in accordance with applicable discharge limits.

The Facility will be connected by pipeline to the Northern Natural Gas pipeline located approximately 3.2 miles east from the Facility site. The Facility will access the transmission grid via Xcel Energy's Wilmarth Substation located approximately 1,000 feet west of the site.

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

2.4 SITE LOCATION

The proposed Facility site is located just north of the Mankato city limits in Lime Township in Blue Earth County, in the southwest ¼ of Section 31, Township 109N, Range 26W. The site is located within an area zoned for industrial use. It is situated on the southern portion of an old

limestone quarry that has been mined to completion and currently serves as a demolition waste landfill and composting facility owned and operated by the Southern Minnesota Construction Company, Inc. ("SMC"). The site is approximately 25 acres in size. The Facility location is shown in Figures 1 and 2.

The site is located east of U.S. Highway 169, north of U.S. Highway 14, and west of County Road 5 (3rd Avenue). A set of railroad tracks no longer in use runs along the south side of the site. Access to the site is provided from the south off Summit Avenue. Industrial and manufacturing facilities located adjacent to the site include Xcel Energy's Wilmarth Generating Plant, a waste processing company, auto salvage yards, scrap metal operations, a construction company, a U.S. Postal Service mail processing facility, and a household hazardous waste collection site. The closest residential dwelling is located approximately 1,500 feet from the center of the site. The nearest residential areas of Mankato lie more than one-half mile to the south on the other side of U.S. Highway 14.

The City of Mankato and Lime Township entered into a Joint Resolution for Orderly Annexation in 1997, whereby the parties agreed that the City of Mankato would annex areas in Lime Township to be developed for residential, commercial, industrial, and governmental purposes so as to encourage orderly urban development using municipal services in a responsible, controlled, and environmentally sound manner.

2.5 PROPERTY OWNER

Mankato Energy currently holds an option to purchase the site for the proposed Facility. The property is part of a larger parcel of land currently owned by SMC. Mankato Energy anticipates that it will exercise their option with SMC to obtain approximately 25 acres of land once it has received all necessary permits and approvals for the Facility. This parcel includes a portion of a the railroad tracks that runs along the southern end of the site, which is being purchased by SMC and will be sold to Mankato Energy as part of the overall Facility site.

2.6 ALTERNATIVE SITES CONSIDERED AND REJECTED

The parent company of Mankato Energy, Calpine, specializes in the development, construction, and operation of combined cycle natural gas-fired facilities. One element of that specialization consists of identifying areas within the United States that have energy needs. In some instances, this decision is made quite simple when a local utility puts out a request for power supply proposals. This was the case with this Facility; Calpine was selected to negotiate an agreement with Xcel Energy for a portion of the Facility output. In other instances, the search is geared toward identifying areas that have a need for energy and one or more utilities or other load-serving entities that are receptive to contracting long-term for the purchase of electric power. Calpine identified the geographic area served by Mid-Continent Area Power Pool ("MAPP") as a region where additional energy supplies were needed and is currently soliciting other nearby utilities for power sales for the remaining portion of the Facility output.

Once the greater geographic area in which the need for electrical energy was identified, Calpine sought to find a specific location within that geographic region in which to develop a power generating project. Initial screening criteria used in determining the power plant location in Minnesota included the following:

- Proximity to major electric transmission infrastructure, including adequately sized transmission lines and substations.
- Proximity to adequately sized high-pressure natural gas pipeline(s).
- Proximity to adequate water supply (surface water, groundwater, or gray water from a nearby water treatment facility).
- Avoidance of environmentally sensitive areas.
- Community acceptance and support.

Upon completion of the screening evaluation process, Calpine determined that the best location for the Facility was in the Mankato area. In some instances, Calpine considered and rejected certain locations because they did not meet the initial screening characteristics described above.

In other instances, alternative sites were rejected because the advantages offered by the sites located near Mankato were far superior to those alternatives in other parts of Minnesota. Once the preferred location for the Facility was narrowed down to the Mankato area, Calpine conducted a more detailed evaluation of potential sites. In addition to the proposed project site described above, three other potential sites within Lime Township were considered. These alternative sites are shown on Figure 4.

In addition to the initial screening criteria, Calpine evaluated specific criteria listed below in the final site selection process considered important to the success of the project.

- Avoidance or minimization of human and environmental impacts.
- Distance from man-made features such as residential areas, airports, schools, hospitals, campgrounds, parks, and tourist attractions.
- Land availability and landowner agreement.
- Topography.
- Proximity to existing rights-of-way (e.g., railroad easements, roadway shoulders, transmission line rights-of-way, gas pipeline rights-of-way, bike paths, etc.) for off-site lateral connections so as to avoid or minimize new impacts.
- Favorable construction conditions (e.g., adequate site access, avoidance of existing utilities, and minimization of earthwork activities).
- Appropriate site zoning designation.
- Availability of municipal services (sewer and water).
- Consultation with state and local governmental agencies including the EQB, Minnesota Pollution Control Agency ("MPCA"), Minnesota Department of Natural Resources ("DNR"), Blue Earth County, and City of Mankato.

After careful consideration of these more refined siting criteria, the proposed site was determined to be the most suitable location for the Facility. The main reasons for rejecting the other sites were as follows:

- Greater distances from city municipal services (sewer, water, gray water) resulting in

higher utility infrastructure costs. The preferred site is located immediately north the Mankato city limits.

- Higher infrastructure costs to tie into the electric grid. The preferred site is located immediately east of the existing Wilmarth Substation.
- Required rezoning. The preferred site is located in an area currently zoned for industrial use while some of the alternative sites are not.
- Poor site access. The preferred site is accessible from the south via an existing driveway off Summit Avenue that currently serves the SMC demolition waste landfill while access roads would need to be constructed to the other sites. Also, the preferred site has access to a rail spur that may be used to transport heavy equipment and materials.
- Greater potential for environmental impacts based on the above as well as other factors considered.

2.7 ENGINEERING AND OPERATIONAL DESIGN

The Facility will be a combined cycle combustion turbine power electricity generating facility fueled primarily by natural gas. The Facility will have the capacity to generate approximately 655 MW of electricity, at summer ambient conditions, and transmit that electricity to a part of the electrical grid owned by Xcel and controlled by the Midwest Independent System Operator ("MISO").

The Facility will receive natural gas from a local area pipeline (primary fuel supply), distillate oil (secondary fuel supply) and non-bulk chemicals by truck, and electricity for backup power supply from Xcel Energy. The Facility will receive potable water from the Mankato municipal water supply system, and process water from the Mankato wastewater treatment plant ("WWTP").

Major equipment to be installed at the Facility will include:

- Two natural gas-fired combined cycle combustion turbine generators, capable of using low sulfur distillate oil as a secondary fuel.
- Two heat recovery steam generators, each equipped with natural gas-fired duct burners.
- One steam turbine generator.
- A multi-cell mechanical draft evaporative cooling tower.
- Certain other appurtenant pieces of machinery and equipment required for a safe and efficient operating power plant in the configuration described.

The proposed layout of the Facility is presented in Figure 5. Flow diagrams for the fuel handling process and plant water usage are provided in Figures 3 and 6. The Facility fuel supply, major equipment, and transmission considerations are discussed in more detail below.

The Facility potentially will generate base load, intermediate load and peak load electricity. The Facility's total electricity generating capacity of 655 MW will be composed of approximately 505 MW base load capacity at summer ambient conditions and 150 MW peak load service at summer ambient conditions. At winter ambient conditions, the Facility will have approximately 580 MW base load capacity and 150 MW peaking capacity.

The 505 MW base load capacity of the Facility will be generated from the two combustion turbine-driven generators and the single steam turbine-driven generator. The steam turbine receives steam from the heat recovery steam generators ("HRSGs"), which use the waste heat from the combustion turbine exhaust streams to produce steam. Supplemental firing of the duct burners associated with the HRSGs will generate the 150 MW peak load capacity. This combined cycle plant will offer a large efficiency advantage over a conventional simple-cycle plant, which relies only on combustion turbine-driven generators. Injecting steam into the combustion turbines can further augment the peak load generating capacity.

2.7.1 Primary Fuel Supply: Natural Gas

The primary fuel for the Facility will be natural gas. Natural gas will be delivered through a new lateral pipeline approximately 3.2 miles in length connecting the Facility to a branch of the Northern Natural Gas Company mainline, just downstream of Northern Natural Gas Company's interconnection with Northern Border Gas Company at Welcome, Minnesota. At this connection point, Northern Natural Gas Company currently receives up to 175 million standard cubic feet per day ("MMscf/day"). This segment of the Northern Natural Gas Company's system is further reinforced by connections with their other north-south lines that run between Ventura and the Minneapolis-St. Paul market. Due to the Facility's close proximity to this existing large volume gas pipeline system, construction of the Facility is not expected to require significant investment in new pipeline facilities.

The Facility will have a peak daily gas requirement of approximately 135 MMscf/day at the peak winter firing condition. On average, the Facility is expected to use about 32,500 MMscf per year, or an average of 89 MMscf/day. By comparison, an average residential customer consumes approximately 0.1 MMscf/day.

Designing the Facility with natural gas as the primary fuel source will yield significantly lower impacts to the environment than using oil as a primary source. For example, emissions of sulfur dioxide ("SO_2"), carbon monoxide ("CO"), nitrogen oxides ("NO_x"), and particulate matter ("PM") will all be lower because of the use of natural gas as the primary fuel instead of fuel oil. Water use will also be slightly lower. However, during periods when gas supplies in Minnesota are constrained because of high demand or a disruption of pipeline deliveries, the combustion turbines will have the capability to switch to low sulfur distillate fuel oil as an alternate fuel for limited periods.

2.7.2 Secondary Fuel Supply: Low Sulfur Distillate Fuel Oil

Above ground storage tank(s) will be installed at the Facility to store low sulfur distillate fuel oil as a back-up fuel supply during periods when natural gas is not available and the Facility must

generate and supply electricity to the grid. The storage capacity of the tank(s) will be as much as 900,000 gallons, which represents approximately 36 hours of uninterrupted electricity generation at the Facility when operating both combustion turbines at baseload. Mankato Energy has agreed to limit the Facility's use of the fuel oil to 875 operating hours per year per combustion turbine (based on an 12-month rolling average).

The fuel oil storage tank(s) will be located in the southwest portion of the Facility and will be constructed with a tank within a tank design, which is designed to contain 110 percent of the tank's working volume and will meet the compliance requirements of all applicable state aboveground storage and federal SPCC regulations. The low sulfur distillate fuel oil will be delivered to the Facility via tanker truck. The tanker truck unloading area will also be equipped with secondary containment in accordance with federal SPCC requirements. The incorporation of low sulfur distillate fuel oil capability increases the operating flexibility of the Facility in that having the ability to switch fuel sources can mitigate the restrictions or interruptions of natural gas supplies.

2.7.3 Natural Gas-fired Combustion Turbines

The Facility will be equipped with two natural gas-fired combustion turbines located outdoors in the central portion of the Facility. The combined cycle combustion turbines will be Siemens-Westinghouse 501FD model turbines and will have an output of approximately 290 MW each (combined cycle mode at winter ambient conditions). Each combustion turbine generator will be 3,600 rpm, 18kV or 15 kV, three phase, 60 Hz design. The maximum firing capacity of each combustion turbine will be 2,040 million British thermal units per hour ("MMBtu/hr") based on higher heating value ("HHV") of the fuel while firing natural gas and 2,052 MMBtu /hr (HHV) when firing on fuel oil (both ratings at winter ambient conditions). The combustion turbines also are capable of injecting steam into the combustion chamber to provide additional output during periods of large electrical power demand. Steam augmentation is limited to 1,500 hours per year per turbine.

Ambient air will be drawn into the combustion turbine compressor, compressed, and directed to the combustion chamber where natural gas is introduced, mixed with the compressed air, ignited and burned. The turbines are equipped with dry low-NO_x ("DLN") combustors, which are used when firing natural gas, as well as water injection equipment that is used during periods of fuel oil firing. Each of these systems is used to control emissions of NO_x within the combustion turbine.

The resulting hot gases from the combustion chamber will be directed to the turbine section where they will expand across a series of turbine blades, causing those blades to rotate. The rotating blades will turn a shaft connected to an electric generator. Each combustion turbine generator will then convert the mechanical energy from the rotating combustion turbines into electrical energy. Electricity from the combustion turbine generators will be transferred along above ground electrical bus duct to the transformer yard.

2.7.4 Heat Recovery Steam Generators

In this "combined cycle" plant, hot gases exhausted from each combustion turbine are directed to a heat recovery steam generator. The heat in the exhaust gas, which would otherwise be directed (wasted) up the exhaust stack, converts water that flows through tubes in the HRSG into steam. The steam that is produced in each of the two HRSGs is directed to the single steam turbine where it passes through a series of blades that rotate the steam turbine generator producing additional electric power. Steam exiting the steam turbine is condensed into water and returned to the HRSG for recirculation. The two HRSGs will be located outdoors and situated in line with (and adjacent to) the two natural gas-fired combustion turbines.

Each HRSG will be designed to supply high-pressure steam to the steam turbine at a sliding pressure between 1,200 psia and 2,200 psia at 1,050 °F. Inside the HRSGs are tubes containing water, which the combustion turbine exhaust gases heat into steam. The HRSGs are multiple-pressure, reheat-type steam generators capable of increased steaming output during periods of higher ambient temperature. The pressure sections of each HRSG consist of an economizer,

evaporator and superheater. Each HRSG will also be equipped with a reheater to improve cycle efficiency further.

The HRSGs will be equipped with natural gas-fired duct burners used for supplemental duct firing of the combustion turbine exhaust gases, to provide additional peaking capacity at the steam turbine. Each duct burner incorporates a low-NO_x burner technology and has a maximum heat input rate of 800 MMBtu/hr.

A selective catalytic reduction system ("SCR") will be used in each HRSG downstream of the duct burners to reduce NO_x emissions from the combustion turbines and duct burners. An oxidation catalyst module will also be used in each HRSG to reduce emissions of CO and volatile organic compounds ("VOCs").

The exhaust gas from each HRSG will be directed to an exhaust stack. Exhaust stack emissions will comply with the federally enforceable air emissions permit to be issued by the MPCA.

Anhydrous ammonia will be used in each of the Facility HRSGs as an SCR reagent. Ammonia will be distributed to both HRSGs from two aboveground storage tanks, each with a 12,000-gallon storage capacity. The ammonia tanks will be situated in the northeastern portion of the Facility, west of the northern extent of the cooling towers. Ammonia will be delivered to the tank via tanker truck and will be transferred from the main storage tank to each of the ammonia injection skids situated immediately north of each HRSG.

2.7.5 Steam Turbine Generator

The Facility will be equipped with one condensing steam turbine, one hydrogen-cooled steam turbine generator, and one associated steam turbine cooling system. The steam turbine generator will be equipped with one heat rejection system. The condensing steam turbine and the steam turbine generator will be placed in a weather enclosure.

The steam turbine generator will be 3,600 rpm, 18kV, three phase, 60 Hz design, and will convert mechanical energy from the rotating steam turbine into electrical energy. The steam turbine will have the capacity to generate approximately 330 MW of additional electrical power. Electricity from the steam turbine generator will be transferred along aboveground electrical bus duct to the transformer yard.

The steam turbine will be a multiple admission, reheat, condensing turbine designed for sliding pressure operation. The steam turbine will have its own lube and control oil systems, sized to provide additional peaking capacity.

The high-pressure portion of the steam turbine will receive high-pressure superheated steam from the two HRSGs, and then exhaust steam into the HRSG reheat section. Reheated steam will be supplied to the intermediate pressure turbine section, which exhausts steam into the low-pressure turbine section. The low-pressure turbine receives low-pressure superheated steam, and exhausts steam into the condenser. Steam is then condensed into water, pumped to pressure and returned to the HRSG for recirculation.

The steam turbine condenser converts exhausted steam from the steam turbine back into liquid water so that it can again be returned to the HRSGs to be converted into steam. The steam turbine condenser receives fresh demineralization water, cold water from the cooling tower and exhausted steam from the steam turbine.

In the condenser, heat is transferred from the exhausted steam to the cooling tower cool water; the resulting warm water is then returned to the cooling tower. Because the steam turbine generator will use steam in a closed cycle, no additional air pollutants will be generated from this portion of the Facility.

2.7.6 Raw Water Treatment System

Raw water will be supplied to the Facility for use as process water and non-contact cooling water. The raw water supply source will be treated wastewater effluent or "gray water" from the

City of Mankato's WWTP, located approximately one mile due south of the Facility on the east bank of the Minnesota River. Please refer to Figure 6 for a water usage flow diagram for the Facility showing estimated flow values for the various water streams for both annual average and summer average (maximum conditions).

The Facility will draw about 2.58 million gallons of water per day ("MGD") on average and about 4.88 MGD at maximum conditions from the Mankato WWTP. Prior to conveyance and use at the Facility, effluent will be further treated in a new treatment system to be constructed adjacent to the Mankato WWTP (proposed to be installed by Mankato Energy). The new gray water treatment system will provide additional filtering and chlorination of the gray water in order to meet the Facility's process water quality needs. Additionally, a storage pond will be constructed at the WWTP to provide a limited backup supply of cooling water for the Facility in the unlikely even that the WWTP remains off-line for a limited period

Gray water from the Mankato WWTP will be piped directly to the Facility's approximate 1.5 million gallon capacity above ground raw water storage tank, situated in the southeastern portion of the Facility, west of the cooling towers. Water from the raw water storage tank will be transferred as needed to the cooling tower and the HRSG quench water system. If required for reliable service, a small service water tank (~10,000 gallons) may be installed to store potable water prior to conveyance to the reverse osmosis ("RO")/demineralizer and service water system.

The Facility's service water system will supply water to all general plant water use activities at the Facility such as hose bibs, pump sealing water, and eye wash stations. The Facility's service water system will use approximately 10,000 gallons per day of potable water. Approximately 580,000 gallons per day of gray water will be discharged as quench water to the HRSG blowdown tank.

2.7.7 Demineralized Water Storage Tanks

The Facility will have two above ground storage tanks for demineralized water that are situated outdoors in the central portion of the Facility. These storage tanks will each have a capacity of approximately 200,000 gallons. The storage tanks will be connected to the circulating water lines. Potable water from the City of Mankato distribution system will be pumped to the RO/demineralization system for processing, then to the demineralized water storage tanks. Demineralized water from these two tanks will be used in the Facility for steam cycle makeup (HRSG and auxiliary boiler), as well as other purposes including combustion turbine on-line and off-line compressor washes, steam injection, water injection for NO_x control and inlet air fogging. The off-line compressor wash water generated from washing the combustion turbines to remove particulates accumulated on the compressor blades will be collected and disposed off-site. All other uses of demineralized water will result in water emitted to the atmosphere as vapor.

2.7.8 Cooling Tower

The Facility will be equipped with a multi-cell evaporative cooling tower, situated along the eastern side of the Facility property. The cooling tower will cool hot water from the steam turbine condenser and other heat loads, such as generators and lube oil systems, and return the cooled water for reuse. The cooling tower will receive gray water at a rate of 2.50 MGD on average and 4.86 MGD at maximum conditions to replace water lost to evaporation and blowdown from cooling operations. The cooling tower will also receive small quantities of recycled water from the oil/water separator and the HRSG blowdown tank.

Fans located at the top of each cooling tower unit will maintain a draft within the cooling tower. The heated cooling water from the condenser will cool as it falls through the baffles from the top of the cooling tower to a basin at the bottom. Approximately 1.95 MGD (average) and 3.72 MGD (maximum) of gray water will be emitted to the atmosphere from the cooling towers through evaporation. Evaporative losses from the cooling towers will increase the dissolved solids concentration of the cooling tower water. Due to the nature of this type of equipment, a

portion of the total dissolved solids contained in the cooling water is emitted in the form of particulate matter. Estimated air pollutant emission rates from the Facility cooling tower are addressed in Section 5.

The cooling tower will operate with a water circulation rate of approximately 180,000 gallons per minute. The cooling tower will have a liquid drift rate of approximately 0.0005 percent of the water circulation rate, which will be achieved through the use of high efficiency (low-drift) mist eliminators.

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

The cooling tower will discharge water as cooling tower blowdown to maintain the appropriate quality of water in the cooling tower system. The cooling tower blowdown, which will be directed to the Minnesota River under a National Pollution Discharge Elimination System ("NPDES") wastewater discharge permit, will be treated onsite with a phosphorus removal and dechlorination system prior to discharge to the river.

2.7.9 Wastewater Collection/Treatment Systems

Process wastewater will be collected and treated at the Facility prior to discharge to the Minnesota River as authorized under an MPCA-issued NPDES wastewater discharge permit. Approximately 0.68 MGD (average) and 1.44 MGD (maximum) of wastewater will be generated from the combination of the following in-plant sources:

- Cooling tower blowdown (85-95 percent).
- RO/demineralization system (5-15 percent).

Gray water from the Mankato WWTP that is treated and routed to the Facility would otherwise be discharged directly to the Minnesota River under the Mankato WWTP's existing NPDES permit. Because this gray water will be further treated prior to being piped to the Facility, and because the wastewater generated from the Facility will be treated to remove phosphorus and chlorine prior to discharge from the Facility (as discussed above), it is anticipated that phosphorus and total suspended solids loads to the Minnesota River will decrease as a result of the Facility's planned water use and discharge.

Two wastewater sump and pump systems will be installed at the Facility in outdoor locations. One of the sumps will be on the west side of the Facility located near the step up transformer containment basins. The other sump will be located east of Combustion Turbine No. 2. These wastewater sump and pump systems will drain to the Facility oil/water separator.

The oil/water separator will be situated west of the cooling tower and approximately southeast of the cooling tower chemical feed enclosure. Water from the oil/water separator system will be recirculated into the cooling tower. Oil/sludge from the oil/water separator system will be collected and shipped off-site for appropriate disposal as a waste material.

The Facility will be equipped with a blowdown tank, which will receive discharge water from the HRSG and quench water from the raw water tank. Approximately 98 percent of the water from the blowdown tank will be recirculated to the cooling towers, and the resulting 2 percent will be flash-evaporated to the atmosphere.

Stormwater generated at the Facility will be managed in one of two ways. Stormwater runoff that comes into contact with the outdoor steam generator step-up transformer pad and combustion turbine pads, where there is potential for pollutant contamination by oils and other chemicals from pumps and motors, will be confined within curbed areas and drain to two area wastewater sump pump systems. The stormwater that is collected in the wastewater sumps will then be pumped to the Facility's oil/water separator and recycled into the cooling tower make-up water system.

Stormwater runoff from non-process areas of the Facility will be routed to the on-site stormwater detention pond that will discharge to the existing drainage ditch along the east side of the site that flows into the Minnesota River. Stormwater discharges from the site and detention pond will be regulated under an NPDES general stormwater discharge permit and conditional use permit.

Domestic wastewater generated from the Facility (i.e., bathrooms and sink areas in the administrative building and water treatment building) will be discharged directly to the City of Mankato sanitary sewer system. This discharge will be authorized by the City of Mankato and subject to any appropriate discharge limits and monitoring requirements.

2.7.10 Other (Ancillary) Structures/Buildings

Certain other pieces of machinery and equipment that are required for a safe and efficient operating power plant include:

- Auxiliary boiler.
- Emergency generator.
- Fire suppression systems, including a diesel-fueled fire pump.
- Fuel supply systems, consisting of a natural gas conditioning system and a distillate fuel oil storage and handling system.
- Steam supply piping.
- Plant electrical systems.
- Plant buildings.

2.7.10.1 Auxiliary Boiler

There will be one auxiliary boiler installed at the Facility to provide steam for sparging HRSG drums, condenser hotwell, and cooling tower basin to prevent freezing so that the Facility can remain in ready-to-start status throughout the year. The auxiliary boiler will only run when the plant is offline; even then, auxiliary boiler operation is likely only in the winter. The auxiliary

boiler will be situated in the north-central portion of the Facility, just north of the northern combustion turbine and HRSG.

The auxiliary boiler will receive water from the demineralized water tanks as part of the Facility's demineralized water system. Water discharged from the auxiliary boiler will be piped to its blowdown tank and ultimately the cooling tower.

The auxiliary boiler will be capable of burning natural gas at a maximum firing capacity of 70 MMBtu/hr. The auxiliary boiler will not require a backup fuel supply such as low sulfur distillate fuel oil. A 100-foot high exhaust stack will vent exhaust gas from the auxiliary boiler.

2.7.10.2 Emergency Generator

The Facility will be equipped with a 1,850 horsepower diesel fuel-powered electric generator able to produce the relatively small amount of electrical power required to provide power to in-house critical components in the event of a loss of station power. The emergency generator has a maximum heat input capacity of 12.2 MMBtu/hr, and will operate no more than 300 hours per year.

The emergency generator will be equipped with two skid-mounted 2,000-gallon capacity diesel fuel tanks. Secondary containment will be provided for the diesel fuel tanks. The emergency generator will be situated in the western portion of the Facility, immediately south of Combustion Turbine Generator Step-up Transformer No. 2.

2.7.10.3 Fire Suppression Systems

The Facility will be equipped with one centrifugal electric pump and one back-up diesel driven fire pump, if it is determined that the City of Mankato's water supply system will not be able to supply adequate flow to supply an underground fire water header. The header will supply water to yard hydrants and installed sprinkler deluge systems. A jockey pump will maintain water pressure in the firewater distribution header.

The combustion turbine enclosures will be equipped with a carbon dioxide fire suppression system. The low sulfur distillate fuel oil tank will be equipped with a foam suppression system. The low sulfur distillate fuel oil unloading station will be equipped with foam nozzle and hose stations for use in fire-fighting activities.

A 290-horsepower diesel engine-driven firewater pump will only be operated in the event of a fire and loss of power to the electric motor-driven firewater pump. The firewater pump will be equipped with a 300-gallon capacity diesel fuel tank. Secondary containment will be provided for the diesel fuel tank. The diesel engine-driven firewater pump has a maximum heat input capacity of 2.0 MMBtu/hr and will operate no more than 300 hours per year.

2.7.10.4 Plant Buildings

There will be an administrative/maintenance/warehouse/control building on the southern-most portion of the site. A parking lot for employees and visitors will adjoin the administrative building to the east and will be composed of one alley way and approximately 20 parking stalls.

The water treatment building will be situated just north of the administrative building and employee parking lot. The water treatment building will contain the sample panel and lab, cycle chemical feed, electrical switchgear and motor control centers, RO/demineralizer system and redundant air compressors and dryers. A sump and pump that discharges to the cooling tower will be situated in the outdoor area south of the water treatment building.

The steam turbine generation building will be situated immediately north of the administrative building and will house the steam turbine, the hydrogen cooled steam turbine generator, steam turbine auxiliary skids, condenser, and condensate pumps.

2.7.11 Transformers

All electricity generated from the two combustion turbine generators and the steam turbine generator is transferred to generator step-up transformers (one for each generator). The generator step-up transformers will increase voltage from 18kV (steam turbine) or 15 kV (combustion turbine) to either 345 kV or 115 kV. An ISO phase bus duct will be used to transfer electricity from the generators to the generator step up transformers. Auxiliary transformers will be installed to step down the combustion turbine generators 15 kV output to 4.16 kV. The 4.16 kV power will be used to supply the Facility's auxiliary load.

2.7.12 Switchyard

The switchyard will be a 75-feet by 485-feet area situated along the west edge of the Facility property. The switchyard will consist of a high-side breaker and disconnect switch for each generator unit connected to a dead-end structure. Xcel will connect transmission lines to these dead-end structures to transport the high voltage electricity to the existing Wilmarth substation. The interconnection will consist of two separate voltages, 345 kV and 115 kV.

2.7.13 Transmission

The Facility will transmit electricity from the switchyard through dedicated overhead transmission lines extending due west from the site to Xcel Energy's Wilmarth Station for distribution within MAPP. The substation will be expanded on the north side to accommodate the interconnection. The approximate length of the transmission lines is 1,000 feet and they will be contained entirely on Xcel Energy's property.

2.8 COST ESTIMATE AND DESIGN LIFE

The estimated cost of the Facility based in preliminary engineering estimates and evaluation of market conditions is $240 million. This includes design and engineering, procurement of

equipment, site preparation, building construction, equipment installation, plant start-up and testing, and other costs associated with development and construction of the Facility. The Facility is anticipated to have a useful life of at least 30 years.

2.9 FUTURE SITE EXPANSION AND GENERATING CAPACITY POSSIBILITIES

The proposed Facility will be constructed on an existing industrial site and will be designed as a stand-alone facility to generate 655 megawatts (at summer conditions) of electricity for export and sale to Xcel Energy and other customers. While there are no plans for future expansion of the Facility to increase electrical output, Mankato Energy may elect to build the Facility in stages. In such event, the construction of the first combustion turbine, the first HRSG, and the steam turbine, along with all associated machinery and equipment, would commence immediately. The second combustion turbine and the second HRSG would be installed at a future date.