Exhibit 9

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September 25, 2009

Via Email and U.S. Mail
Weyman Lee,
Senior Engineer
Bay Area Air Quality Management District
939 Ellis Street,
San Francisco, California 94109

Re: **Addendum to Comments Submitted Concerning Russell City Energy Center (RCEC) Application No. 15487 re Additional SOB**

Dear Weyman:

On behalf of Chabot-Las Positas Community College District, this is to add as an addendum to our earlier comments submitted on September 16, 2009 the following additional observations that were inadvertently omitted.

Under section (B), pp. 43-46, of the Additional SOB, the Air District states the following:

> The Air District has considered this issue further in light of these comments and has concluded that requiring a urea SCR system over an ammonia system would not be the most appropriate BACT alternative. Although urea substitution could reduce the potential for accidental ammonia releases, the Air District has found that it would involve offsetting negative environmental impacts in the form of increased emissions of formaldehyde, a hazardous air pollutant and toxic air contaminant. The Air District reviewed data from a similar facility in Sumas, Washington, which demonstrated that urea injection (as opposed to the use of ammonia) resulted in a nearly five-fold increase in formaldehyde emissions.[fn]

To draw this conclusion, the Air District relies on the communications from the applicant Calpine set forth in footnote 85, page 45, citing to "Valid Results, Inc., test report for June 13, 2002, EPA Method 316 Source Test (0.226 tpy formaldehyde emissions with urea); email message from Brian Fretwell to Barbara McBride, Calpine, March 4, 2009 (prior test without urea was 0.049 tpy formaldehyde emissions)."

To reject urea, however, due to formaldehyde emissions, based on one set of tests, is erroneous. The formaldehyde emissions can be avoided by using liquid urea. Formaldehyde is present only in the coating on the solid urea pellets. From what we understand, urea can be purchased as a 50% to70% solution and the solution does not contain formaldehyde. In fact, SNCR systems normally use 50% urea solution. This completely eliminates the formaldehyde.

The first step in converting solid urea to ammonia is to transfer it from dry storage to a dissolver tank where it is mixed with heated de-ionized water to make up a urea solution of 40% to 50%. (Spencer et al. 2001.) By importing urea solution, this initial step can be eliminated, offsetting a portion of the increase in transportation cost.

Although the new PM10 BACT limit, page 51, is a step in the right direction, it should be lower. The Blyth facility, using the same turbine, has a lower PM10 BACT limit.

We also want to bring to your attention that Condition No. 24, limiting sulfuric acid mist to 7 ton/yr in any twelve-month period, we understand as a practical matter is not enforceable.

The permit does not identify the test methods that will be used for annual stack testing. This is particularly critical for PM10 and PM2.5, as the magnitude of the emissions is determined by the method used to measure them. Similarly, the standard sulfuric acid mist test methods are known to be inaccurate. Also not verified is whether the SAM levels can be detected as low as 7 ton/yr.

Additionally, given the District's nonattainment status for PM2.5, LAER for the cooling towers should be dry cooling.

Your attention in this matter is greatly appreciated.

Sincerely,

Jewell J. Hargleroad

Cc: (Via Email Only)
Golden Gate Law School Clinic, Helen Kang
Earthjustice, Paul Cort
Communities for A Better Environment

Exhibit 10

PM2.5 PSD SOURCE IMPACT ANALYSIS

(Revised July 30, 2009)

For the:

Russell City Energy Center Draft Prevention of Significant Deterioration (PSD) Permit

Prepared for:

Russell City Energy Company, LLC.

Prepared by:

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PM2.5 Source Impact Analysis

Localized cumulative source impacts from the Russell City Energy Center (RCEC) were assessed for particulate matter with an aerodynamic diameter of 2.5 microns or less (PM2.5). The cumulative multisource modeling analysis focused on the proposed RCEC project combined with mobile PM2.5 emissions from Highway 92, located just south of the project site, along with PM2.5 emissions from permitted sources within six (6) miles of RCEC. The analysis demonstrates that the emissions from RCEC will not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) for PM2.5. If required, it would also demonstrate that the emissions from RCEC would not result in any exceedance of the lowest of EPA's proposed Class II increments for PM2.5. Further, it reviews the results of RCEC's earlier Class I impacts analysis to conclude that no impacts greater than the lowest of EPA's proposed Class I significant impact levels (SILs) are expected in either of Point Reyes National Seashore or Pinnacles National Monument.

1. Regulatory Context. This analysis was undertaken in response to the April 24, 2009 decision of the Administrator of the U.S. Environmental Protection Agency (EPA), Lisa P. Jackson, to grant a petition for reconsideration brought by EarthJustice on behalf of the Sierra Club and Natural Resources Defense Council concerning specific provisions in EPA's May 16, 2008 rule, *Implementation of New Source Review (NSR) Program for Particulate Matter Less than 2.5 Micrometers (*PM2.5*)*, 73 Fed. Reg. 28321. In that decision, Administrator Jackson said that she intends to repeal the "grandfathering provision concerning the continued use of the PM10 Surrogacy Policy" for those federal PSD permit applicants completed prior to July 15, 2008 (as codified at 40 CFR 52.21(i)(l)(xi)) because it had been promulgated without public comment. She also stayed the effectiveness of this provision for three months pending consideration.

In its December 2008 *Statement of Basis for Draft Amended Federal Prevention of Significant Deterioration Permit for RCEC* (*Statement of Basis*), the Bay Area Air Quality Management District (Air District) relied upon the PM10 Surrogacy Policy for purposes of demonstrating compliance with the requirement to conduct an air quality impacts analysis (AQIA).[1] As a consequence of Administrator Jackson's April 24, 2009 decision, that analysis would no longer satisfy federal PSD requirements with respect to PM2.5.

2. PSD Source Impact Analysis. Under EPA's PSD regulations, an applicant must conduct a "source impact analysis", which demonstrates that "allowable emission increases from the source in conjunction with all other applicable emissions increases or reductions (including secondary emissions), would not cause or contribute to air pollution in violation of: (1) Any NAAQS in any region; or (2) Any applicable maximum allowable increase over the baseline concentration in any area." 40 CFR § 52.21(k).

Subparagraph (1) is required to assure that the source's emissions will not cause a violation of the NAAQS, which, in this case, consist of the 24-hour and annual PM2.5 standards of 35 $\mu g/m^3$ and 15 $\mu g/m^3$, respectively. Subparagraph (2) is the "increment consumption analysis", which assures that, in those locations currently meeting the federal NAAQS (*i.e.*, those deemed "attainment" or "unclassifiable"), the concentration

[1] *See* Statement of Basis, at 17-18, 86-88.

of a given pollutant cannot increase by an amount greater than the "maximum allowable increase" specified by the Clean Air Act and/or the PSD regulations for the particular pollutant.

3. Role of Significant Impact Levels. For purposes of the PSD program, EPA has traditionally applied "significant impact levels" ("SILs") as a *de minimis* value, which represents the offsite concentration predicted to result from a source's emissions that does not warrant additional analysis or mitigation.[2]

If a source's modeled impact at any offsite location exceeds the relevant SIL, the source owner must then conduct a "multi-source" (or "cumulative") air quality analysis to determine whether or not the source's emissions will cause or contribute to a violation of the relevant NAAQS or applicable PSD increment.

While EPA has not promulgated any final SILs or PSD increments for PM2.5 at this time, in 2007, EPA proposed three options for establishing PM2.5 SILs and increments. *September 21, 2007 Proposed Rule*, 72 Fed. Reg. 54112. As a conservative measure, RCEC applied the lowest (*i.e.*, most stringent) of each of the three proposals for both the Class II and Class I SILs and increments, as shown in Table 1 below.

Table 1
Lowest of Proposed PSD Ambient Significance Levels and Increments

Pollutant/ Avg. Period		Class II SIL ($\mu g/m^3$)	Class II Increment ($\mu g/m^3$)	Class I SIL ($\mu g/m^3$)	Class Increment ($\mu g/m^3$)
PM2.5	- 24-hour	1.2	9	0.07	2
	- Annual	0.3	4	0.04	1

4. NAAQS Compliance Demonstration. To demonstrate that the emissions from the proposed RCEC will not cause or contribute to a violation of the PM2.5 NAAQS, a multi-source cumulative modeling analysis was conducted in accordance with EPA

[2] *See, e.g., Prevention of Significant Deterioration (PSD) for Particulate Matter Less than 2.5 Micrometers (PM2.5) – Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC); Proposed Role*, 72 Fed. Reg. 54112, at 54138 (September 21, 2007) (hereinafter, "*September 21, 2007 Proposed Rule*") ("Based on EPA interpretations and guidance, SILs have also been widely used in the PSD program as a screening tool for determining when a new major source or major modification that wishes to locate in an attainment or unclassifiable area must conduct a more extensive air quality analysis to demonstrate that it will not cause or contribute to a violation of the NAAQS or PSD increment in the attainment or unclassifiable area."); 72 Fed. Reg. at 54139 ("The EPA considers a source whose individual impact falls below a SIL to have a *de minimis* impact on air quality concentrations. Thus, a source that demonstrates its impact does not exceed a SIL at the relevant location is not required to conduct more extensive air quality analysis or modeling to demonstrate that its emissions, in combination with the emissions of other sources in the vicinity, will not cause or contribute to a violation of the NAAQS at that location.")

requirements[3] This analysis considered both the existing background concentrations, as established by ambient monitoring data,[4] and the contribution from additional sources, which might not be reflected by the monitoring data, but could interact with the facility's potential impacts.

5. Preconstruction Monitoring Data. EPA's PSD regulations require an applicant to provide preconstruction monitoring data for purposes of use in the Source Impacts Analysis.[5] However, a source is exempt from this requirement if its modeled impact in any area is less than pollutant-specific "significant monitoring concentrations" ("SMC"), which EPA has generally established as five times the lowest detectable concentration of a pollutant that could be measured by available instrumentation.[6] In its *September 21, 2007 Proposed Rule*, EPA proposed three options for establishing PM2.5 SMCs, as shown in the following Table 1A.

TABLE 1A[7]
EPA's Proposed Significant Monitoring Concentrations for PM2.5

Option Number	Basis	Proposed Level
1	5-times lowest detectable 24-hour average concentration for PM2.5 (2.0 µg/m^3) (40 CFR Part 50, App. L, § 3)	10 µg/m^3
2	Existing PM10 SMC (10 µg/m^3), times ratio of PM2.5 to PM10 emissions (0.8)	8.0 µg/m^3
3	Existing PM10 SMC (10 µg/m^3) times ratio of PM2.5 24-hr NAAQS to PM10 24-hr NAAQS (0.233)	2.3 µg/m^3

[3] *Guideline on Air Quality Models*, 40 CFR Pt. 51, App. W, § 7.2.1.1.a.The PSD regulations require that all "estimates of ambient concentrations" must be based "on applicable air quality models, data bases, and other requirements specified in appendix W of part 51 of this chapter (*Guideline on Air Quality Models*)." 40 CFR § 52.21(l).

[4] *See Guideline on Air Quality Models*, 40 CFR Pt. 51, Appendix W (App. W), § 7.2.1.1.a. According to Appendix W, "[t]ypically, air quality data should be used to establish background concentrations in the vicinity of the source(s) under consideration". *Id*. § 8.2.1.b For comparison with the 24-hour PM2.5 NAAQS, the background concentration is based on the average of the 98th percentile 24-hour values measured over the last three years of available data. *Id*., § 10.1.c. For the annual PM2.5 NAAQS, the background is established by the three year average of the annual averages.

[5] *See* 42 U.S.C. § 7475(e)(2); 40 CFR § 52.21(m)(1).

[6] *See September 21, 2007 Proposed Rule*, 72 Fed. Reg. at 54141. ("The EPA promulgated values that represented five times the lowest detectable concentration in ambient air that could be measured by the instruments available for monitoring pollutants… The EPA chose the factor of five after reviewing test data for various methods and considering instrument sensitivity, potential for sampling error, instrument variability, and the capability to read recorded data.")

[7] *Id*.

Even if a source's potential impacts exceeds the corresponding SMC, and the applicant must therefore provide preconstruction monitoring data as part of its Source Impact Analysis, that does not necessarily mean the applicant must install and operate a new monitor at the project site. Rather, according to EPA guidance, an applicant may satisfy the preconstruction monitoring obligation in one of two ways[8]: (i) Where existing ambient monitoring data is available from representative monitoring sites, the permitting agency may deem it acceptable for use in the Source Impacts Analysis;[9] or (ii) where existing, representative data are not available, then the applicant must obtain site-specific data.[10]

As a general matter, the permitting agency has substantial discretion "to allow representative data submissions (as opposed to conducting new monitoring) on a case-by-case basis."[11] In determining whether existing data are representative, EPA guidance has emphasized consideration of three factors: monitor location, data quality and currentness of the data.[12] The permitting agency also may approve use of data from a representative "regional" monitoring site for purposes of the NAAQS compliance demonstration.[13]

While the maximum offsite impact modeled to occur from RCEC (4.86 ug/m^3) is below two of EPA's proposed Significant Monitoring Concentrations ("SMCs"), it would exceed the lowest of the three proposed SMCs. Accordingly, RCEC has proposed existing monitoring data from nearby Fremont, CA to satisfy the preconstruction

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[8] *See Ambient Monitoring Guidelines for Prevention of Significant Deterioration, U.S. EPA Office of Air Quality Planning and Standards*, EPA-450/4-87-007, May 1987 ("*PSD Monitoring Guidelines*"), at § 2.1. ("It should be noted that the subsequent use of 'monitoring data' refers to either the use of existing representative air quality data or monitoring the existing air quality.")

[9] *New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Area Permitting*, Draft 1990 ("*Draft NSR Workshop Manual*"), at C.18. ("Once a determination is made by the permitting agency that ambient monitoring data must be submitted as part of the PSD application, the requirement can be satisfied in one of two ways. First, under certain conditions, the applicant may use existing ambient data. To be acceptable, such data must be judged by the permitting agency to be representative of the air quality for the area in which the proposed project would construct and operate.")

[10] *Id.*, at C.19.

[11] *In re Kawaihae Cogeneration Project*, 7 Environmental Administrative Decisions ("E.A.B.") 107, 128 (U.S. EPA Environmental Appeals Board, April 28, 1997) (denying review of claim that permitting agency should have required site-specific monitoring for pollutants exceeding the significant monitoring concentrations based on EPA guidance and an earlier decision in *In re Hibbing Taconite Co.*, 2 E.A.D. 838, 851 (EPA Administrator 1989), cited for the proposition that "monitoring guidelines 'are very broad and leave much to the discretion of the permitting authority'").

[12] *Id.*; *see also PSD Monitoring Guidelines*, at § 2.4.

[13] *Draft NSR Workshop Manual*, at C.18 ("It is generally preferable to use data collected within the area of concern; however, the possibility of using measured concentrations from representative 'regional' sites may be discussed with the permitting agency.")

monitoring requirement. The BAAQMD maintains air quality and meteorological monitoring stations throughout the entire air basin with sufficient resolution to adequately determine representative background concentrations for attainment/nonattainment determinations. Unlike air toxics or certain criteria pollutants (*e.g.*, carbon monoxide), PM2.5 generally occurs as a regional pollutant in the Bay Area. In a case such as this, where the Air District maintains an extensive network of monitoring stations validated to meet the relevant federal reference methods, the applicant and permitting agency may rely upon the robust data set generated by the monitoring network for purposes of the NAAQS compliance demonstration.

In discussions with Air District personnel, RCEC has proposed the Fremont monitoring data as adequately representative of the conditions at the project site. This monitoring location has been classified as a "population oriented" monitor and designated for collection of PM2.5 data "because light winds combined with surface based-based [sic] inversions during the winter months can cause elevated particulate levels." *2008 Air Monitoring Network Plan*, To be Submitted: July 1, 2009, at 31. Similar conditions affecting PM2.5 concentrations are expected to occur within the vicinity of the project site.

In addition, the Fremont monitoring station is the closest within the Bay Area's monitoring network for which at least three years of PM2.5 monitoring data are available, as required for purposes of the NAAQS compliance demonstration: the 24-hr design value is based on the three-year average of the 98th percentile of daily average concentrations, while the annual design value is the three year average of annual averages.[14] As suggested, the Fremont monitor has collected a complete set of validated, PM2.5 data. According to the Air District's *2008 Air Monitoring Network Plan*, "[t]he national 24-hour PM2.5 standard of 35 $\mu g/m^3$ was exceeded on four days in the last 3 years." *2008 Air Monitoring Network Plan*, To be Submitted: July 1, 2009, at 31.

In contrast, the closest monitoring station in the other direction (to the north of the project site) that has collected PM2.5 monitoring data is classified as a "Special Purpose Monitor" (SPM) and has only been collecting data since November 2007. *Id.*, 97-98. As a consequence, the data set would be inadequate for the Source Impact Analysis' determination of whether or not RCEC's emissions of PM2.5 would cause or contribute to an exceedance of the PM2.5 NAAQS.

For the summer months, when RCEC's contributions are the highest, the 98th percentile of average daily concentrations recorded by the Fremont monitoring station is approximately 21 $\mu g/m^3$, as a daily (24-hour) average; for winter months, when exceedances are likely to occur throughout the Bay Area, it is approximately 29 $\mu g/m^3$. As a conservative measure, RCEC has applied the higher background concentration for all modeled periods. For the annual average, the background concentration is approximately 9.5 $\mu g/m^3$.

RCEC representatives have discussed and agreed upon the representativeness of the data set from the Fremont monitor for purposes of the Source Impacts Analysis.

[14] *See* 40 CFR Pt. 51, App. W, § 10.1.c. ("Standards for fine particulate matter (PM-2.5) are expressed in terms of both long-term (annual) and short-term (daily) averages. The long-term standard is calculated using the three year average of the annual averages while the short-term standard is calculated using the three year average of the 98th percentile of the daily average concentration.")

Further, to the extent these data may not reflect the influence of nearby sources which might interact with RCEC's impacts to cause an exceedance of the NAAQS (*e.g.*, motor vehicle traffic on State Highway 92 and 29 additional stationary sources permitted by the Air District since 2007 located within a 6-mile perimeter around the project site), RCEC has modeled additional contributions from those sources and included those contributions in its cumulative impacts analysis, as described below.

If, after adding in the background concentration, the modeled contribution from the source and any other modeled sources, the result is less than the relevant NAAQS at all locations, then no violation would occur and the cumulative impacts analysis is complete. If a violation is predicted by the model, the source may still demonstrate that it does not "cause or contribute to" a violation of the NAAQS by demonstrating that its own contribution is lower than the SIL at the particular location and time of the modeled violation.[15] This is referred to as a culpability analysis.

6. PSD Increment Consumption Analysis. As described above, EPA has not yet promulgated final PSD increments for PM2.5. Upon promulgating the final NSR implementation rule for PM2.5, EPA said that, "[a] demonstration that a source does not cause or contribute to a violation of the PM2.5 NAAQS can be conducted notwithstanding the absence of an increment for PM2.5."[16] As indicated previously, a source owner must demonstrate that its emissions would not cause or contribute "[a]ny applicable maximum allowable increase over the baseline concentration in any area" 40 CFR § 52.21(k); *see also* 42 U.S.C. § 7475(a)(3)(A). In the absence of any maximum allowable increase, no increment consumption analysis is required.

Even if such an analysis were required at this time, the modeling analysis described herein would also demonstrate that RCEC's emissions will not cause or contribute to any exceedance of EPA's proposed PM2.5 Class II increments of 9 $\mu g/m^3$ for the 24-hour standard and 4 $\mu g/m^3$ for the annual standard. The highest annual and 24-hour concentrations indicated at any offsite location were 0.529 and 4.86 $\mu g/m^3$, respectively.

When it proposed these increments in 2007, EPA proposed a number of options for establishing the "trigger date" for PM2.5, but said that its preference was to follow the example it set upon promulgating NO_2 increments in 1988 and "reset" the trigger date (hence, the baseline for purposes of the increment consumption analysis) at the time of the rule's issuance.[17] EPA said this approach would be more protective and also was

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[15] *Draft NSR Workshop Manual*, Draft October 1990, at C.52 ("The source will not be considered to cause or contribute to the violation if its own impact is not significant at any violating receptor at the time of each predicted violation.")

[16] *Implementation of the New Source Review (NSR) Program for Particulate Matter Less than 2.5 Micrometers in Diameter (PM2.5)*, Response to Comments (hereinafter, "*Implementation Rule Response to Comments*"), U.S. EPA, Office of Air Quality Policy and Standards, Air Quality Policy Division, New Source Review Group, March 2008, at 82.

[17] *See September 21, 2007 Proposed Rule*, at 54136. ("Specifically, we are proposing that the major source baseline date and trigger date, both fixed dates, will be defined as the effective date of this rule after promulgation… EPA's judgment is that starting with new baseline dates on or after the effective date of this rule would make the new PSD increments more protective. Under our

justified under the Clean Air Act because PM2.5 constitutes a "new pollutant", and not a revision of an existing criteria pollutant; as a consequence, EPA said the baseline date for purposes of PM2.5 need not be tied to the historic baseline dates for either total suspended particulate or PM10. This approach has been endorsed by many parties which commented on the proposed rule, including consortia of state and local permitting agencies.[18]

If EPA should promulgate a new "trigger date" for PM2.5, RCEC's application could be deemed the first completed PSD application received after the trigger date and would, consequently, trigger both the minor source baseline date and major source baseline date.[19] In light of this, RCEC would not need to consider any other stationary sources for purposes of its increment consumption analysis , unless such sources had increased their emissions since the date when RCEC's application was complete. Because the highest modeled concentrations from RCEC are significantly below the lowest of the proposed Class II increments, RCEC could not possibly be found to cause or contribute to an exceedance of a PSD increment.[20] However, as suggested previously, no increment consumption analysis is currently required under the PSD regulations because, at this time, no increment has been established for PM2.5.

Modeling for PM2.5

To satisfy the requirement to evaluate the potential source impacts, dispersion modeling was conducting using the AERMOD model. The detailed modeling procedures, model

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proposed approach, any emissions reductions occurring prior to the effective date of this rule would be counted toward the baseline concentration rater than expanding the PM2.5 increment.")

[18] *See* letter, Northeastern States for Coordinated Air Use Management, to Docket ID No. EPA-HQ-OAR-2006-0605, Re*: NESCAUM Comments on EPA's Proposed Rule: Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers (PM2.5)–Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC). 72 Federal Register 54111, September 21, 2007*, December 13, 2007; letter from National Association of Clean Air Agencies to U.S. EPA Air and Radiation Docket, Re: Docket ID: EPA-HQ-OAR-2006-0605, January 17, 2008; available at: http://www.4cleanair.org/documents/PM25Increments.pdf.

[19] According to EPA's September 21, 2007 Proposed Rule, the minor source baseline date cannot occur prior to the "trigger date":

> The trigger date, as the name implies, triggers the overall increment consumption process nationwide. Specifically, this is a fixed date, which must occur before the minor source baseline data can be established for the pollutant-specific increment in a particular attainment area. *See, e.g.*, 40 CFR 52.21(b)(14)ii).

72 Fed. Reg. at 54117. *See also supra* at note 8.

As a consequence, no increases or decreases occurring since the time when RCEC initially submitted its application, but before the EPA's selected trigger date for PM2.5, would consume increment.

[20] Note that, for the 24-hour NAAQS, Appendix W instructs that the highest, second-highest increase in estimated concentration must be less than or equal to the relevant increment. 40 CFR Pt. 51, App. W, § 10.2.3.3.a.

options, and meteorological data used in the cumulative impacts dispersion analysis were the same as those used for the proposed facility as described in the AERMOD Modeling Assessment (September 2008).

Supporting information used in the analysis included the following:

- RCEC source's respective coordinate locations and worst-case stack parameters and emissions;
- Stack parameters for sources included in the cumulative air quality impacts dispersion modeling analysis; and
- Output files for the dispersion modeling analysis.

The same stack locations and building dimensions used for the facility modeling analyses were also used to assess downwash considerations for the emissions sources at the proposed

RCEC. Worst-case source conditions defined by the screening analyses in the facility modeling analyses for RCEC were used to define stack conditions analyzed. These conditions are shown below in Table 2.

Table 2 Stack Parameters and Emission Rates for RCEC Facility*

	Stack Height (meter)	Stack Diam. (meter)	Stack Temp (deg K)	Exhaust Velocity (m/s)	Emission Rates (g/s) for each turbine/HRSG and cooling tower cell
					PM2.5
Averaging Period: 24 hours					
Turbines/HRSGs	44.196	5.4864	350.68	14.075	0.945
Fire Pump Diesel Engine	4.572	0.1524	665.37	53.340	4.167E-4
Cooling Tower	18.288	9.7536	298.17	10.308	0.03066
Averaging Period: Annual					
Turbines/HRSGs	44.196	5.4864	356.83	21.655	0.8952
Fire Pump Diesel Engine	4.572	0.1524	665.37	53.340	5.936E-5
Cooling Tower	18.288	9.7536	300.27	10.308	0.02998

*PM2.5 emissions from the cooling tower were assumed to equal the PM10 emissions which are based on total TDS. No conversions were assumed.
deg K = degree Kelvin, g/s = grams per second, m/s = meters per second

RCEC 24-hour PM2.5 Significant Impact Level Modeling Results

Emissions from the proposed project were modeled to determine the areal extent of the PM2.5 significance area for both the 24-hour and annual NAAQS. For purposes of these analyses, all total dissolved solids in the cooling tower were assumed to form PM2.5, which is a highly conservative assumption. Additionally, the emissions of PM2.5 from the turbine were based upon to the proposed emissions limit of 7.5 lb/hr PM10/ PM2.5 per gas turbine/HRSG train. The operation of the turbines and cooling tower were modeled with the assumption of 24-hours per day of emissions. The results of the SIL modeling analysis for locations that are greater than or equal to the 1.2 $\mu g/m^3$ SIL are presented in Figure 1 and 1a.

Figure 1 24-Hour PM2.5 Significant Impact Level Modeling Areas

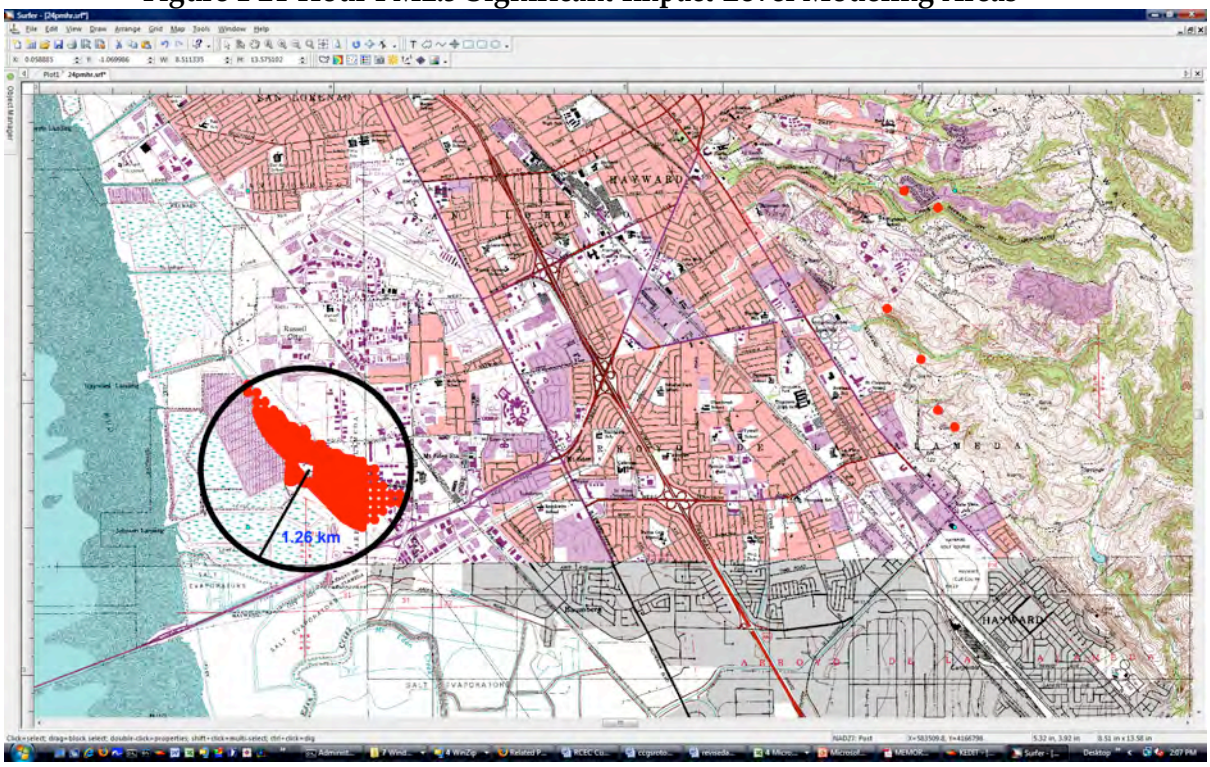
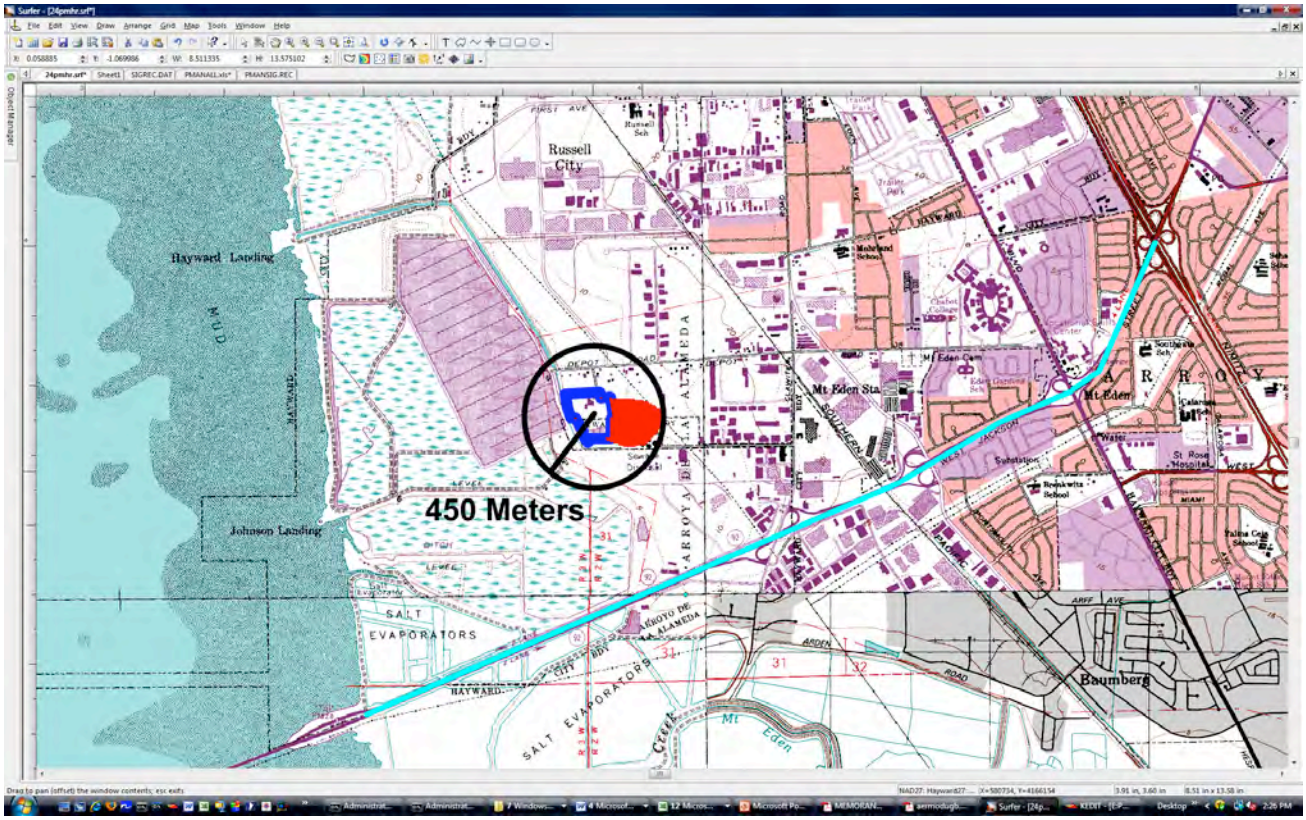


Figure 1a Annual PM2.5 Significant Impact Level Modeling Area



1. ***Identification of Significant Impact Area and Nearby Sources for Consideration in Cumulative Impacts Analysis.*** EPA guidance prescribes use of the significant impact levels (SILs) to establish the "impact area", which is used to identify the appropriate geographic area in which a cumulative impacts analysis should be conducted according to EPA guidance, the "impact area" is identified by drawing a circle around the site with a radius equal to the distance to the farthest location where an exceedance of the SIL is modeled to occur.[21] This impact area is also used in a multi-source cumulative impacts

[21] According to EPA's Draft NSR Workshop Manual, the "impact area" is defined by taking farthest location of a modeled exceedance of the SIL and drawing a circle to that point, with the source located at the center:

> The proposed project's ***impact area*** is the geographical area for which the required air quality analyses for the NAAQS and PSD increments are carried out. This area includes all locations where the significant increase in the potential emissions of a pollutant from a new source, or significant net emissions increase from a modification, will cause a significant ambient impact (i.e., equal or exceed the applicable significant ambient impact level as shown in *Table C-4*). The highest modeled pollutant concentration for each averaging time is used to determine whether the source will have a significant ambient impact for that pollutant.

analysis to "guide the identification of other sources to be included in the modeling analyses."[22]

As illustrated by Figure 1, a majority of the significant impacts locations occurred within the immediate area of the project site. Most of these impacts were due to the cooling tower emissions and are based in part on the conservative assumptions used to calculate PM2.5 emissions from the cooling tower, *i.e.*, that all total dissolved solids in the cooling tower convert to PM2.5. The six (6) receptor locations in terrain eastward of the project site were due primarily to the turbines/HRSGs. According to EPA guidance, the impact area was established by taking the distance from the project site to the farthest of these locations and then drawing a circle with that distance as its radius. For the 24-hour PM2.5 standard, the impact area was determined to be approximately 8.1 kilometers in radius from the project site. For the annual PM2.5 standard, the impact area radius is 450 meters, as all significant impacts were immediately next to the project site.

Per EPA guidance, the larger impact area was then surveyed to identify other "nearby sources", which also should be included in the cumulative impacts analysis. Both Appendix W and the *Draft NSR Workshop Manual* require that the cumulative impacts analysis include "nearby sources", which includes "[a]ll sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration." 40 CFR Pt. 51, App. W, §§ 8.2.3.b; 8.2.1.c; *Draft NSR Workshop Manual*, at C.32. Appendix W further instructs that the "impact of nearby sources should be examined at locations where interactions between the plume of the point source under consideration and those of nearby sources (plus natural background) can occur". 40 CFR Pt. 51, App. W, § 8.2.3.e. Emphasizing that "[t]he number of sources is expected to be small except in unusual situations", Appendix W leaves identification of nearby sources to the "professional judgment" of the permitting agency. *Id*.[23]

Based on the location of significant impacts illustrated by Figures 1 and 1a, RCEC, in consultation with BAAQMD representatives, considered the potential that other background sources within the impact area might produce a significant concentration gradient in the same location where RCEC's modeled impacts were at or above the SIL. As discussed above, a majority of these locations occur in the immediate vicinity of the

---

> The ***impact area*** is a circular area with a radius extending from the source to (1) the most distant point where approved dispersion modeling predicts a significant ambient impact will occur, or (2) a modeling receptor distance of 50 km, whichever is less.

"*Draft NSR Workshop Manual*, at C.26 (emphasis in original).

[22] *Id*., at C.31.

[23] The *Draft NSR Workshop Manual* further underscores the "flexibility" and "judgment" required to identify "nearby sources", as follows:

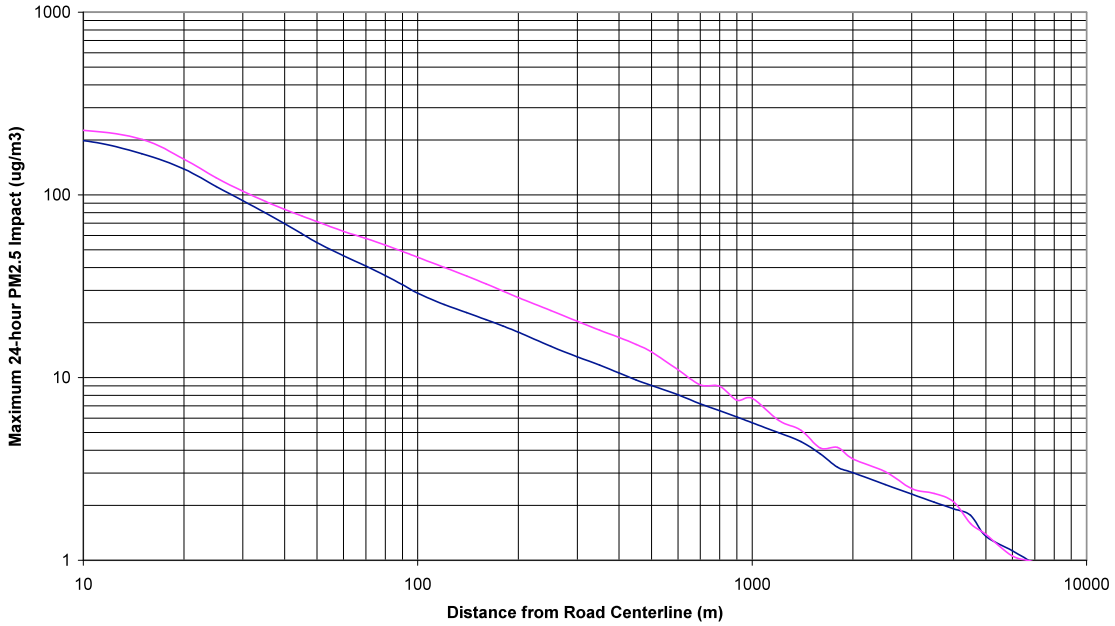
> In determining which existing point sources constitute nearby sources, the <u>*Modeling Guideline*</u> necessarily provides flexibility and requires judgment to be exercised by the permitting agency. Moreover, the screening method for identifying a <u>nearby</u> source may vary from one permitting agency to another. To identify the appropriate method, the applicant should confer with the permitting agency prior to actually modeling any existing sources.

Draft NSR Workshop Manual., at C.32 (emphasis in original).

project site. Given the proximity of Highway 92 to these modeled exceedances of the SIL, the BAAQMD identified traffic on certain lengths of Highway 92 as nearby sources, *i.e.*, sources whose emissions might cause a significant concentration gradient in the vicinity of the project's impacts.

To determine the potential of Highway 92 to produce a concentration gradient, receptors were placed at equidistant locations along the highway, near Clawiter and extended outwards from the highway up to 10,000 meters. AERMOD was then used to determine the concentration gradient, which is shown in Figure 2.

Figure 2
PM2.5 Sensitivity Analysis
Impact vs. Distance from Road for Middle Route 92 Segment (Clawiter->Industrial)

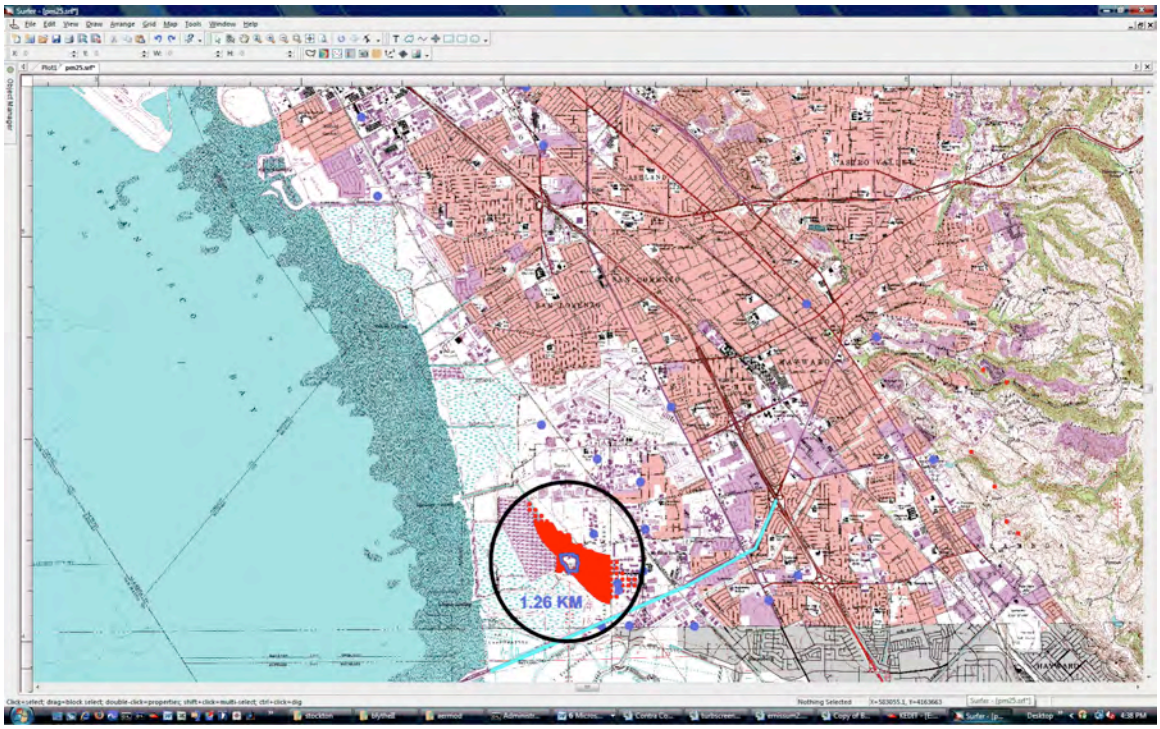


Based on the graphical results in Figure 2, a significant concentration gradient exists from the center of the highway outwards to distances up to 1000 meters from the source. Using the results of the significance modeling and the demonstration of the Highway 92 concentration gradient, the Air District provided emissions and highway length segment recommendations for use in the PM2.5 NAAQS modeling assessment. Figures 1a and 3 display the portions of Highway 92 that were included in the cumulative modeling assessment, which are outlined in light blue.

For the six (6) locations in elevated terrain to the east of the project site where RCEC's impacts were modeled above the 24 hour SIL, no additional sources were identified that would cause a significant concentration gradient in the vicinity of these impacts. The BAAQMD also provided a list of additional permitted sources from the beginning of 2007 to present. Although none of these additional sources was expected to cause a significant concentration gradient in the same location as RCEC's significant impacts, they were also included in the cumulative modeling analysis because, while already permitted, they may not yet be operational and thus, not reflected by the background monitoring data for PM2.5. The location of these additional sources is shown on Figure 3 by the violet dots. Together, with the area sources included from Highway 92 traffic

(the length of which are shown on Figure 3 in light blue), these additional sources were added to the contribution from RCEC and the background monitored concentration to determine compliance with the NAAQS.

Figure 3 Additional Background Sources Included in the 24-hour and Annual NAAQS Modeling Assessment



NAAQS Dispersion Modeling Inputs

The Air District provided the emissions of PM2.5 from mobile sources based on model year 2007 car/truck vehicle mix and emission factor data, specific to Alameda County. Additionally, traffic count data based on average daily east and westbound traffic were provided for the following segments:

- San Ramon Road Interchange
- Palomares/Eden Canyon Road Interchange
- Crow Canyon Road/Center Street
- Redwood Road
- Strobridge Avenue
- Junction Route 238

The PM2.5 emission factors for Alameda county on-road motor vehicle fleet for calendar year 2007 in grams/mile are:

Exhaust:	0.039
Tire Wear:	0.002
Brake Wear:	0.006
Road Dust:	0.060
Total:	**0.107**

The typical traffic speed for the modeled sources was assumed to be 60 miles per hour and is only used in estimating the exhaust emission factor. These emissions were based on EMFAC2007 version 2.3. It should be noted that the road dust emission factor provided by the BAAQMD was for all roadway types, and not just freeways. Using the road dust factor for freeways reduces this emission rate to 0.040 grams/mile for a new total of 0.087 grams/mile. However, the modeling assessment used the higher emission factor. Highway 92 was modeled as six (6) area sources corresponding to the traffic count data provided by the Air District. Table 3 presents the area source parameters used in the cumulative NAAQS modeling.

Table 3 Stack Parameters and Emission Rates for Highway 92

	Location X (meters)	Location Y (meters)	Base Elevation (meters)	Release Height (meters)	Emission Rates (g/s/meter^2) for area sources
					PM2.5
Source ID					
ROAD11	575174.9	4163661.0	1.8	0.50	0.40890E-05
ROAD21	577656.1	4164753.0	6.0	0.50	0.44410E-05
ROAD22	578328.9	4165042.0	6.0	0.50	0.44410E-05
ROAD31	578602.1	4165209.5	9.0	0.50	0.43090E-05
ROAD41	579490.1	4165658.8	12.0	0.50	0.47930E-05
ROAD42	579684.1	4165837.2	15.8	0.50	0.47930E-05

Initial vertical dispersion, Sigma Z, was set to 0.0

In addition, the BAAQMD provided a list of 29 additional sources that were within six (6) miles of the RCEC project. These sources were permitted for construction and operation between January 2007 to present and therefore may not be adequately represented by the background PM2.5 monitoring data. Based upon this possibility, the 29 background sources were included in the NAAQS modeling analysis and are presented in Table 4.

Table 4 Stack Parameters and Emission Rates for BAAQMD Source Inventory

BAAQMD Source #s	Stack Height (meter)	Stack Diam. (meter)	Stack Temp (deg K)	Exhaust Velocity (m/s)	Emission Rates (g/s) for each source
					PM2.5
Averaging Period: 24 hours and Annual					
00167	9.144	0.761	377.59	4.15	4.488E-2
00698	2.134	0.152	750.37	46.94	5.753E-5
01009	3.658	0.215	752.59	211.02	2.877E-3
02099	2.591	0.089	768.71	95.23	5.753E-5
03576	7.010	0.555	588.71	3.13	1.395E-2
03933	3.170	0.203	772.59	35.82	1.151E-4
04784	9.144	0.761	377.59	4.15	2.129E-2
07215	4.267	0.101	761.48	187.67	2.877E-4
07688	9.144	0.761	377.59	4.15	5.638E-3
13930	2.134	0.127	799.26	49.68	5.753E-5
15959	4.267	0.203	755.93	52.77	5.753E-5
16441	3.511	0.168	761.48	68.31	2.301E-4

Table 4 Stack Parameters and Emission Rates for BAAQMD Source Inventory					
BAAQMD Source #s	Stack Height (meter)	Stack Diam. (meter)	Stack Temp (deg K)	Exhaust Velocity (m/s)	Emission Rates (g/s) for each source
					PM2.5
16451	2.591	0.076	740.37	56.29	2.301E-5
16947	3.353	0.203	779.82	42.14	9.493E-5
17548	6.096	0.510	422.04	4.96	1.070E-2
17553	7.925	0.356	1033.15	6.42	2.273E-3
17621	11.582	0.406	733.15	47.03	4.027E-4
17952	4.267	0.089	866.48	77.26	2.589E-5
18189	2.134	0.152	710.37	27.19	2.877E-5
18210	7.010	0.555	672.04	5.57	1.726E-3
18421	3.261	0.152	817.04	60.78	4.315E-5
18548	10.000	0.100	0.00	0.10	1.346E-2
18676	3.048	0.101	761.48	187.67	4.315E-5
18683	2.515	0.076	703.15	72.78	2.301E-5
19014	1.829	0.076	724.26	76.30	2.877E-5
19164	4.267	0.101	795.37	85.89	4.027E-5
19173	2.134	0.152	710.37	27.19	4.315E-5
19244	7.010	1.067	0.00*	11.09	1.640E-3
19583	3.511	0.168	761.48	4.15	5.753E-5
*Temperature set to ambient. deg K = degree Kelvin, g/s = grams per second, m/s = meters per second					

In addition to modeling the proposed project's impacts, along with the impacts from traffic on the identified sections of Highway 92 and the BAAQMD supplied source inventory, the 98th percentile background concentration of PM2.5 recorded by the Fremont, California monitoring station was also included for the 24-hour analysis. As suggested previously, Air District personnel agreed upon the representativeness of the Fremont monitoring data for purposes of this analysis. For the years 2006 through 2008, the 24-hour background is 29.0 $\mu g/m^3$. The annual background concentration was 9.5 $\mu g/m3$. These concentrations were then added to the modeling results, as described in the following section.

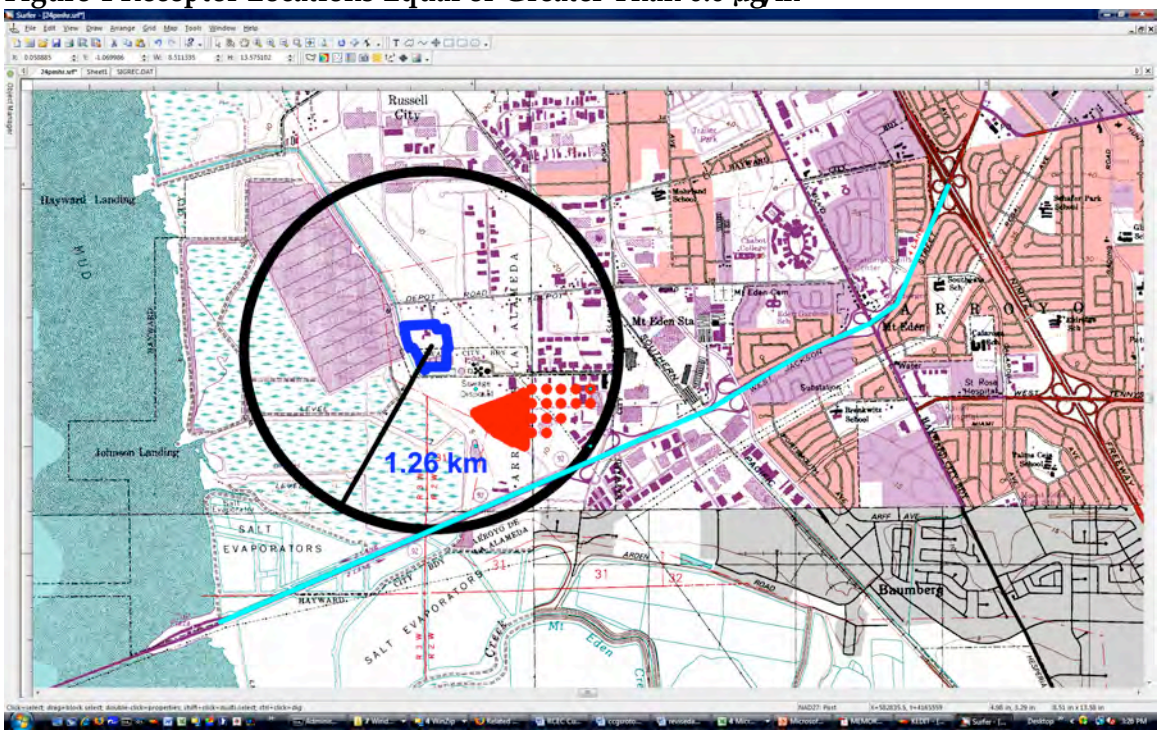
NAAQS Dispersion Modeling Results

1. 24-Hour Standard. To asses whether RCEC causes or contributes to a violation of the 24-hour (daily) PM2.5 NAAQS, AERMOD was run for only those receptors where the RCEC "first high" impacts (*i.e.*, the maximum predicted concentration) exceeded 1.2 $\mu g/m^3$ on a 24-hour basis. This is because, according to EPA guidance, a "source will not be considered to cause or contribute to the violation if its own impact is not significant at any violating receptor at the time of each predicted violation." *Draft NSR Workshop Manual*, Draft October 1990, at C.52. Accordingly, even if violations of the NAAQS were modeled at other receptor locations, RCEC could not be found to cause or contribute to any such violation because its maximum modeled concentration at that receptor location would be below the SIL. Thus, the modeling receptor grid of 31,000 receptors was reduced to 6,019 receptors.

To evaluate whether cumulative multisource impacts would exceed the 24-hour NAAQS at those receptor locations, the emissions from the proposed project were then modeled along with the emissions from the BAAQMD-supplied inventory and Highway 92 sources. For comparison with the NAAQS, the 98th percentile 24-hour concentrations were then considered.[24] The highest 98th percentile concentration from this modeling run was 11.27 µg/m³, which, upon the addition of background, would result in an exceedance of the NAAQS. This modeled exceedance was due almost entirely to Highway 92. Moreover, on the particular date of the modeled NAAQS violation, RCEC's contribution was only 0.0013 µg/m³; thus the project's emissions would not "cause or contribute to" this violation and RCEC can nevertheless make the required PSD demonstration.

To reduce the volume of output from the model when the EVENT post processing option was used, AERMOD was instructed to generate a plot file identifying instances where the 98th percentile total impact from all modeled sources equaled or exceeded 6 µg/m³. This concentration was chosen because the existing background applied for all modeled periods is 29.0 µg/m³; thus, any modeled concentration equal to or greater than 6 µg/m³ could produce a violation of the PM2.5 NAAQS standard of 35 µg/m³. Figure 4 displays the locations of all receptors where the 98th percentile modeled concentrations equaled or exceeded 6 µg/m³.

Figure 4 Receptor Locations Equal or Greater Than 6.0 µg/m³



This group of receptors coincides in location with some of the locations where RCEC's impacts were modeled at concentrations exceeding the lowest of EPA's proposed PM2.5 SIL. However, further review of the model output indicates that RCEC's projected exceedances of the SIL never coincide in both time and location with total modeled

[24] 40 CFR Pt. 51, App. W, § 10.1.c.

concentrations above 6 µg/m^3. In other words, when the wind direction is from the northwest, RCEC's impacts sometimes exceeded the SIL at these receptor locations, but the amount contributed from all background sources was too small to result in a total impact that would exceed 6 µg/m^3 (*i.e.*, an exceedance of the NAAQS).

Similarly, when the wind direction is from the south-southeast, Highway 92 sometimes impacts these receptor locations at concentrations that, when combined with RCEC's contribution, would exceed 6 µg/m^3; but, in all such instances, RCEC's contribution was always less than the SIL for those occurrences. Further, the additional 29 stationary sources located within 6 miles of the project site permitted by the Air District since 2007 did not significantly affect the total modeled concentrations; the maximum 98th percentile 24-hour impact within the model domain from these additional sources was 0.186 µg/m^3. Thus, although these sources are already likely accounted for by existing background monitoring data, their contribution was modeled anyway and included in the NAAQS compliance determination as a conservative measure.

This analysis was conducted using the AERMOD EVENT postprocessor. The EVENT postprocessor provides source-by-source contributions at selected receptors during specific events. In this case, the postprocessor identified any event wherein the 98th percentile concentration from RCEC, Highway 92 and the additional sources exceeded 6 µg/m^3 and the "first high" concentration from RCEC equaled or exceeded 1.2 µg/m^3. Three EVENT input files were generated by AERMOD for post processing. Review of the EVENT processor output confirms that the RCEC project does not contribute above the SIL for any receptor where the model calculates an exceedance of the PM2.5 NAAQS. Table 5 presents the EVENT output for the maximum 24-hour PM2.5 impact. Although other periods were modeled wherein the maximum concentration, after adding the emissions from RCEC, Highway 92 and the 29 additional sources to the identified background concentration of 29 µg/m^3, would exceed the 24-hr standard of 35 µg/m^3, the results of the post processor confirmed that the contribution of RCEC to all such exceedances is less than the relevant significance threshold (1.2 µg/m^3).

Table 5 24-hour Cumulative Impacts Modeling Results (µg/m^3)

PM2.5	Maximum Multisource Concentration (µg/m^3)	RCEC Contribution (µg/m^3)	Modeled Background Contribution (µg/m^3)	Monitored Background (µg/m^3)	Total Impact (µg/m^3)	Federal Standard (µg/m^3)
24-hour	11.302	0.00137	11.3007	29.0	40.302	35

Modeled and Background PM25 24-hour averages, for comparison to the federal standard, are the maximum 3-year average of the annual 98th percentile 24-hour concentrations (i.e., for modeled impacts equal to the 8th highest concentration at each receptor). RCEC modeled impacts at each receptor is the first high concentration for comparison to the SIL.

Included under separate attachment are the AERMOD input/output files on DVD in addition to the EVENT post processing files. The maximum modeled impact from Highway 92 is due primarily to the conservative assumptions used to generate the emissions data as well as the conservative nature of area sources within AERMOD. Additional modeling of Highway 92 using the aforementioned revised road dust emission rate as well as taking into account rain events would certainly reduce the overall impacts from Highway 92.

2. ***Annual Standard***. A multi-source analysis was also conducted to determine whether the emissions from RCEC would cause or contribute to a violation of the annual PM2.5 NAAQS. According to the modeling analysis, the emissions from RCEC would exceed

the lowest of EPA's proposed SILs of 0.3 µg/m^3 at a number of offsite receptor locations, as shown by Figure 1a. To determine whether these impacts from RCEC, when added to the background concentrations of approximately 9.5 µg/m^3, plus the contribution from any nearby sources with a significant concentration gradient would exceed the relevant NAAQS (15 µg/m^3, annual average), the same sources from the 24-hour analysis were modeled using traffic data from Highway 92 and emissions factors, as provided above in addition to the BAAQMD provided source inventory. The results of the analysis demonstrate that the maximum modeled concentration at all receptors above significance are below the annual NAAQS, as summarized in Table 6.

Table 6 Annual Cumulative Impacts Modeling Results (µg/m^3)

PM2.5	Maximum Multisource Concentration (µg/m^3)	RCEC Contribution (µg/m^3)	Modeled Background Contribution (µg/m^3)	Monitored Background (µg/m^3)	Total Impact (µg/m^3)	Federal Standard (µg/m^3)
Annual	1.06	0.513	0.544	9.5	10.56	15

Conclusion

The maximum ambient concentrations predicted as a result of this cumulative source modeling exercise would, when added to the background concentration assumed for the area, exceed the applicable 24-hour PM2.5 NAAQS. This is primarily due to the conservative assumptions and methods used to model contributions from Highway 92. It is also because the background concentrations are already very close to the relevant NAAQS. Indeed, on December 22, 2008, EPA designated the Bay Area as "nonattainment" for the 24-hour PM2.5 NAAQS. As a consequence, the Bay Area will imminently be designated "nonattainment", at which time PM2.5 will no longer be subject to review under the federal PSD rules. [25] Regardless, the foregoing modeling analysis demonstrates that, for all time periods and locations where the model predicted a violation of the standard, RCEC's contribution would be less than the lowest of EPA's proposed Class II SILs and, accordingly, is considered insignificant. Additionally, the annual PM2.5 NAAQS modeling analysis demonstrates compliance with the NAAQS at all receptors which equal or exceed the annual significance level.

Class I Area Impacts Analysis

According to EPA's *Draft NSR Workshop Manual*, an impact analysis must be performed for any PSD source which "may affect" a Class I area *Draft NSR Workshop Manual*, E.16. This includes any PSD source located within 100 km of a Class I area. *Id*. According to the Air District's analysis presented in the December 2008 *Statement of Basis*, the potential impacts of RCEC's emissions of PM10 at Point Reyes National Seashore were only 0.06 µg/m^3 (24-hr average), which the Air District found to be below a significance

[25] According to EPA's PSD rules, "[t]he requirements of paragraphs (j) through (r) of this section shall not apply to a major stationary source or major modification with respect to a particular pollutant if the owner or operator demonstrates that, as to that pollutant, the source or modification is located in an area designated as non-attainment under section 107 of the Act." 40 CFR § 52.21(i)(2). The referenced paragraphs (j) through (r) contain the sum and substance of the PSD program.

level of 1 μg/m^3. (*Statement of Basis*, at 90.) According to the *Draft NSR Workshop Manual*, EPA's policy requires, at a minimum, an analysis of the source's impacts on "air quality related values" whenever a source's predicted impact in the Class I area would exceed 1 μg/m^3. *Draft NSR Workshop Manual*, E.16.

RCEC previously submitted a Class I Area Impacts Analysis that relied upon the PM10 Surrogacy Policy to support its conclusion that the emissions from RCEC would not cause any impacts above the corresponding SILs in any Class I area. This analysis considered potential impacts at the nearest Class I areas, Point Reyes National Seashore (70 kilometers from the project site) and Pinnacles National Monument (145 kilometers from the project site), using the CALPUFF long-range transport model. Additional details regarding the Class I Impacts Analysis can be found in the earlier submittal, dated February 2007.

As described by the *Statement of Basis*, the Air District's modeling indicated maximum 24-hour potential impacts at Point Reyes National Seashore of 0.06 μg/m^3, which was found to be below the corresponding Class I SIL for PM10 of 0.3 μg/m^3. RCEC's earlier Class I area impacts analysis also demonstrated maximum annual impacts at Point Reyes National Seashore of 0.008 μg/m^3, which is significantly below the corresponding Class I SIL for PM10 of 0.2 μg/m^3. RCEC's analysis also reported modeled PM10 impacts at Pinnacles National Monument of 0.05 μg/m^3 (24-hr avg) and 0.004 μg/m^3 (annual avg), which are also below the corresponding Class I SILs for PM10 (0.3 and 0.2 μg/m^3, respectively).

For purposes of the Class I impacts analysis for PM2.5, RCEC has compared its earlier analysis' modeled impacts for PM10 with the lowest of EPA's proposed Class 1 SILs for PM2.5. This comparison is shown in the following Table 7.

TABLE 7
PM10 and PM2.5 Class I SILs and Increments

Pollutant	Averaging Interval	Modeled Impact Pinnacle (μg/m^3)	Modeled Impact Point Reyes (μg/m^3)	Class I Significant Impact Level (μg/m^3)	Class I PSD Increment (μg/m^3)
PM10	24-Hour	0.05	0.06	0.3	10
	Annual	0.004	0.008	0.2	5
PM2.5	24-Hour	0.05	0.06	0.07	2
	Annual	0.004	0.008	0.04	1

Assuming that RCEC's PM2.5 impacts are the same as the earlier analysis of PM10 impacts results in a conservative over-prediction of potential PM2.5 impacts upon Point Reyes National Seashore and Pinnacles National Monument. This is because the PM10 impacts modeled by the earlier analysis were based upon higher emissions limits than now proposed by RCEC. It also is because, as described previously herein, in is based upon the assumptions that all PM10 is PM2.5 and, for the cooling tower, that all total dissolved solids, is emitted as PM2.5.

As shown by Table 5, if we assume that RCEC's PM2.5 impacts are the same as its previously modeled PM10 impacts, then the potential impacts of PM2.5 on both Point

Reyes National Seashore and Pinnacles National Monument are less than the lowest of EPA's proposed Class I SILs for PM2.5, which are 0.07 and 0.04 $\mu g/m^3$ (as a 24-hour and annual average concentration, respectively).

EPA said that its decision to set the Class I SILs at 4 percent of the proposed Class I increments was based on its belief that, "where a proposed source contributes less than 4 percent to the Class I increment, concentrations are sufficiently low so as not to warrant a detailed analysis of the combined effects of the proposed source and all other increment-consuming emissions." *See* 72 Fed. Reg. at 54140. *Id*. In conclusion, the foregoing analysis demonstrates that no significant impacts on Class I areas are expected as a result of RCEC.

Exhibit 11

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

March 2004

CALPINE

250 PARKWAY DRIVE
SUITE 380
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847.484.7700 (MAIN)
847.484.7799 (FAX)

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

Submitted by:

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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]

[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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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 ^{o}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.

3.0 Infrastructure Needs and Connections

3.1 TRANSPORTATION

The existing roadway network and site access road are adequate to serve the Facility and no transportation improvements will be required for construction or operation. Access to the site is provided west of 3rd Avenue off Summit Avenue via an existing paved road that currently serves the demolition waste landfill. The closest main highway serving the facility is Highway 14 located approximately one-half mile to the south. A diamond intersection is located at the 3rd Avenue crossing providing a safe entrance and exit to and from the highway.

3.2 GAS PIPELINE

As discussed in Section 2.71, Northern Natural Gas will supply natural gas to the Facility through a new 12 or 16-inch diameter service distribution line with a maximum operating pressure of 800 psi. The distribution line will be buried underground and connect into the existing Northern Natural Gas 16-inch diameter interstate pipeline located approximately 3.2 miles east of the site near the Mankato Municipal Airport. A gas metering station will be constructed either near the connection point at the pipeline tap or at the Facility on the project site (downstream of the metering station, the operating pressure will be 475 psig). The proposed route for the supply line from its connection at the Northern Natural Gas line to the Mankato Energy site is shown on Figure 7 and generally follows an existing 115 kV transmission line right-of-way, thus minimizing potential impacts to affected landowners. The pipeline would require a 50-foot construction easement and 30-foot permanent right-of-way and would be constructed using standard construction practices.

The Mankato Energy Center will be a significant new gas load in comparison to the current size of the Minnesota market. However, because of the Facility's close proximity to Northern Natural Gas's existing large volume gas pipeline system and the Facility's capability to switch to low sulfur distillate fuel oil as an alternative fuel, there will be sufficient capacity to deliver the full gas requirements of the Facility without requiring significant investment in new pipeline facilities. At this time, an interconnection agreement has not been executed. Mankato Energy will enter into negotiations with Northern Natural Gas to develop an interconnection agreement upon approval of the Facility.

At this time, Mankato Energy intends to construct, own, and operate the service distribution line; accordingly, a pipeline route permit application for the new pipeline will be prepared and submitted to the EQB in accordance with the requirements of Minnesota Rules 4415. The EQB would be the lead agency responsible for regulatory review of the interconnection line. That regulatory review will require a separate environmental assessment to evaluate potential human and environmental impacts associated with construction and operation of the proposed pipeline. Mankato Energy would seek a partial exemption from the pipeline route selection procedures allowed for qualifying projects under a shorter process, which does not require the applicant to identify an alternative route and does not require a contested case hearing. The pipeline tap at the connection point with the Northern Natural Gas mainline would be subject to federal jurisdiction and requires approval by the Federal Energy Regulatory Commission ("FERC"). All other necessary permits and approvals will be obtained prior to construction of the pipeline. The Minnesota Office of Pipeline Safety will be involved in required inspections during and after construction.

3.3 ELECTRICAL TRANSMISSION

Electricity generated at the Facility will be carried from a switchyard located on the west edge of the Facility property through two new parallel overhead pole-mounted high voltage transmission lines to Xcel Energy's nearby Wilmarth Substation. The interconnection will consist of two separate voltages, 345 kV and 115 kV. The approximate length of the transmission lines is 1,000

feet and they will be contained entirely on Xcel Energy's property. The substation will be expanded on the north side to provide the necessary equipment to accommodate the interconnection. The proposed transmission line route is shown on Figure 8. At the Wilmarth Substation, electricity from the Facility will enter Xcel Energy's transmission system for distribution within MAPP.

While Mankato Energy has proposed the new transmission lines, the lines would be built, owned, and operated by Xcel Energy. Electricity will pass through on-site step-up transformers, which will convert the voltages to 345 kV and 115 kV. Dead-end structures will be constructed within the switchyard for the 345 kV and 115 kV outputs, from which Xcel Energy will tie into in completing the electrical interconnection between the Facility and the Wilmarth Substation.

Calpine performed an internal analysis to determine the amount of electric power generation that could be added to the Xcel Wilmarth Substation without degrading or adversely impacting the transmission system. The results of the analysis showed a generating plant capable of producing approximately 550 MW could be constructed with little to no transmission upgrades. In fact, the addition of Facility to the existing utility electric grid system will have positive impacts for Minnesota in both generation and transmission benefits. The Minneapolis/St. Paul metro area is a large load pocket located north of the Facility. For this reason, excess power that does not flow through the Wilmarth transformers to serve local load will most likely flow from Mankato in a northerly direction toward the large load area. Adding the Facility, which will be a large, efficient, and low cost generator, in an area of Minnesota that does not have such a generator at this time will benefit the stability and reliability of the system in that it will provide local voltage support. The location of the Facility will also increase the geographic diversity of Minnesota's electric generation.

At this time, an interconnection agreement has not been executed. Mankato Energy will enter into negotiations with MISO to develop an interconnection agreement upon approval of the Facility. Once the Interconnect Agreement is approved, Xcel Energy will also proceed with the line design and securing all necessary permits and approvals. In accordance with the requirements of Minnesota Rules 4400, a transmission route permit application for the new

transmission lines will be prepared and submitted to the EQB, which is the lead agency responsible for regulatory review of new transmission lines. That regulatory review will require a separate environmental assessment to evaluate potential human and environmental impacts associated with construction and operation of the proposed transmission lines. The proposed transmission lines qualify for the shorter alternative permitting process (high voltage transmission lines in excess of 200 kV but less than five miles in length in Minnesota), which does not require the applicant to identify an alternative route and does not require a contested case hearing. As the proposed transmission lines are relatively short and located entirely on Xcel Energy property, potential impacts are expected to be minimal.

3.4 WATER AND SEWER

Potable water for steam cycle makeup, fire protection, and domestic uses at the Facility such as drinking water, eye wash stations, showers, toilets, sinks, and other incidental water needs will be supplied by the City of Mankato through a lateral service line connection to the municipal water supply system. Raw water used at the Facility for non-contact cooling water and process water will be supplied by the City of Mankato in the form of treated wastewater effluent from their municipal wastewater treatment plant. The Mankato WWTP is located approximately one mile south of the project site on the east bank of the Minnesota River and treats municipal wastewater flows received from both the communities of Mankato and North Mankato. The Mankato WWTP, which recently underwent a $24.5 million upgrade and expansion in 2000, has adequate capacity to meet the Facility's water needs. The treated wastewater effluent will be piped to the facility via a buried underground pipeline to be constructed within the right-of-way of an existing city bike trail.

Domestic wastewater generated from the Facility (e.g., bathrooms and sink areas in the administrative building and water treatment/electrical control building) will be discharged directly to the City of Mankato sanitary sewer system through a lateral service line connection. This discharge will be authorized by the City of Mankato and subject to any appropriate discharge limits and monitoring requirements.

The water and sewer connections described above would be constructed and paid for in accordance with an interconnection agreement or service contract between Mankato Energy and the City of Mankato. Negotiations are currently taking place including what type of additional treatment of the wastewater effluent will be required (and associated pretreatment facilities to be constructed on the wastewater plant site) prior to conveyance to the Facility.

3.5 OTHER UTILITIES

Details regarding other utility connections to the Facility including electricity, telephone, and cable are not known at this time but will be worked out with local utility companies as necessary. Wherever possible, utilities will follow existing easements to help reduce costs and minimize local impacts.

4.0 Effects on Human Environment

4.1 ENVIRONMENTAL SETTING

As described in Section 2.4, the proposed Facility site is located just north of the Mankato city limits in Lime Township in Blue Earth County. The site is approximately 25 acres in size and 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 SMC. 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. Based on available records, the limestone quarry began operations back in the mid-1950s. In 1992, the site began accepting construction and demolition wastes under a permit issued by the MPCA. Site topography and a visual record of existing conditions and environmental setting are shown in Figure 9.

The dominant feature of the site is the demolition waste landfill located to the north. A recently improved gravel haul road leading to active landfill areas is located along the west side of the site. The site currently contains a few buildings used primarily for sorting demolition waste materials and storing equipment. An outside storage area containing sanitary and storm sewer pipe and miscellaneous construction material is located on the east side of the site. A mobile trailer located on the southern portion of the site is currently being used by SMC for office space. The truck scale, recycling bins, and compost piles also are located in this area. The facility accepts yard and garden waste, brush, and other vegetation debris, which is processed, placed into compost piles and then sold to the general public. SMC also sells landscaping materials including wood chips, decorative rock, and retaining wall blocks, which are stored outside on the site property.

Adjacent lands consist of numerous industrial and manufacturing facilities including Xcel Energy's Wilmarth Generating Plant and electrical substation, a waste processing company, auto salvage yards, scrap metal operations, a construction company, a U.S. Postal Service mail processing facility, and a household hazardous waste collection site. There are numerous railroad tracks and spur lines in the area as well as overhead electrical transmission lines. 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 Minnesota River is located approximately 1,800 feet west of the Facility site. The river and adjacent wooded river bottoms provide wildlife habitat as well as recreational opportunities in the form of boating, fishing, and hunting. There are also trails, parks, and other recreational facilities in the general area. A large drainage ditch is located along the east side of the site, which flows in a north/northwesterly direction to the Minnesota River. The Minnesota River valley extends approximately one mile to the east of the site at which point steep bluffs rising 150 feet dominate the landscape. Outlying rural areas to the north and east of the site in Lime Township consist predominately of agricultural and conservation lands.

4.2 DISPLACEMENT

The project site is appropriately zoned for industrial use. The closest residential dwelling is located approximately 600 feet northeast of the Facility's site boundary. No one will be physically displaced by the Facility nor should the Facility alter the usage of adjacent property.

4.3 NOISE

The site is located within an established industrial and manufacturing area on the north edge of Mankato more than one-half mile from the nearest residential areas of town. Two sensitive noise receptors consisting of residential dwellings are located near the site and are shown on Figure 10.

The nearest residential dwelling (receptor 1) is located on the west side of 3rd Avenue just south of Brad's Auto Parts approximately 1,500 feet away from the center of the site. The next closest residential dwelling (receptor 2) is approximately 2,500 feet away to the northeast. There are no other known sensitive noise receptors in the area. Existing noise sources located in the general vicinity of the proposed site include industrial facilities, highways, county roads, and railroad tracks.

Noise will be generated during construction of the Facility as well as during normal operation of the Facility. The largest potential noise impacts will likely be generated during the construction of the Facility. Construction noise will be temporary and will be mitigated as described Section in 4.3.2.

Noise associated with tanker truck traffic to replenish the back-up fuel oil supply tank will be temporary and intermittent. Curtailment of the primary natural gas fuel supply, which would require an increase in truck deliveries to replenish the back-up fuel oil supply, is expected to be rare.

The major components of the plant that will generate noise during the operation of the Facility include the cooling tower, the combustion turbine generators, electrical transformers and HRSGs. Mankato Energy will utilize noise mitigation and control methods and equipment in the final design of the Facility as necessary to mitigate noise emissions in excess of MPCA standards during normal operation.

The Facility will be designed to operate within the State of Minnesota Noise Standards (Minnesota Rules 7030.0040) listed in Table 4-1 below. The City of Mankato does not have a noise ordinance but relies on the State's noise level restrictions for local control of noise problems. The noise area classification ("NAC") is determined by the land use activity of the receiver. Land use activities are generally divided into four NACs; 1) residential, 2) commercial, 3) industrial and agricultural, and 4) unclassified (undeveloped and unused land and water areas). The Facility and adjacent industrial and manufacturing facilities would be characterized as NAC 3. The most sensitive receptor area would be classified as NAC 1 during the nighttime.

TABLE 4-1
MINNESOTA NOISE STANDARDS (MINNESOTA RULES 7030.0040)

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

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

4.3.1 Baseline Noise Survey

A baseline environmental noise survey was conducted on November 25 and 26, 2003 at the site to document existing noise levels. Noise monitoring was conducted at three locations along the west, south, and east site boundaries and two locations at nearby residential receptors (see Figure 10). A measurement location along the northern boundary of the Facility site was not included due to the anticipated topography changes in this area associated with ongoing landfill operations that would render these results meaningless in the future. Noise measurements were taken during the daytime and nighttime hours in accordance with the procedures outlined in the Minnesota Noise Standards. The results of these measurements will be used to evaluate the noise impact under existing conditions and utilize this information in finalizing the design of the Facility. Results of the noise survey are presented in a report included in Appendix B.

The daytime noise survey results showed that the baseline noise levels are below the applicable limits at the residential and boundary locations. The major daytime noise sources during the survey period included traffic on nearby roadways (3rd Avenue, U S Highways 169 & 14), traffic associated with landfill operations and flyover of geese.

The nighttime noise survey results also were below the applicable limits at the residential and boundary locations. The major nighttime noise sources during the survey period included traffic on nearby roadways (3rd Avenue, U S Highways 169 & 14) and local industrial operations.

4.3.2 Noise During Facility Construction

Facility construction is expected to consist of site excavation and grading, foundation work, steel erection, finishing, and the installation of Facility equipment. Sources of noise during the construction period will include delivery trucks and haul trucks, earth moving and grading equipment (bulldozers, graders), cranes, and fabrication activities (pneumatic wrenches, saws, welding equipment). Many of these noise sources are intermittent and of short-term duration during the construction period. The most intrusive sources of noise during construction would be from dynamic pile driving activities, to the extent such activities would be required. Portions of the construction of the Facility will involve indoor work such as pipefitting, electrical wiring, and equipment installation. Those indoor activities normally do not result in appreciable outdoor noise.

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

- Outdoor and noisy construction activity to will be limited to daylight hours to the extent practicable.
- Controlling the extent and duration of pile driving and other noisy activities that may be required during construction.
- Limiting the duration of the overall construction period, by contracting for sufficient construction resources and through efficient scheduling and coordination of construction activities.

Based on the mitigation measures that will be taken, existing background noise levels, and distance to sensitive noise receptors, it is anticipated that any noise impacts due to the construction of the Facility will be minimal.

4.3.3 Noise During Facility Operation

Sources of noise during routine Facility operation will include operation of process equipment, fuel oil delivery trucks, and maintenance activities. Delivery of fuel oil and associated noise from delivery trucks will be temporary and limited to those periods when fuel oil is burned as a backup fuel, which is expected to be infrequent and of limited duration. In a worst-case situation where the natural gas supply is interrupted for an extended period of time and the on-site fuel oil storage is depleted, the average number of tanker trucks delivering backup fuel oil would be approximately 56 trucks per day. This calculation is based on unloading of two 7,000-gallon capacity tanker trucks simultaneously, with approximately 45 minutes per tanker truck required for unloading and approximately 6 minutes required to switch from one tanker truck to another.

Noise from the Facility is expected to be relatively constant during operation. There may be brief episodes of intrusive noise (e.g., relief valve discharges) during periods of abnormal operations and Facility start-up and shut down. The major equipment noise sources during normal operation include:

- Multi-cell cooling tower.
- Two combustion turbine generators.
- Three step-up electrical transformers.
- Steam turbine generator.
- Two heat recovery steam generators.

The potential impacts of noise on nearby residential receptors 1 and 2, which were identified during the baseline noise survey, were evaluated quantitatively. Noise emission data for each source was compiled from three references. The cooling tower noise emission data was provided by Marley Cooling Technology (2/24/04). The HRSG noise estimate was supplied by another equipment supplier, Nooter Eriksen (1/15/04). Data on noise from the combustion turbines was provided by Siemens-Westinghouse (2/24/04). The remaining equipment noise levels were taken from a noise assessment report prepared for a similar Calpine facility in Wisconsin.[4]

[4] **Fox Energy Center Noise Impact Assessment, July 2003.**

The Facility will employ stack silencers, low-noise fans and related equipment at the cooling tower, and equipment enclosures around the transformers and combustion turbines, which will ensure noise emissions during normal operation will comply with applicable Minnesota Noise Standards. It is anticipated that noise impacts due to Facility operations will not have an adverse effect on the surrounding area.

Noise data for the selected equipment was adjusted to reflect the application of the planned noise mitigation measures and combined with the baseline noise survey results to estimate noise levels at nearby receptors and determine compliance with noise standards. At residential receptor 1, the estimated daytime L50 is 53.2 dBA and the estimated nighttime L50 is 49.1 dBA. At residential receptor 2, the estimated daytime L50 is 48.1 dBA and the estimated nighttime L50 is 46.4 dBA. These levels are well below the Minnesota noise limits for residential areas.

The adjacent properties to the site are classified as NAC 3 (industrial) receptors, where the Minnesota Noise Standards allow for greater noise levels than at NAC 1 (residential) receptors. The calculated noise levels during Facility operations are shown on the noise contours of Figure 3 of the complete noise report in Appendix B. The projected noise levels at the industrial receptors are well within the NAC 3 limits. Further numerical results and related discussion are also provided in Appendix B.

4.4 AESTHETICS

The Facility will blend into the established industrial area on the north edge of Mankato. The Facility site is adjacent to the Wilmarth Generating Station and related Wilmarth electrical substation. The Wilmarth Generating Station is a two-unit generating plant that was built in the late 1940s to burn coal. The facility's two generating units were converted to burn processed municipal solid waste in 1987. Other adjacent industrial and manufacturing facilities located adjacent to the Facility site include a waste processing company, auto salvage yards, scrap metal

operations, a construction company, a U.S. Postal Service mail processing facility, and a household hazardous waste collection site.

The various buildings, pieces of equipment, exhaust stacks, storage tanks, cooling tower, and ancillary equipment that make up the Mankato Energy Center will be arranged on the site as shown on the site plan (Figure 5). All roads at the Facility will be paved and will be designed to efficiently and safely move traffic onto, around and off of the Site. Sufficient paved parking areas for employees and visitors will also be provided on site.

The tallest building at the Facility will be the steam turbine generation building on the south side of the site at an approximate design height of 110 feet above ground level. The other two main buildings (administrative building and water treatment building) are based on approximate design heights of 25 feet. The two HRSGs will be located outdoors with their design heights varying between 60 and 114 feet. The height of the adjacent combustion turbine generators will vary between 25 and 70 feet. The design height of the cooling tower to be located on the east side of the site is 45 feet.

The tallest structures at the Facility will be the two HRSG stacks, which are proposed to be 200 feet tall. If the stacks were to exceed 200 feet in height, the Federal Aviation Administration ("FAA") could impose requirements such as obstruction warning lights and other measures intended to improve visibility of the structures. Notification will be provided to the FAA of the planned construction of these structures, and Mankato Energy expects that a determination of "no hazard" will be issued and that no additional lighting requirements will be imposed.

The HRSG stacks would be most visible from the west end of Summit Avenue and would possibly be visible from along the Minnesota River depending on the vantage point. The stacks will look similar to the two stacks located at the nearby Wilmarth Generating Plant, which are shown in the lower right-hand photo on Figure 9 and stand 158 feet tall. Due to the existing topography, finished grades at the demolition waste landfill, a dense grove of mature trees located around the perimeter of the site, and the distance away from adjacent roadways, most of the other structures at the Facility should not be visible to the general public.

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

In addition to effects on visibility associated with water vapor, certain stack emissions have the potential to impact local visibility. Emissions of particulate matter can reduce visibility by scattering light, and emissions of nitrogen oxides can reduce visibility by absorbing light. The Facility must apply Best Available Control Technology ("BACT") for both of these visibility-related pollutants, as explained in Section 5.1. Furthermore, the emissions of nitrogen oxides will be continuously monitored to ensure compliance with BACT-related emission limits. Accordingly, emissions from the Facility are not expected to have a significant impact on local visibility. This conclusion is substantiated by the fact that the maximum projected air quality impacts as presented in Section 5.1 have been shown to be well below the federal and state ambient air quality standards.

Lighting at the Facility will be provided for security and plant operational purposes. Mankato Energy will light the grounds in a manner similar to other industrial sites using directional lighting and minimizing light impacts onto adjacent property. Off-site lighting impacts should be minimal and are not expected to affect any residential areas.

The Facility is located within an industrial area on the north edge of Mankato, and most of the buildings and structures will be far enough away from adjacent roadways or screened from view by exiting trees or other physical barriers; therefore, no significant visual impacts to the surrounding area are anticipated. Overall, the Facility will blend in well with existing adjacent industrial and manufacturing facilities including the Wilmarth Generating Station, which has been a part of the local landscape for more than 50 years.

4.5 SOCIOECONOMIC IMPACTS

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

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

- Construction of the Facility is estimated to cost $240 million and will employ as many as 450 construction workers at peak construction periods. It is anticipated that workers commuting to the site from the three-county area (Blue Earth, Nicollet, and Le Sueur) will fill most of the construction job needs. These jobs (include welders, pipefitters, iron workers, millwrights, carpenters, electricians, and other trades) will benefit the local economy during the construction phase. Once in operation, the Facility will employ approximately 24 full-time workers, with many of these positions being filled from within the local community.
- The state of Minnesota and Blue Earth County will receive sales and income tax revenue from the construction of the project as well as income taxes from permanent full-time employees once the Facility is up and operating.
- The Facility will also bring indirect jobs to the area in the form of local support services.
- Mankato Energy intends to be an active member of the local community, participating in charitable events, community service organizations, and outreach programs.

- The Facility is anticipated to have a useful life of at least 30 years, meaning that the Facility will provide the City of Mankato and Blue Earth County area with a reliable, consistent source of economic and other benefits for many years.

Addition of the Facility to the existing utility electric grid system also will have positive impacts for Minnesota in terms of both generation and transmission benefits. The Minneapolis/St. Paul metro area is a large load pocket located north of the Facility site. For this reason, excess power that does not flow through the nearby Wilmarth Substation transformers to serve local load will most likely flow from Mankato in a northerly direction toward the large load area. Adding the Facility, a large, efficient, and low-cost generator, in this area of Minnesota will benefit the stability and reliability of the system through local system voltage support. The location of the Facility also will enhance the geographic and fuel diversity of Minnesota's electric generation fleet.

4.6 CULTURAL VALUES

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

Today, the Cities of Mankato and North Mankato with a combined population of 44,245 continue to be a significant regional center for education, health care, commerce, industry, and

agriculture. In addition to serving as the county seat for Blue Earth County, Mankato provides goods and services to the nearby Counties of Nicollet and Le Sueur as well as other outlying areas of southern Minnesota.

The Facility site is located within an area zoned for industrial use and 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. A set of railroad tracks run along the south side of the site. Based on available records, operation of the limestone quarry began in the mid-1950s. In 1992, the site began accepting construction and demolition wastes under a permit issued by the MPCA.

As discussed in Section 7, the Minnesota Historical Society was contacted about possible archeological, historical or architectural resources located on or near the Site. Upon review of their records, the State Historic Preservation Office ("SHPO") concluded that there are no known or suspected resources present on or near the site that would be affected by the Facility. Based on SHPO's findings and the disturbed nature of the site from past limestone and gravel mining activities, construction and operation of the Facility should have no impact on cultural values in the area.

4.7 RECREATION

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

The Minnesota River is located approximately 1,800 feet west of the Facility site. The river and adjacent river bottoms provide recreational opportunities in the form of boating, fishing, and hunting. However, there are no public access points, boat landings, designated trails, or developed public facilities along the stretch of river flowing near the Facility site.

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

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

Although there are recreational facilities in the area of the Facility site, as described above, construction and operation of the Facility will not directly impact any existing public land, trails, parks, or other areas used for recreation.

4.8 PUBLIC SERVICES

4.8.1 Transportation System

As discussed in Section 3.1, the existing public roadway network and site access road are adequate to serve the Facility, and no public transportation improvements will be required for construction or operation. Access to the site is provided west of 3rd Avenue off Summit Avenue

via an existing paved road that currently serves the demolition waste landfill. It has not yet been determined if the set of existing railroad tracks running along the south side of the site will be utilized to deliver any materials or equipment during construction of the facility. If these tracks and the existing railway system are utilized, minor upgrades and improvements to the tracks may be required.

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

4.8.2 Water and Sewer Services

As discussed previously in Sections 2.7 and 3.4, water and sewer services will be provided by the City of Mankato in accordance with an interconnection agreement or service contract between Mankato Energy and the City. The City will supply both process water and potable water to the Facility and will receive domestic wastewater discharges. Mankato Energy will construct its own water storage facilities on site. Details regarding the location of utility lines to be extended onto the site and connections to the existing municipal systems will be finalized at a later date. Wherever possible, utilities will follow existing easements to help reduce costs and minimize local impacts.

4.8.3 Waste Collection and Disposal

Mankato Energy will privately contract with local waste haulers to properly collect and dispose of all liquid and solid wastes generated at the facility. No municipal services would be required.

4.8.4 Fire and Police Protection

During construction of the Facility, the City of Mankato will provide fire and police protection and rescue services. The Facility will be equipped with a security system and fire suppression system. The City of Mankato will continue to provide emergency services as necessary once the

plant is up and running, and coverage of the Facility should not affect the existing capabilities of the City's fire and police departments.

5.0 Effects on Public Health and Safety

5.1 AIR EMISSIONS

5.1.1 Sources of Emissions to the Air

The Facility will include two identical combined cycle combustion turbines (rated at approximately 290 MW each in combined cycle mode at winter ambient conditions) equipped with DLN combustors. The combustion turbines will be fired primarily by natural gas with low sulfur distillate oil as a backup fuel. Backup oil firing is limited to 10 percent of the available annual operating hours. The combustion turbines will also have the capability of injecting steam for the generation of additional power as dictated by demand. This is referred to as power augmentation. Each of the combustion turbines will exhaust to a separate HRSG having a supplementary duct firing capacity of 800 MMBtu/hr. The duct burners are fired only with natural gas. Mankato Energy will install a selective catalytic reduction system to reduce NO_x emissions and a catalyst oxidation system to control CO emissions from the combustion turbine duct burner exhaust.

Secondary combustion sources include an auxiliary boiler with a rated heat input of 70 MMBtu/hr and an emergency generator. Mankato Energy will also install a fire pump engine if it is determined that the City of Mankato's water system will not be able to supply the Facility with adequate flow. The auxiliary boiler will be fired with natural gas only and the emergency generator and fire pump engine will be fired with diesel fuel. Other non-combustion related sources include fuel oil storage tanks and the cooling tower.

5.1.2 Air Pollutants Emitted, Control Measures, and Compliance Testing

5.1.2.1 Air Pollutants Emitted

The Facility must obtain a Prevention of Significant Deterioration ("PSD") permit from the MPCA prior to construction of the Facility. An air permit application was submitted to the MPCA on December 3, 2003. Combustion-related emissions of particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, volatile organic compounds and sulfuric acid are of primary interest because these pollutants are emitted in quantities that exceed the threshold triggering PSD review. The estimated annual emissions of these pollutants from the PSD application are shown in Table 5-1. Emissions of sulfuric acid, ammonia, and other non-criteria pollutants are addressed further in section 5.1.5.

TABLE 5-1
PROPOSED COMBINED CYCLE SYSTEM PERMIT LIMITS
AND POTENTIAL ANNUAL EMISSION RATES

Pollutant	Maximum Emissions		Proposed Emission Controls	Compliance Basis
	Proposed Permit Limit [1]	Potential to Emit (tpy)		
Particulate Matter (PM)/PM_{10}	30.1 lb/hr natural gas combustion, 72.8-lb/hr distillate oil combustion.	301	Good combustion control practices and use of clean fuels.	Performance Test
Nitrogen Oxides ("NO_x")	3.0 ppmvd without power augmentation, 3.5 ppmvd with power augmentation, 5.5-ppmvd fuel oil combustion.	341	DLN combustor technology and the installation of selective catalytic reduction. (SCR) on the combined cycle combustion turbine systems.	Continuous Emission Monitor (CEM)
Carbon Monoxide ("CO")	4.0 ppmvd without power augmentation, 4.5 ppmvd with power augmentation, 4.8 ppmvd fuel oil combustion.	254	Good combustion control practices and the installation of an oxidation catalyst system on the combined cycle combustion turbine systems.	Continuous Emission Monitor (CEM)
Volatile Organic Compounds ("VOCs")	3.0 ppmvd without power augmentation, 3.8 ppmvd with power augmentation, 2.0 ppmvd fuel oil combustion.	121	Good combustion control practices and the installation of an oxidation catalyst system on the combined cycle combustion turbine systems.	Performance Test
Sulfur Dioxide ("SO_2")	< 0.8 grains of Sulfur/100 scf in natural gas, <0.05% sulfur content of distillate oil.	114	Good combustion practices and use of clean-burning fuel.	Monitor sulfur content of fuel.
Sulfuric Acid	< 0.8 grains of Sulfur/100 scf in natural gas, <0.05% sulfur content of distillate oil.	13.6	Good combustion control practices and use of clean-burning fuel.	Monitor sulfur content of fuel.

[1] All concentrations based on a ppmdv are corrected to 15% oxygen.

In addition to the above pollutants, there will be a small release of ammonia from the combined cycle system stacks. Mankato Energy is proposing to utilize SCR systems to control NO_x emissions from the combustion turbines. Ammonia emissions result from the use of ammonia as a reagent in the SCR system. Ammonia emissions, also referred to as "ammonia slip," will be at a low concentration of less than 10 ppm.

5.1.2.2 Emission Control Measures

As noted earlier, Mankato Energy must obtain a PSD permit from the MPCA to authorize construction of the proposed facility. This requires the application of the Best Available Control Technology ("BACT") to control emissions from the Facility's emission units. Mankato Energy will satisfy BACT requirements by applying the most effective of available options to control NO_x, CO, VOC, and organic emissions from the combustion turbines. The facility will utilize the following emissions control strategies:

- Firing primarily natural gas in the turbines (distillate oil firing limited to 875 hours per year) to minimize sulfur dioxide and particulate emissions from the turbine.
- DLN combustors and water injection are used while firing natural gas and oil, respectively, to minimize the formation of oxides of nitrogen in the combustion turbines.
- SCR to reduce oxides of nitrogen emissions in the combustion turbine exhaust gas.
- Catalytic oxidation to reduce CO, VOC, and organic air pollutant emissions from the combined cycle system exhaust gas.
- Firing solely natural gas in the auxiliary boiler to minimize pollutant emissions.
- Limiting operation of the emergency generator and fire pump to less than 300 hours per year.
- Installation of high efficiency mist eliminators to reduce cooling tower drift rate to minimize particulate matter emissions from the cooling tower.

5.1.2.3 Compliance Testing

Compliance with emissions permit limits will be demonstrated by means of Continuous Emission Monitoring Systems ("CEMS") operating according to demonstrated performance criteria, by periodic stack emissions tests, or by monitoring fuel. Mankato Energy is proposing to install CEMS to continuously measure CO and NO_x emissions in the combined cycle system exhaust. Stack testing or fuel monitoring will be required for the other pollutants as specified by the MPCA in the air permit for the Facility.

5.1.3 Criteria Pollutant Impacts

5.1.3.1 Significant Impact Level Analysis

As part of the PSD permit application, air dispersion modeling was performed to demonstrate that the emissions from the Facility will not cause or contribute to a violation of an ambient air quality standard or PSD increment. Preliminary modeling was performed using a modeling protocol that conforms to U.S. Environmental Protection Agency ("EPA") standards to predict the maximum ambient concentrations of NO_2, CO, PM_{10}, and SO_2 resulting from the Facility's emissions alone. These concentrations were compared to the PSD ambient air significant impact levels ("SILs"). The ambient impact significance levels serve as screening criteria to determine if further analyses are required to verify that the emissions will not cause or contribute to an exceedance of an ambient air quality standard or PSD increment. If all modeled concentrations are below their respective SILs, then further modeling for the National and Minnesota Ambient Air Quality Standards ("NAAQS" and "MAAQS", respectively) and PSD increment compliance is not required.

Preliminary modeling of the Facility's emissions alone yielded predicted CO concentrations below the PSD significant ambient impact levels; therefore, no further modeling was required for CO. Further modeling to more thoroughly assess NAAQS/MAAQS and PSD increment compliance was performed for NO_2, SO_2, and PM_{10}. Table 5-2 summarizes the preliminary modeling results and compares the results to their respective SIL.

TABLE 5-2
PRELIMINARY MODELING RESULTS

Pollutant	Averaging Period	Predicted Ambient Concentration ($\mu g/m^3$)	PSD Significant Ambient Impact Level ($\mu g/m^3$)
SO_2	3-hour	86.72	25
	24-hour	39.43	5
	Annual	4.43	1
NO_x	Annual	3.79	1
PM_{10}	24-hour	27.85	5
	Annual	1.79	1
CO	1-hour	147.68	2,000
	8-hour	81.77	500

5.1.3.2 Increment Modeling

PSD increments have been established for NO_2, SO_2, and PM_{10} to prevent degradation to air quality by limiting the cumulative change in ambient concentrations that can occur due to construction or modification of stationary sources in the region after the specific baseline date for each pollutant. The baseline date for SO_2 for this region was triggered in 1985 and the NO_2 baseline date for this region was triggered in 2000. Therefore it is necessary to include changes at other facilities occurring after the baseline date in assessing the PSD increments. The minor source baseline date for PM_{10} is triggered by this project so only Mankato Energy sources are included in the PM_{10} increment analysis.

The modeling results presented in Table 5-3 demonstrate compliance with the PSD increments for all applicable averaging periods.

TABLE 5-3
INCREMENT MODELING RESULTS

Pollutant	Averaging Period	Predicted Ambient Concentration ($\mu g/m^3$)	PSD Increment Ambient Impact Level ($\mu g/m^3$)
PM_{10}	24-hour	22.27	30
	Annual	1.79	17
NO_2	Annual	3.79	25
SO_2	3-hour	88.2	512
	24-hour	33.1	91
	Annual	5.60	20

5.1.4 NAAQS Modeling

Mankato Energy sources were modeled to determine compliance with the ambient air quality standards. MPCA guidance was relied upon in determining appropriate background concentrations for NO_2, SO_2, and PM_{10}. The modeling results for the $PM_{10,}$ NO_x, and SO_2 ambient air quality standards presented in Table 5-4 demonstrate compliance with the applicable standards for all averaging periods.

TABLE 5-4
MODELING RESULTS - $PM_{10,}$ NO_2, and SO_2 NAAQS/MAAQS

Pollutant	Averaging Period	Facility's Contribution to Predicted Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	Ambient Air Quality Standard ($\mu g/m^3$)
PM_{10}	24-Hour	22.27	42	64.27	150
	Annual	1.79	21	22.79	50
NO_2	Annual	3.79	23	26.79	100
SO_2	1-Hour	104.47	181	285.47	1300
	3-Hour	76.42	128	204.42	1300
	24-Hour	33.36	60	93.36	365
	Annual	4.43	5	9.43	80/60

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

5.1.5 Air Emissions Risk Analysis

Mankato Energy completed an Air Emissions Risk Analysis ("AERA") in accordance with MPCA technical guidance (Facility Air Emissions Risk Analysis Guidance; Version 1.0; September 2003). The purpose of the AERA is to assess the potential health risk attributed to air emissions from a given source. The AERA includes both quantitative and qualitative analyses. In the quantitative portion of the analysis, the potential incremental cancer risks and non-cancer hazard indices are estimated using procedures outlined in MPCA guidance. The qualitative portion of the analysis identifies and discusses items of potential interest that cannot be easily quantified. Detailed documentation for the AERA will be submitted to the MPCA for review. A summary of the AERA and its findings are presented here.

MPCA guidance exempts natural gas-fired combustion units from review. Further, Mankato Energy has agreed to accept limits of 300 hours per year or less on the diesel fired emergency generator and fire pump. These limits exempt these units for AERA review under MPCA guidance. Therefore, the AERA needed only to address the emissions resulting from combustion of the low-sulfur distillate oil back-up fuel in the combustion turbines. Emission species assessed included trace metals, acid gases, ammonia, and aromatic hydrocarbons resulting from incomplete combustion.

The MPCA's AERA guidance allows for a preliminary assessment based on the use of screening level air dispersion modeling to predict exposure levels. However, since the project was undergoing refined modeling for criteria pollutants, refined modeling inputs rather than screening level modeling were used in the AERA. Maximum one-hour impacts for each pollutant were determined for assessing acute exposures. The maximum annual impacts for each pollutant were determined for assessing chronic exposures and/or cancer risk. These exposures

were then compared with pollutant-specific toxicity values supplied by the MPCA. Hazard indices and cancer risks were then calculated. The results are summarized below.

Hazard indices were determined for acute, sub-chronic, and chronic exposures. A cancer risk was also determined. These values are as follows:

TABLE 5-5
PRELIMINARY AERA RESULTS

	Results	Acceptable Level
Acute Hazard Index	0.3	1.0
Sub-chronic Hazard Index	<0.01	1.0
Chronic Hazard Index	0.07	1.0
Cancer Risk	3×10^{-6}	1×10^{-5}

5.1.6 Air Permitting Requirements

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

5.2 PUBLIC WATER SUPPLY

No groundwater wells will be installed on site to serve the Facility. Cooling and process water will be supplied from effluent taken from the Mankato municipal wastewater treatment plant and piped through a dedicated line to the Facility. Potable water for domestic uses such as drinking water, showers, toilets, sinks, and other incidental water needs will be supplied by the municipal water supply system through a lateral service line. Additionally it is anticipated that the Facility will use potable water to supply its boiler makeup, consuming up to 200 gallons/minute ("gpm").

The Cities of Mankato and North Mankato maintain separate municipal water supply systems. Mankato has five groundwater wells located throughout the city and none are within two miles of the project site. North Mankato has four groundwater wells and likewise, they are more than

two miles from the project site. Therefore, it is assumed the site is well beyond the boundaries of the wellhead protection area and no potential impacts to existing groundwater resources or water supplies that could affect public health and safety are anticipated as a result of construction and operation of the Facility.

5.3 TRAFFIC

The existing roadway network and site access road are adequate to serve the Facility and no transportation improvements will be required for construction or operation. Access to the site will be provided off Summit Avenue via 3rd Avenue (County Road 5). The closest main highway serving the facility is Highway 14 located approximately one-half mile to the south. A diamond intersection is located at the 3rd Avenue crossing providing a safe entrance and exit to and from the highway. There are no private residences along Summit Avenue or along the section of 3rd Avenue between Summit and Highway 14 that would be affected by traffic generated by the Facility. Vehicles going to and from the Facility would not have to pass through the central business district or any nearby residential neighborhoods.

During normal operations, the Facility will employ approximately 24 full-time employees and the impact on existing traffic is expected to be insignificant. Natural gas is the primary fuel for the combustion turbines and will be transported to the site via an underground gas pipeline to be constructed and connected to the main natural gas pipeline located approximately three miles away. To ensure uninterrupted operation of the Facility and maintain MAPP accreditation, fuel oil will be stored on-site and burned as a back-up fuel. The fuel oil will be stored in an aboveground storage tank with a capacity of up to 900,000 gallons, which represents approximately 36 hours of uninterrupted electricity generation (with two combustion turbines operating) when the primary fuel is unavailable. Fuel oil will be delivered to the site via tanker truck.

Mankato Energy has applied for an air emissions permit to operate the facility for up to 875 hours per year (roughly five weeks) on fuel oil but anticipates actual usage to be much less than

this as interruptions or curtailment of the natural gas supply are expected to be rare, isolated, and of limited duration. Fuel oil tanker trucks hold an average of 7,000 gallons of fuel. Therefore, in the extremely unlikely event of an extended use of fuel oil, it would take approximately 130 tanker truck deliveries to refill the storage tank. This would present a temporary, but significant, increase in traffic on the local roadways. Fuel tanker truck deliveries could be spaced over several days to refill the storage tank after the primary fuel supply has been restored; however, if the primary fuel supply were interrupted for a period of time beyond the onsite storage capacity, the average number of tanker truck delivering back-up fuel to the facility would be approximately 56 trucks per day.

Existing traffic levels will increase temporarily during construction of the facility and will vary during different phases of the construction period. Construction of the Facility will take place over a period of approximately 20 months and will employ as many as 450 construction workers at peak construction periods. It is anticipated that workers commuting to the site from the three-county area (Blue Earth, Nicollet, and Le Sueur) will fill most of the construction job needs. Construction traffic at the site will include the movement of work crews, delivery of construction equipment and materials, and support personnel.

Impacts on local roads can be expected at the beginning and end of each workday and at shift changes. Occasional large and/or slow-moving vehicles on local roadways (similar to the movement of existing farm equipment and machinery) and utilities installed to serve the facility (gas, sewer, water, telephone, etc.) may also temporarily impact traffic during construction and could result in temporary lane closures and/or traffic rerouting. These temporary closures and rerouting would be coordinated with the City, Township, and County as appropriate. A set of existing railroad tracks no longer in use run along the south side of the site. It has not yet been determined whether these tracks and the existing railway system will be utilized to deliver any materials or equipment during construction of the facility. If the rail line is utilized, it would be limited to transporting a few pieces of very large equipment and possibly some bulk equipment like boiler pipes and traffic impacts would be minimal.

Given the location of the Facility in an industrial area on the edge of town and the capacity of existing highways and local roads serving the site and surrounding area, vehicular traffic during construction and operation of the facility should not significantly affect existing traffic flows except on rare occasions when the natural gas supply is interrupted and tanker trucks are needed to deliver fuel oil on a continuous basis.

5.4 AIRCRAFT

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

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

5.5 PLUMES

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

The visible plumes from the stacks and from the cooling tower at the Facility are not expected to impair visibility or safety on adjacent roadways. The plume rising from the 200-foot stacks should dissipate well before reaching ground level. The cooling tower will be designed to incorporate "high efficiency drift eliminators to minimize fogging and icing potential from the plant. Summit Avenue and 3rd Avenue, the nearest adjacent roadways, are at least 800 feet away from the cooling tower**.**

6.0 Effects on Land-Based Economies

The Cities of Mankato and North Mankato with a combined population of 44,245 have experienced tremendous growth over the past decade, evolving into a regional retail, manufacturing, health care, and trade center providing goods and services to the surrounding Counties of Blue Earth, Nicollet, and Le Sueur as well as other outlying areas of Southern Minnesota. As previously discussed in Section 4.5, construction and operation of the Facility will provide positive economic benefits to Mankato and the surrounding area.

The proposed project site is located within an area zoned for industrial use and is situated on the southern portion of an old limestone quarry that has been mined to completion and is currently being used as a demolition waste landfill and composting facility owned and operated by SMC. The landfill began accepting construction and demolition wastes in 1992. SMC is currently in the process of permitting a new demolition waste landfill site on property they own approximately one mile to the north. SMC will eventually move their operations to this new site once the storage capacity of the existing facility is reached and/or the landfill is closed. SMC will be fairly compensated for the amount of land purchased by Mankato Energy upon which to build their power plant.

As described below, the Facility will not affect the agricultural, forestry, or mining industries in the area nor will the Facility adversely impact existing tourism.

6.1 AGRICULTURE

No agricultural land will be taken out of production as a result of the construction and operation of the Facility. The closest agricultural lands are located approximately one-half mile to the north and will not be affected by the Facility.

6.2 FORESTRY

There will be no adverse effects to the forestry economy as a result of the Facility. The Facility site is not located on or near any commercial forestry land.

6.3 TOURISM

There will be no adverse effects to the tourism economy from the Facility. The Facility site is not located on or near any tourist attractions.

6.4 MINING

There will be no adverse effects to the mining economy from the Facility. The Facility site is a former limestone quarry that has been mined to completion. There are other old limestone quarries in the area but no active mining is taking place at this time. Land is currently being cleared along the west side of County Road 5 approximately one-mile north of the site for a future gravel mining operation, but this area will not be affected by the Facility.

7.0 Archaeological and Historic Resources

Information was requested from the SHPO about possible archeological, historical, or architectural resources located on or near the proposed project site. A response letter dated September 9, 2003 was received from SHPO indicating that no known or suspected archeological, historical, or architectural resources are present in the area that would be affected by the project (see attached letter in Appendix C). Based on these findings and due to the disturbed nature of the site from past limestone and gravel mining activities, construction and operation of the proposed Facility will have no impact on any such resources.

8.0 Effects on the Natural Environment

8.1 AIR QUALITY

The maximum projected air quality impacts on plants, animals, and soils resulting from construction and operation of the Facility are anticipated to be insignificant. As identified previously in Section 5, the projected impacts from the Facility will comply with the primary and secondary NAAQS and PSD increment standards. EPA has set the primary standards to protect human health, and the secondary standards to protect public welfare, including that of visibility, plants, soils, and animals. The PSD increment standards prevent the degradation of air quality in areas with clean healthful air.

Additional information was gathered to further support this conclusion. Land in the immediate vicinity of the proposed Facility, is classified in the 1999 Blue Earth County Land Use and Cover Survey as consisting of gravel pits and open mines (mostly gravel and non-paved surfaces.) Compliance with the secondary NAAQS will ensure that there are not adverse impacts to the types of soils and vegetation in the vicinity of the proposed Facility.

8.2 LAND

Site topography and a visual record of existing conditions are provided in Figure 9. The Facility site is approximately 25 acres in size and is located within an area zoned for industrial use. This site 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 SMC. A set of railroad tracks no longer in use runs along the south side of the site. A paved access road to the site is provided from the south off Summit Avenue. Based on

available records, the limestone quarry began operations back in the mid-1950s. In 1992, the site began accepting construction and demolition wastes under a permit issued by the MPCA.

The site currently contains a few buildings used primarily for sorting demolition waste materials and storing equipment. An outside storage area containing sanitary and storm sewer pipe and miscellaneous construction material is located on the east side of the site. A mobile trailer located on the southern portion of the site is currently being used by SMC for office space. The truck scale, recycling bins, and compost piles also are located in this area. The facility accepts yard and garden waste, brush, and other vegetation debris, which is processed, placed into compost piles and then sold to the general public. SMC also sells landscaping materials including wood chips, decorative rock, and retaining wall blocks, which are stored outside on the site property. A recently improved gravel haul road leading to active fill areas of the demolition waste landfill is located on the west side of the site.

The majority of the site has been previously disturbed by activities associated with past gravel and limestone gravel mining activities and more recently with demolition waste landfill and compost operations described above. Wooded areas exist on the east edge of the site along a drainage ditch, which receives stormwater runoff from the site and surrounding areas and flows northerly to the Minnesota River. A railroad trestle is located east of the site access road where the railroad tracks cross the drainage ditch. Wooded areas also exist along the south side of the site along the railroad tracks.

Mankato Energy conducted a Phase I Environmental Site Assessment in September 2003 to determine the potential for environmental liabilities associated with the Facility site and adjacent properties. Findings from this environmental assessment are documented in a report prepared by Wenck Associates, Inc. dated October 2003. Subsequently, a Limited Phase II Environmental Site Assessment ("Phase II") was conducted by Mankato Energy in November 2003 focusing on those recognized environmental conditions identified in the Phase I study relevant to the site itself. The Phase II study included a subsurface investigation that involved soil and groundwater sampling at five locations. Based on the results presented in the Phase II report prepared by

Wenck Associates, Inc. dated December 2003, it was determined that no environmental hazards were evident at the Facility site due to past land use that would require further action.

As shown on the site plan aerial overlay provided in Figure 11, roughly three-quarters of the 25-acre site would be developed as part of the Facility. The proposed development is generally confined to areas of the site previously disturbed by activities associated with gravel and limestone gravel mining activities and demolition waste landfill and compost operations. Existing wooded areas located along the east and south sides of the site will not be disturbed and will continue to serve as a buffer and visual barrier between the site and adjacent properties while also providing wildlife habitat.

Based on the contours from the topographic site survey completed by Mankato Energy in November 2003**,** existing ground elevations on the site vary from approximately 780 feet to 810 feet. A large amount of cut and fill will be required to adequately level the site and allow for construction of the Facility at a planned base elevation of 795 to 800 feet. The demolition waste landfill operates under a MPCA permit that specifies a closure plan. The existing closure plan will be amended to include a 50-foot setback between the north property line of the Facility site and demolition waste landfill material that will eventually be placed in this part of the landfill as part of the ongoing landfill operations. The final grade of the landfill cover will slope upwards from this point at an approximate 5:1 slope to its planned final landfill elevation of approximately 840 feet.

8.2.1 Subsurface Investigations

Eight soil borings were taken at various depths across the site in September 2003 as part of a preliminary subsurface investigation and geotechnical evaluation. The investigation was performed to determine existing soil conditions and aid in the design of building and major equipment foundations, floor slabs, pavements, utility support, and earthworks for the Facility. Subsurface site information was collected to help describe the site geology, characterize existing soil conditions, and determine groundwater levels in the area. Results of the soils investigation

are provided in a written report to Calpine prepared by STS Consultants, Ltd., dated October 15, 2003.

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

The soil profile generally consists of fill material of varying thickness consisting primarily of sand, silty sand, gravel, clay, topsoil, and concrete rubble overlying weathered limestone bedrock or Jordan sandstone. During the investigation, groundwater was encountered in three of the eight borings varying in depths from 6.9 to 21.5 feet below the ground surface, corresponding to elevations from 775 to 795 feet. The higher water level observed in one of the borings is likely perched water above clayey fill material that was encountered. The long-term hydrostatic groundwater table is probably closer to the lower elevation of 775, which is consistent with the average groundwater levels observed in the monitoring wells installed on the site as part of the Limited Phase II study described above. Variations in the location of the groundwater table should be expected seasonally and with variations in precipitation, evaporation, and surface runoff. Based on the above information, groundwater levels are roughly 20 feet below the Facility's proposed minimum base elevation of 795 feet and therefore, should not be impacted during construction and operation of the Facility.

8.3 WATER RESOURCES

8.3.1 Floodplains

A review of the Federal Emergency Management Agency ("FEMA") mapping done for Blue Earth County and the City of Mankato indicate that the Facility site is not located with a regulated 100-year floodplain area. Designated 100-year floodplain areas along the Minnesota River within Blue Earth County and the City of Mankato were delineated as part of FEMA's National Flood Insurance Program. Figure 12 shows 100-year floodplain areas within the general vicinity of the site. The 100-year floodplain elevations range from 774 to 775 feet. Existing ground elevations vary from 780 feet in the low area of the old limestone quarry on the north side of the site to 810 feet on the south side of the site where SMC's office building and compost piles are located. The final base elevation for the developed portion of the Facility site is anticipated to be between 795 and 800 feet. Therefore, any site grading, excavation, and fill activities associated with site development would occur well above the 100-year floodplain and would not result in any floodplain impacts or undue risk of flooding.

8.3.2 Shoreland Protection Areas

Based on discussions with City of Mankato staff, the drainage ditch running along the east side of the site is classified as a tributary stream in the Blue Earth County Shoreland Ordinance. Any proposed structures must maintain a 50-foot setback from the top of the bank of the channel or a 10-foot setback from the top of the embankment if the embankment slope is greater than 10 degrees and further than 50 feet from the stream. These setback requirements are in place to minimize impacts to the stream and protect water quality and have been taken into account in preparing the site layout plan for the facility.

8.3.3 Wetlands

Based on visual observations made during site visits and review of existing wetland mapping, there is no indication that existing wetlands would be impacted by the project. The U.S. Fish and

Wildlife National Wetlands Inventory ("NWI") maps were reviewed to make a preliminary evaluation of possible wetlands located on the project site. NWI maps covering the area were prepared in 1990 based on interpretation of high altitude 1980 aerial photography and limited field checks to classify and delineate approximate wetland locations.

Figure 13 shows the wetland areas identified on the NWI map within the general vicinity of the project site. These wetlands are confined to low outlying areas and are generally classified as seasonally flooded basins and inland shallow marshes. Since the portion of the site to be developed for the Facility is in upland areas or within disturbed areas of the former limestone quarry and current demolition waste landfill and composting site, it appears that no existing wetlands would be impacted by the project.

The DNR Public Waters Inventory map for Blue Earth County (revised 1996) also was reviewed for the presence of regulated waters and wetlands. The Minnesota River and an unnamed tributary to the north that flows along the north side of the landfill and into the Minnesota River are both classified as DNR protected watercourses. No other state protected waters or wetlands are located in the general vicinity of the Project area.

The actual route and required easements across adjacent properties needed for the wastewater discharge pipe from the Facility site to the Minnesota River have not been finalized at this time. It is anticipated that the pipe will extend to the north and then turn west to the river, passing through land owned by SMC. The buried pipe will have to cross the wetland area shown on Figure 13 at some point. Wetland areas will be temporarily impacted during installation of the pipe, but the utility work will not alter the original cross-sections of the basin. Impacts to the wetland will be minimal, and all disturbed areas will be properly restored. Installation of the pipe would be exempt from the Minnesota Wetland Conservation Act and will be covered under a U.S. Army Corps of Engineers ("ACOE") General Permit. Mankato Energy will obtain other necessary permits from the DNR and ACOE for construction of the discharge outfall pipe and structure along the bank of the Minnesota River.

8.3.4 Groundwater

No groundwater wells will be installed on site to serve the Facility and, therefore, no adverse impacts to groundwater resources are anticipated. As discussed previously, raw water for cooling and process water will be supplied in the form of treated wastewater effluent ("gray water") taken from the Mankato WWTP and piped through a dedicated line to the Facility. The Mankato WWTP, which recently underwent a major upgrade and expansion in 2000, has adequate capacity to meet the Facility's water needs. The use of the gray water as a water source will not require a DNR water appropriation permit. The DNR has made a determination that gray water is not considered to be a "water of the state", and therefore is not regulated by the DNR relative to water appropriation and consumptive use. Despite this regulatory determination, the Minnesota Legislature approved the consumptive use of water for the proposed Facility during its 2003 Legislative session.[5]

Potable water will be supplied by the City of Mankato's municipal water supply system through a lateral service line and used for steam cycle makeup and fire water, as well as for domestic uses such as drinking water, eye wash stations, showers, toilets, sinks, and other incidental water needs. Chemicals used at the Facility will be stored indoors or within appropriate containment areas. Fuel oil storage tanks and unloading areas will be equipped with secondary containment in accordance with federal SPCC requirements.

8.3.5 Stormwater Runoff

Stormwater runoff from the east half of the site currently flows overland to an existing drainage ditch that flows along the east side of the site. Adjacent industrial properties to the south and east of the site also drain to the ditch, which flows in a north/northwesterly direction discharging to the Minnesota River. The Minnesota River, flows in a northeasterly direction eventually discharging into the Mississippi River near Fort Snelling in St. Paul.

[5] Minnesota Session Laws 2003, 1st Special Session, Chapter 11, Article 3, Section 15.

The west half of the site drains to the north into the bottom of the old limestone quarry where stormwater runoff is then routed to a sediment basin located along the east side of the demolition waste landfill. The sediment basin, constructed by SMC as part of the landfill's operation plan, also receives drainage from landfill areas to the north including both active fill areas and areas that have been filled to capacity, capped, and vegetated. The sediment basin discharges to the drainage ditch through a plastic perforated standpipe located on the east side of the basin. The majority of the stormwater flowing into the basin infiltrates into the underlying permeable soils. According to SMC staff, discharges from the stormwater basin to the drainage ditch typically occur only in April or during heavy rainfall events.

As stated previously and as shown on the preliminary site plan aerial overlay (see Figure 11), roughly three-quarters of the 25-acre site will be disturbed during site grading and construction activities. Impervious surfaces will be added such as buildings and structures, power generation equipment, concrete equipment pads, storage tanks, paved areas, and access and service roads that will affect site drainage. There will also be hard-packed gravel surfaces scattered throughout the Facility. Other areas of the Facility site will be landscaped as appropriate with grass, trees and shrubs. Stormwater runoff from the Facility site will be managed as described in the next section.

8.3.5.1 Stormwater Management

An increase in stormwater runoff can be expected as a result of the added impervious surfaces from the proposed Facility. Stormwater runoff from general plant areas (non-process areas) will be directed to a stormwater pond to be constructed on the east side of the site next to the cooling tower as shown on Figure 11. The stormwater pond will provide settling capacity and discharge rate control prior to discharging to the nearby drainage ditch. The stormwater pond and outlet will be designed to meet the City of Mankato's requirements for water retention areas for new development projects that create new impervious surfaces of one acre or greater. Due to the nature of the existing permeable soils and underlying bedrock material, it is anticipated that the pond will function similar to an infiltration basin, retaining water for short periods of time and

thus providing additional stormwater treatment and further reducing runoff volumes and peak discharge rates.

Stormwater runoff coming into contact with the outdoor steam generator step-up transformer pad, combustion turbine pads and other process areas where there is potential for pollutant contamination by oils and other chemicals from pumps and motors, will be confined within curbed areas and drain to two area sump pump systems. The stormwater that is collected will then be routed to the Facility's oil/water separator and recycled into the cooling tower make-up water system. To ensure efficient operation of the oil/water separator, routine inspection and maintenance will be performed and accumulated materials cleaned out on an as-needed basis. All materials removed from the structure will be properly managed and disposed of offsite in accordance with applicable local, state, and federal requirements.

The Facility site will be properly maintained and good site housekeeping practices will be implemented to keep all road surfaces clean, reducing solids loading in stormwater runoff. Landscaped areas and natural vegetation buffer strips along the perimeter of the Facility site, which have low runoff potential, will provide further treatment of stormwater runoff by filtering out nutrients and suspended solids and promoting infiltration into underlying permeable soils.

The proposed best management practices ("BMPs") described above that will be implemented at the Facility have been proven to be effective methods of treating stormwater runoff and are management techniques typically recommended by the MPCA, watershed management organizations, and other water management and planning agencies. As a result, stormwater runoff from the Facility is not expected to adversely affect the flow rates or water quality in downstream receiving waters. The existing sediment basin constructed as part of the demolition waste landfill will not be affected by construction of the Facility and will continue to serve runoff from landfill areas in accordance with the landfill closure plan.

8.3.5.2 Storm Water Pollution Prevention Plan

A Stormwater Pollution Prevention Plan ("SWPPP") will be prepared for the Facility in compliance with coverage under Minnesota NPDES General Stormwater Discharge Permit MN G611000 for industrial activities. The SWPPP will identify potential pollutant sources at the Facility, outline operating procedures for material handling activities, and describe controls and BMPs that will be implemented to minimize pollutants in stormwater runoff. In addition to the stormwater management provisions described above, management practices will also include storage of chemicals indoors or within appropriate containment areas, good site housekeeping practices, and proper disposal of any waste materials.

8.3.5.3 Erosion and Sediment Control

A large amount of cut and fill will be required to adequately level the site and allow for construction of the Facility to the planned base elevation. It is likely that borrow material obtained from higher elevations will be used for fill material in low areas. A significant portion of the on-site fill consists of fine to medium sand, which is suitable material for use in building areas. Concrete rubble that is excavated will likely be crushed and reused as structural fill below equipment and buildings and to balance soils on the site. If any of the existing soil material on the site is found to be unsuitable for use, it will be excavated and hauled offsite and placed in a designated upland area.

Since construction of the Facility will disturb more than one acre of land, a permit application for coverage under Minnesota NPDES General Stormwater Discharge Permit MN R100001 for construction activities is required and will be submitted to the MPCA prior to construction. The permit application certifies that temporary and permanent erosion and sediment control plans have been prepared and implemented to prevent soil particles from being transported offsite. This general permit requires that runoff from a project's new impervious surfaces must be directed to an on-site stormwater treatment facility when development creates one or more acres of cumulative impervious surface. The proposed stormwater pond will satisfy this requirement and will be designed to in accordance with the criteria set forth in the General Permit for

sedimentation/infiltration basins. The pond will also serve as a temporary sediment basin during construction.

Mankato Energy will work with the City of Mankato to ensure that adequate measures are taken to minimize soil erosion and sedimentation on the site. Temporary erosion and sediment control measures will be maintained during construction and will remain in place until the Facility site has been stabilized and vegetation has been reestablished. In addition to the stormwater pond, control measures such as silt fence, staked hay bales, sediment filters and traps, erosion control matting, mulching, and crushed rock pads will also be used where applicable. All disturbed areas of the Facility site will be seeded and mulched as soon as practical after the grading, excavation work, and final development have been completed.

8.3.6 Temporary Dewatering

Temporary site dewatering of local groundwater may be required to facilitate excavation for building and equipment foundations and underground utility installation work. If dewatering is required, appropriate permits and approvals will be obtained from the DNR. Temporary dewatering, if required, is expected to have a minimal impact on groundwater levels outside the Facility development area.

8.3.7 Wastewater Discharges

The Mankato Energy Center will have two separate discharge points - one each for process and domestic wastewater. The Facility has been designed to maximize water reuse and recycling and to minimize wastewater discharges. As discussed in Section 2.7 and shown on the water usage flow diagram (Figure 6), process wastewater consisting of cooling tower blowdown, reverse osmosis reject, and other minor low volume waste streams will be discharged to the Minnesota River under an NPDES discharge permit to be obtained from the MPCA. Boiler blowdown and oil/water separator decant will be recycled to supplement the makeup water for the cooling tower and are components of the cooling tower blowdown.

It is estimated that the discharge rate to the Minnesota River will be approximately 0.69 MGD under average conditions and 1.47 MGD under maximum summertime conditions. The actual rate of discharge will be influenced by the ambient temperature and operating load of the Facility. Due to evaporative losses of water through the cooling tower, the dissolved solids in the gray water will become more concentrated as the water is recirculated. However, the total mass of dissolved solids will be essentially the same as that taken from the City of Mankato's WWTP. Any residual volatile compound left in the gray water after pretreatment will be expected to have been removed at the cooling tower and therefore will not be expected in the discharge effluent.

Process wastewater will be treated onsite with a phosphorus removal and dechlorination system prior to discharge to the river. The Facility's wastewater treatment equipment will be located in the northwest corner of the site as shown on Figure 11. The phosphorus removal system will consist of adding ferric chloride to the wastewater stream to chemically react with the phosphate and induce precipitation of iron phosphate. The precipitate that settles out in the clarifier is transferred to a sludge thickener where the solids content is increased through the addition of a polymer as a flocculant aid. The sludge is then transferred to a filter press where solids containing the precipitated phosphate are removed. The dewatered solids are collected and transported off site for proper disposal. The treated wastewater from the clarifier is then routed through a dechlorination system to remove residual chlorine prior to being piped to the Minnesota River.

A minor amount of wastewater also will be generated from intermittent off-line washing of the combustion turbines to remove any particulates accumulated on the compressor blades. The used wash water will be collected and stored in an onsite holding tank and will be trucked to a permitted offsite disposal facility by a licensed hauler on an as-needed basis.

The NPDES permit application is currently being prepared by Mankato Energy and is expected to be submitted to the MPCA in March 2004. The NPDES permit will regulate the wastewater discharge from the plant to ensure the protection of humans, aquatic life, wildlife, and beneficial uses of the Minnesota River. The NPDES permit will include discharge limitations and

monitoring requirements to ensure compliance with permit conditions and water quality standards for the Minnesota River.

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 for phosphorus and chlorine removal prior to discharge from the Facility as described above, it is anticipated that phosphorus and total suspended solids loads to the Minnesota River will be reduced as a direct result of the Facility's planned water use and discharge.

Domestic wastewater generated from the Facility will be discharged directly to the City of Mankato's sanitary sewer system through a lateral service connection line. This discharge will be authorized by the City of Mankato and subject to any appropriate discharge limits and monitoring requirements.

8.4 BIOLOGICAL RESOURCES

As discussed in Section 9, the U. S. Fish and Wildlife Service ("USFWS") and the Minnesota DNR were contacted about possible threatened and endangered plant and animal species that may exist at or near the Facility and may be affected by the its construction and/or operation. According to correspondence with the USFWS and DNR, review of their records indicates that no significant species have been documented at the Facility site. Based on these findings and the disturbed nature of the existing site and surrounding area, the Facility should not adversely affect any significant biological resources including plants, animals, and critical wildlife habitat areas. Although there may be some loss of vegetation, trees, and shrubs as a result of the Facility's construction, abundant wildlife habitat exists in areas surrounding the Site.

Existing wooded and wetland areas located on the east, west, and south sides on the Facility site will not be disturbed by the development of the proposed Facility and will continue to provide

wildlife habitat for birds, deer, and other animals found in the area. The Facility site is located approximately 1,800 east of the Minnesota River. As discussed previously, stormwater runoff will be routed through an onsite stormwater pond prior to discharging into the existing drainage ditch that flows into the Minnesota River. As a result of the substantial distance from the Minnesota River and the stormwater management system that will be utilized at the Facility, the Facility will not adversely affect fish and aquatic species or their habitat.

9.0 Rare and Unique Natural Resources

A review of the Minnesota Natural Heritage Information System database was requested from the DNR to determine if any rare plant communities or animal species, unique resources, or other significant natural features are known to occur on or near the proposed project site. As stated in a letter from the DNR dated September 11, 2003, results of the database search indicated that nine rare features consisting of animals (snakes, fish, and birds) and natural plant communities (mesic prairie and floodplain forest) were known to occur within the vicinity of the project area. These rare features are beyond the site boundaries and, therefore, will not be directly affected by the project. This finding is confirmed in the DNR letter, which concludes that based on the nature and location of the proposed project, the known occurrences of rare features identified by the search would not be affected. A copy of the DNR letter is provided in Appendix D.

Information was also requested from the USFWS in a letter dated August 21, 2003 about possible federally threatened and endangered species that may exist at or near the proposed project site. Mankato Energy was verbally informed in a follow-up telephone conversation on September 5, 2003 with Lori Fairchild, USFWS Wildlife Biologist covering Blue Earth County, that a review of their records indicates that no federally listed species have been documented near the project area. Based on this finding, she stated that the project would not adversely affect any threatened and endangered species or their critical habitat. Due to budget constraints, the USFWS only responds in writing if any issues or effects have been identified. The agency no longer sends out confirmation letters if a "no effect" determination has been made.

10.0 Unavoidable Adverse Effects and Mitigative Measures

As discussed and documented within this application, the Mankato Energy Center will not cause significant adverse effects to humans or the environment. As with any type of development, there will be some unavoidable impacts; however, the Facility has been designed to minimize potential impacts to the greatest practical extent. Furthermore, as listed in Table 11-1 in the next section, Mankato Energy will obtain all federal, state, and local permits required for construction and operation of the Facility.

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

Noise Impacts

Noise will be generated during construction and operation of the Facility. The Site is located within an established industrial area on the edge of Mankato more than one-half mile from the nearest residential areas and approximately 1,500 feet from the nearest residential dwelling. Due to the planned noise mitigation measures that will be taken at the Facility, other noise sources in proximity to the Facility, and the distance to sensitive noise receptors, it is anticipated that any noise generated due to Facility construction and operation will not adversely affect the surrounding area. The Facility will comply with the Minnesota Noise Standards (Minnesota Rules 7030.0040) for all off-site receptors.

Visible Plumes

Exhaust stacks associated with plant equipment, as well as the Facility's cooling tower may occasionally produce visible steam and vapor plumes. The length and persistence of these plumes are influenced by the prevailing weather conditions such as temperature, relative

humidity, and wind speed. The plumes will be most persistent and visible during cold and damp weather, principally during the winter. On most days of the year, however, visible steam or vapor plumes, if present, will disperse and evaporate after traveling only a moderate distance aloft and should not impact local roadways or residences. The impacts of these plumes, if any, will be aesthetic, rather than environmental.

Air Emissions

Air pollutant emissions will be generated from the Facility as a result of combustion of fuels from several sources within the proposed facility. The primary sources of combustion-related air pollutant emissions are the combined-cycle gas turbines and associated duct firing systems. Secondary sources of combustion-related emissions include the auxiliary boiler, emergency generator, and fire pump engine. These emissions will result in ambient impacts that represent only minor fractions of the applicable air quality standards and, therefore, will not adversely impact public health and safety, plants, animals, or soils. Advanced emission control equipment will be designed and implemented at the Facility to mitigate emissions to the air through the exhaust stacks and from other equipment. Mankato Energy must obtain the required state and federal air permits prior to construction and operation of the Facility and will comply with requirements to monitor and test air pollutant emissions to demonstrate compliance with established permit limits.

Traffic

Overall, vehicle traffic levels in the area will temporarily increase during construction of the Facility and will vary during different stages of the construction period, which is expected to last about 20 months. Minor impacts on local roads can be expected at the beginning and end of each workday and at shift changes. To ensure the capability of the Facility to operate in the event of a natural gas curtailment and maintain MAPP accreditation, fuel oil will be stored on-site and burned as a back-up fuel. Because of the limited amount of onsite fuel storage capacity, tanker trunks delivering fuel oil to the Facility during gas curtailments would represent a temporary, but significant increase in traffic on the local roadways. Mankato Energy will be

limited under the MPCA air emissions operating permit as to the amount of time that each combustion turbine is allowed to operate while firing on fuel oil. Instances where fuel oil will be used is expected to be rare, isolated, and of limited duration. Furthermore, fuel tanker truck deliveries required to refill the fuel storage tank(s) will be spaced over several days where possible to minimize traffic impacts to the extent possible.

Wastewater Discharges

Cooling tower blowdown and low volume wastewater from the Facility will be discharged to the Minnesota River. The process wastewater will be treated with ferric chloride and will be processed through a dechlorination system to remove phosphorus and residual chlorine prior to discharge to the river. This discharge will be authorized by an NPDES permit to be issued by the MPCA. This permit will include discharge limitations and monitoring requirements to ensure compliance and protection of humans, aquatic life, wildlife, and beneficial uses of the Minnesota River.

11.0 Permits and Approvals

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

TABLE 11-1
REQUIRED PERMITS AND APPROVALS

Unit of Government*	Type of Approval	Regulated Activity	Status
Federal			
FAA	Notice of Proposed Stack Construction	Stack height greater than 200 feet above ground level	To be provided
U.S. EPA	Acid Rain Permit	Title IV Acid Rain Certificate of Representation for the discharge of sulfur oxides	To be obtained
	Risk Management Plan/Process Safety Management (RMP/PSM)	Risk management plan is required for facilities possessing more than threshold quantities of regulated chemicals (e.g., anhydrous ammonia)	To be developed
	Notice of Hazardous Waste Generation	Hazardous waste generation	To be provided if needed; anticipated to qualify as CESQG
USACOE	Section 404 Permit; GP/LOP-98-MN	Discharges of dredged or fill material within wetland areas associated with installation of cooling water discharge pipe and outfall structure; covered by General Permit (non-reporting)	No application required; confirm compliance with general permit terms and conditions prior to construction
	Section 10 Permit	Construction of outfall structure at the Minnesota River (a navigable water)	To be obtained
U.S. Fish & Wildlife Service	Threatened and Endangered Species Review	Review of agency records for federally threatened and endangered species that may exist at or near the site and may be affected by the project	Completed - Verbal comments received Sep-5-03

TABLE 11-1
REQUIRED PERMITS AND APPROVALS

Unit of Government*	Type of Approval	Regulated Activity	Status
State of Minnesota			
PUC	Certificate of Need	Certification that electricity generated by the facility is needed	Pending - Application submitted Mar-2-04
MAPP	Approval as a Network Resource for Xcel	Generator interconnection and transmission access	To be obtained
EQB	Power Plant Siting Permit	Review of potential human and environmental impacts associated with the siting of a large electric power generating plant. Qualifies for alternative review process for facilities fueled by natural gas	Pending - Permit application submitted Mar-4-04 (this document)
SHPO	Cultural Resources Review	Review of agency records for the presence of archeological, historical, or architectural resources at or near the site that may be affected by the project	Completed - Received comment letter dated Sep-9-03
MDNR	Minnesota Natural Heritage Database Review	Review of the Minnesota Natural Heritage Information System database for the presence of any rare plant communities or animal species, unique resources, or other significant natural features at or near the site that may be affected by the project	Completed - Received comment letter dated Sep-11-03
	Protected Waters Permit	Construction of outfall structure at the Minnesota River	To be obtained
MPCA	NPDES/SDS Discharge Permit	Discharge of cooling water and other low volume wastewater to the Minnesota River	To be obtained
	NPDES/SDS General Stormwater Discharge Permit (MN R100001) for Construction Activities	Stormwater discharges associated with construction activities disturbing one or more acres of land	To be obtained
	NPDES/SDS General Stormwater Discharge Permit (MN G611000) for Industrial Activities	Stormwater discharges associated with industrial activities at the Facility. Coverage under the permit requires preparation of a Stormwater Pollution Prevention Plan	To be obtained
	Air Emission Facility Permit (Combined Construction and Title V Operating)	Air emissions - permitting requirements associated with federal PSD new source review and NSPS requirements, and other applicable state/federal requirements	Pending - Permit application submitted Dec-3-03
	Air Toxics Review	Air emissions risk analysis to evaluate potential health risks associated with burning low sulfur distillate oil as back-up fuel	Pending - AERA report submitted Feb-19-04

TABLE 11-1
REQUIRED PERMITS AND APPROVALS

Unit of Government*	Type of Approval	Regulated Activity	Status
MPCA	Section 401 Water Quality Certification	Review and certification of construction activities affecting wetlands requiring a USACOE permit	To be obtained
	Hazardous Waste Generator License	Hazardous waste generation	To be obtained if needed
	Spill Prevention, Control and Countermeasure Plan	Aboveground storage of greater than 1,320 gallons of fuel oil; plan to be prepared and maintained at the facility	To be completed
	Oil and chemical storage requirements	Certain tank construction and installation requirements must be met; provisions and measures to prevent discharges will be incorporated in the design of the fuel oil storage tank	To be met
Local			
City of Mankato	Conditional Use Permit	Electric generating facility within areas zoned M-2, Heavy Industrial District	To be obtained
	Building Permit	Site grading, development, construction, and occupancy approval	To be obtained
	Minnesota Wetland Conservation Act Exemption	Exemption from wetland replacement associated with installation of cooling water discharge pipe through wetland areas	To be obtained
	Orderly Annexation	City of Mankato and Lime Township entered into Joint Resolution for Orderly Annexation whereby the City agreed to annex areas to be developed for industrial purposes.	To be obtained
	Other	Applicable permits/approvals for connections to municipal sewer and water as well and gray water from WWTP	To be obtained if required
Other			
Utilities	Utility Connection Permits and Approvals	Installation of necessary utilities and related equipment (e.g., water, wastewater, gas pipelines, transmission lines, telecommunications)	Responsibility of Supplier Gas pipeline permits listed in separate pipeline route permit application submitted to the EQB

*Abbreviations:

EPA	United States Environmental Protection Agency
EQB	Minnesota Environmental Quality Board
FAA	Federal Aviation Administration
MAPP	Mid-Continent Area Power Pool
MDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency

PUC	Minnesota Public Utilities Commission
SHPO	Minnesota State Historical Preservation Office
USACOE	United States Army Corps of Engineers
NPDES/SDS	National Pollution Discharge Elimination System/State Disposal System
NSPS	New Source Performance Standards
PSD	Prevention of Significant Deterioration

12.0 Certificate of Need

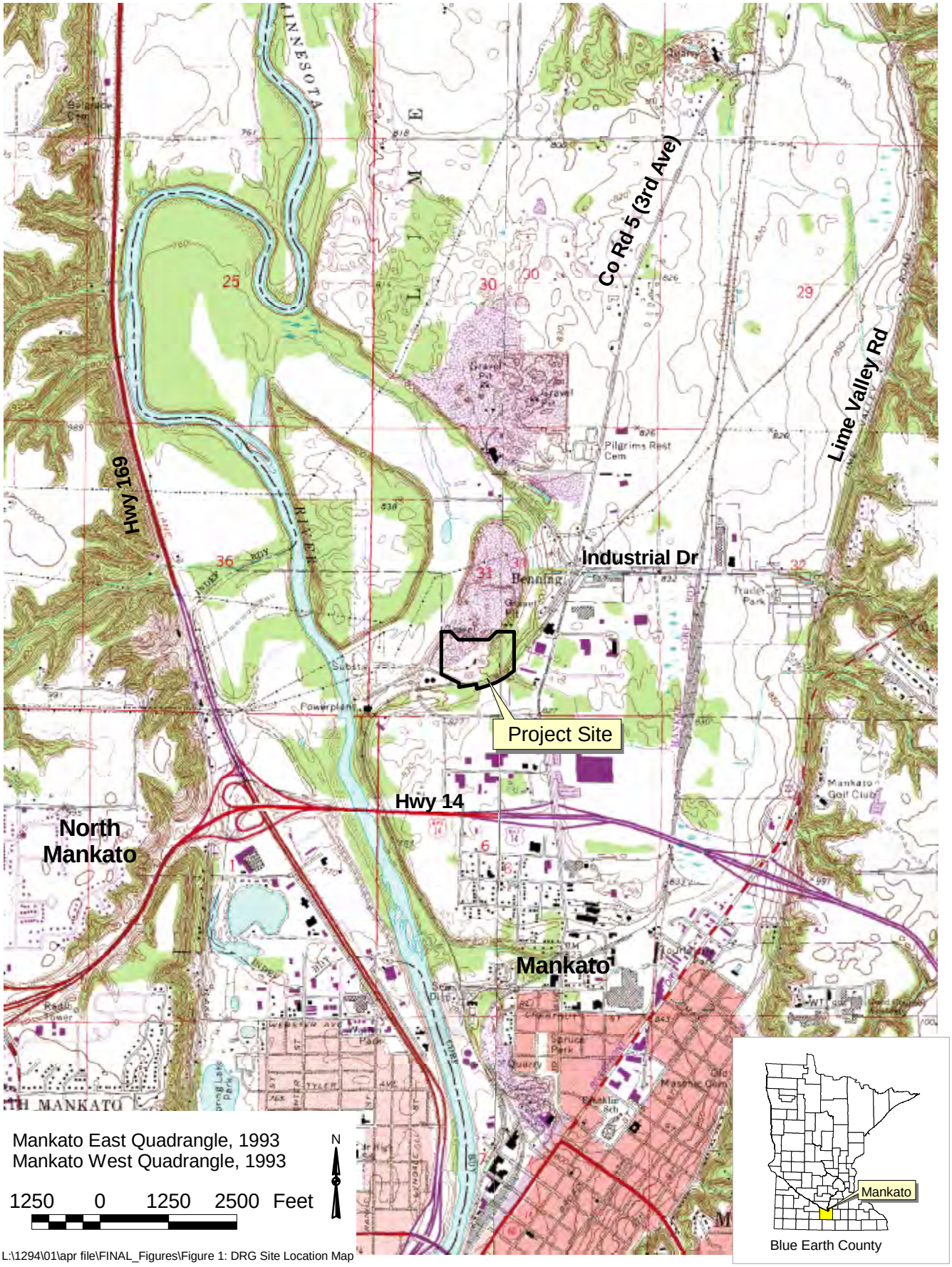
On November 25, 2003, Mankato Energy submitted a written request to the PUC to: (1) seek exemptions, pursuant to Minnesota Rules 7849.0200, Subp. 6, from certain Certificate of Need data requirements that are not necessary to determine the need for an independent power production facility; and (2) establish that the scope of data required for Mankato Energy's application for a Certificate of Need should relate only to power generated for the wholesale market, excluding data related to power production already certified through a Commission-approved resource plan solicitation.

Mankato Energy asked that the first request for exemption be granted because the data at issue is either not applicable to a generation project proposed by an independent power producer, not reasonably available to Mankato Energy, or not necessary to determine the need for the proposed facility. With regard to the second request, Mankato Energy presented its position that it is both prudent and efficient to confirm the scope of required data before filing its Certificate of Need application with the PUC.

Comments on Mankato Energy's request were submitted by the Minnesota Department of Commerce on December 29, 2004 with a recommendation that approval with modifications be granted. On January 8, 2004, Mankato Energy issued a response to the Department's comments. The PUC considered the matter at their January 22, 2004 meeting and approved Mankato Energy's request in its entirety with qualifications as suggested by PUC staff in its briefing papers prepared for the meeting. The PUC's findings are summarized in an Order dated February 6, 2004.

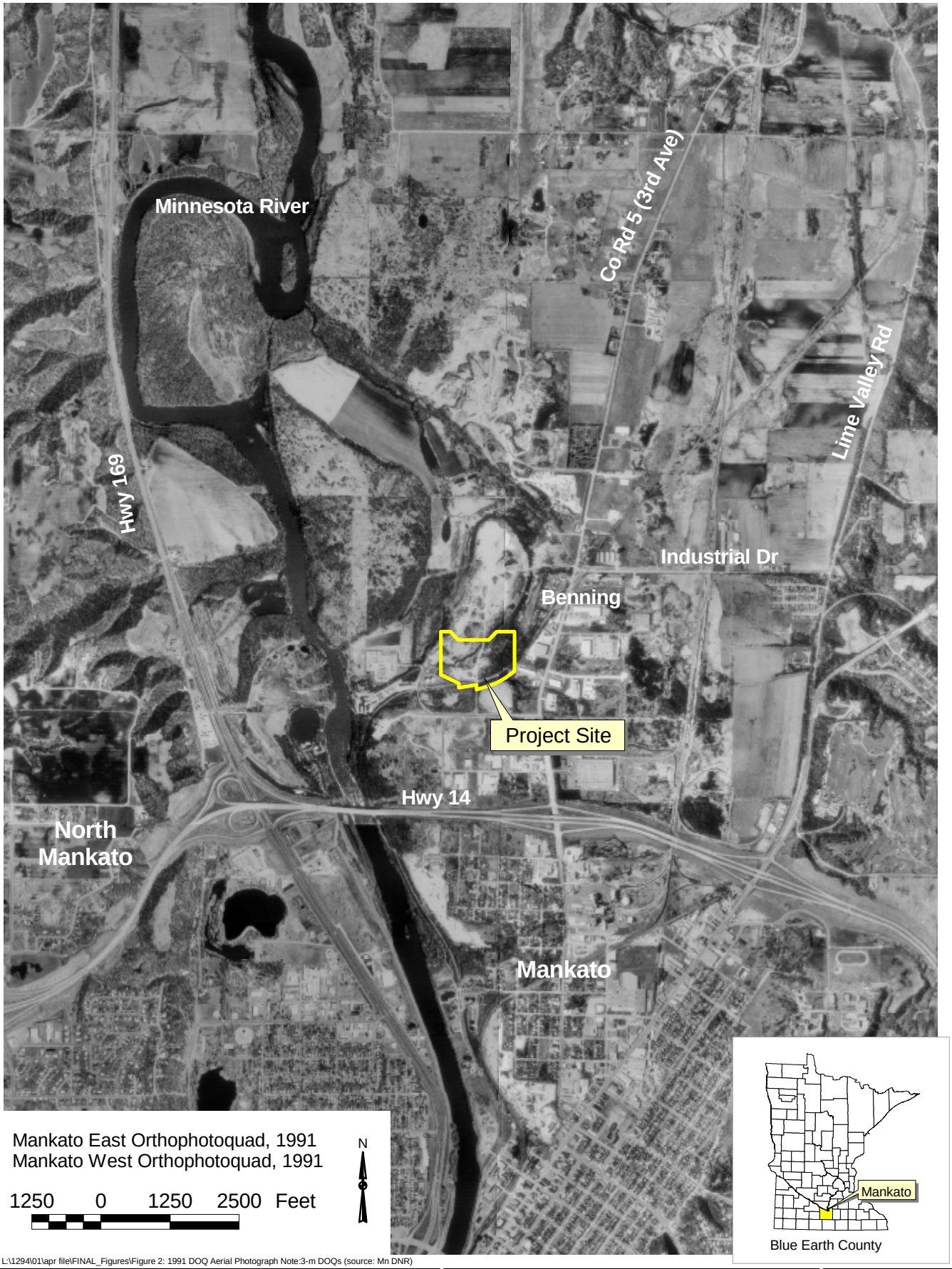
Mankato Energy submitted a Certificate of Need application to the PUC on March 2, 2004 for the additional equipment and associated generating capacity associated with the wholesale power production of the plant.

Figures



L:\1294\01\apr file\FINAL_Figures\Figure 1: DRG Site Location Map

MANKATO ENERGY CENTER	Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359-0249	MAR 2004
Site Location Map (USGS Quadrangle)		Figure 1



L:\1294\01\apr file\FINAL_Figures\Figure 2: 1991 DOQ Aerial Photograph Note:3-m DOQs (source: Mn DNR)

MANKATO ENERGY CENTER

Site Location Map (Aerial Photograph)

Wenck

Wenck Associates, Inc. 1800 Pioneer Creek Center
Environmental Engineers Maple Plain, MN 55359-0249

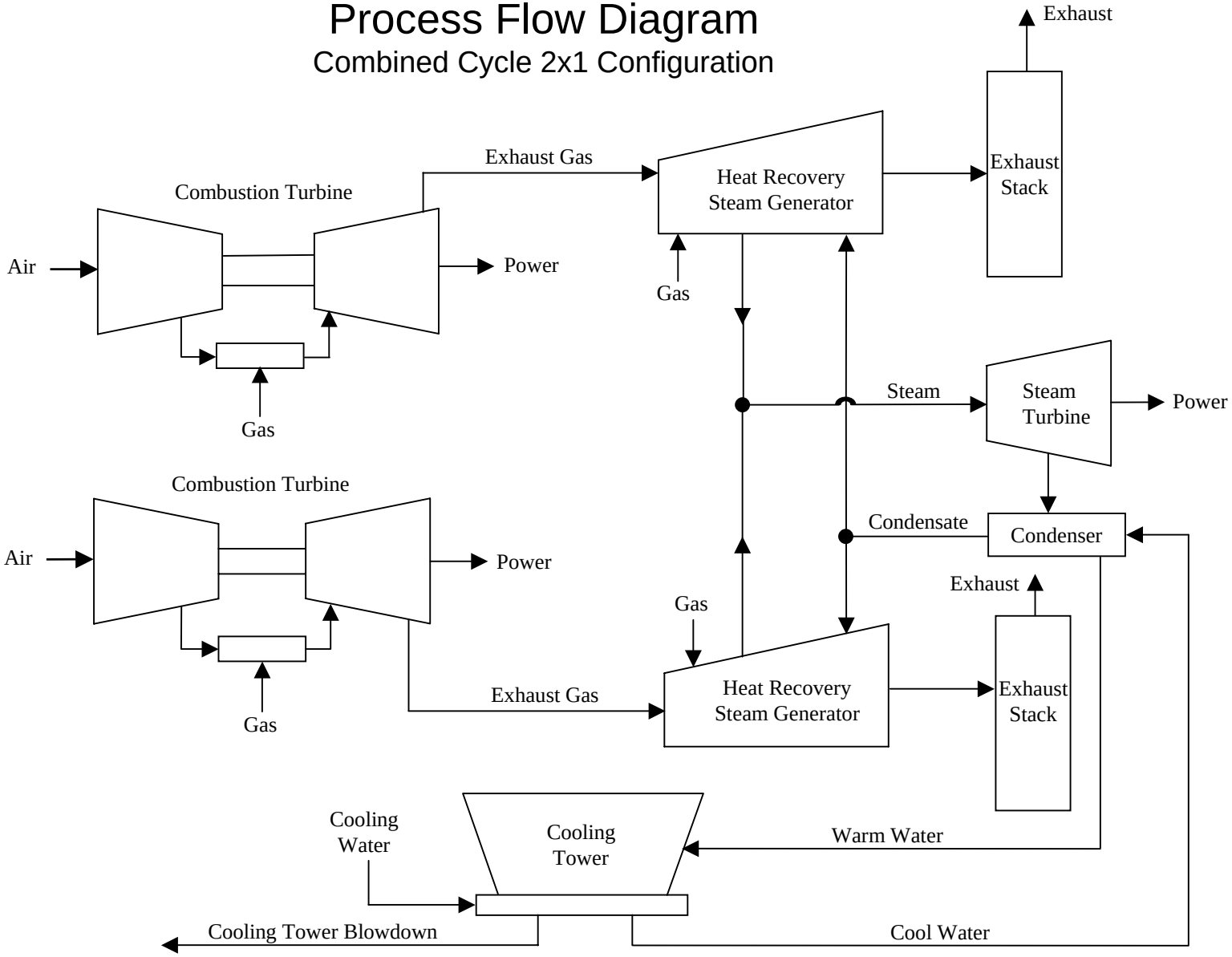
MAR 2004

Figure 2

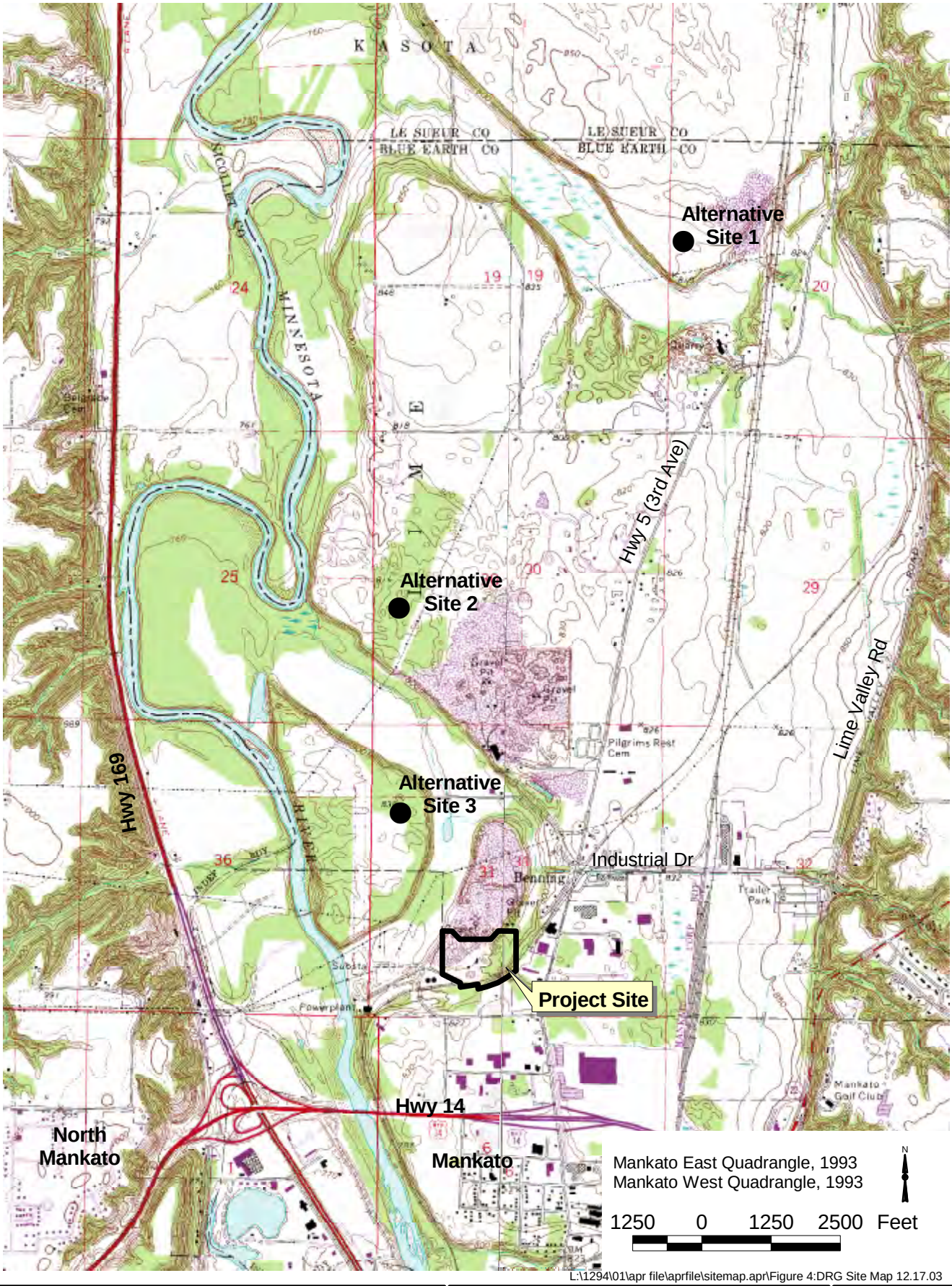
Mankato Energy Center

Process Flow Diagram

Combined Cycle 2x1 Configuration

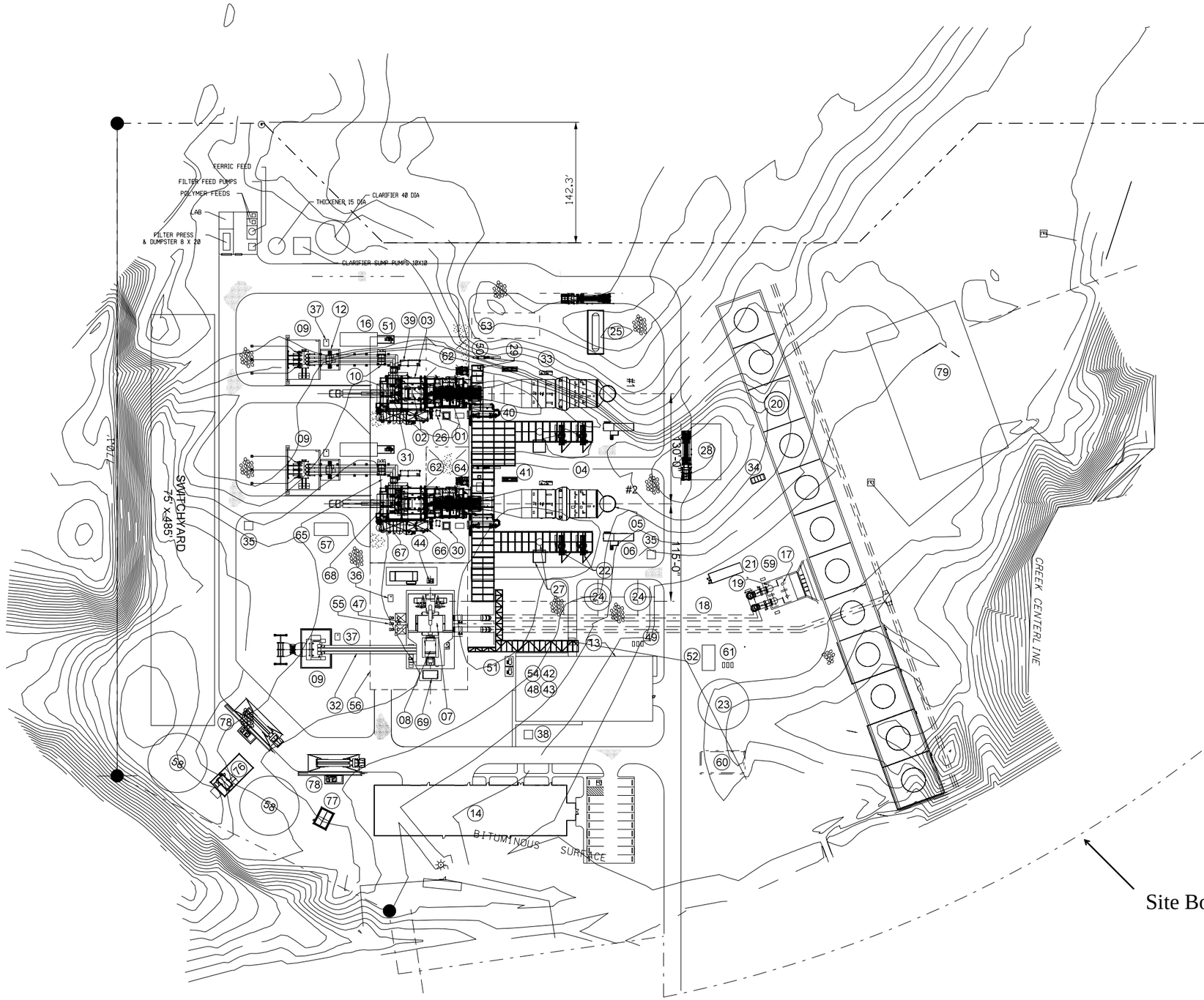


MANKATO ENERGY CENTER	Wenck Associates, Inc. Environmental Engineers 1800 Pioneer Creek Center Maple Plain, MN 55359	MAR 2004
Process Flow Diagram		Figure 3



L:\1294\01\apr file\aprfile\sitemap.apr\Figure 4:DRG Site Map 12.17.03

MANKATO ENERGY CENTER	Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359-0249	MAR 2004
Alternative Site Locations		Figure 4



LEGEND

1. COMBUSTION TURBINE
2. CT GENERATOR
3. CT AIR INLET
4. HRSG
5. HRSG STACK
6. CEM/HRSG POWER DISTRIBUTION CENTER
7. STEAM TURBINE
8. ST GENERATOR (HYDROGEN COOLED)
9. GENERATOR STEP-UP TRANSFORMER
10. CT GENERATOR CIRCUIT BREAKER
11. NOT USED
12. UNIT AUXILIARY TRANSFORMER
13. WATER TREATMENT & BOP ELECTRICAL CONTROL BLDG
14. ADMIN/MAINTENANCE/WAREHOUSE/CONTROL ROOM BLDG
15. PRIMARY FUEL GAS CONDITIONING AREA
16. CTG POWER DISTRIBUTION CENTER
17. AUX COOLING WATER PUMP
18. CIRCULATING WATER LINES
19. CIRCULATING WATER PUMPS
20. COOLING TOWER
21. COOLING TOWER PDC
22. BOILER FEED PUMPS
23. SERVICE / FIRE WATER STORAGE TANK
24. DEMIN. WATER STORAGE TANK
25. AMMONIA STORAGE TANK
26. HYDRAULIC UNIT
27. BLOWDOWN TANK & SUMP
28. COOLING TOWER CHEMICAL FEED ENCLOSURE
29. FUEL GAS CONDITIONING SKID
30. WATER WASH TANK
31. WATER WASH SKID
32. ISO PHASE BUS DUCT
33. AMMONIA INJECTION SKID
34. OIL/WATER SEPARATOR
35. OIL / WATER SUMP & PUMP
36. 345kV ACT/VT METERING UNITS
37. CTG LCI/GENERATOR EXCITATION COMPARTMENT
38. CHEMICAL AREA SUMP & PUMP
39. CT FOGGING SKID
40. ROTOR AIR KETTLE
41. DUCT BURNER SKID
42. SAMPLE PANEL & LAB
43. CYCLE CHEMICAL FEED
44. STG LUBE OIL & EHC EQUIPMENT SKID
45. NOT USED
46. NOT USED
47. CONDENSER
48. AIR COMPRESSORS & DRYERS
49. DEMIN. WATER PUMPS
50. FUEL GAS DEWPOINT HEATER
51. SUS TRANSFORMER 4160-480 V
52. FIRE PUMP SKID ENCLOSURE
53. AUXILIARY BOILER
54. ELECTRICAL ROOMS
55. CONDENSATE PUMPS
56. STG BUILDING ENCLOSURE
57. STANDBY DIESEL GENERATOR
58. FUEL OIL STORAGE TANK
59. CLOSED COOLING WATER PUMPS & HEAT EXCHNGRS.
60. PLANT WASTEWATER SUMP & PUMPS
61. SERVICE WATER PUMPS
62. CRANE AREA / MAINTENANCE
63. NOT USED
64. MAIN & PILOT FILTER SEPARATOR
65. CT PEECC
66. MECHANICAL PACKAGE
67. ELECTRICAL PACKAGE
68. STARTING PACKAGE
69. STG GENERATOR EXCITATION COMPARTMENT
70. NOT USED
71. NOT USED
72. NOT USED
73. NOT USED
74. NOT USED
75. NOT USED
76. FUEL OIL FORWARDING SKID
77. FIRE FOAM HOUSE
78. FUEL OIL UNLOADING STATION
79. STORM POND
80. WASTE WATER PRE-TREATMENT
81. CLARIFIER TANK

REV	DATE	DESCRIPTION	DRAWN	CHECKED	ENGINEER	PROJECT ENGINEERING MANAGER	PROJECT MANAGER
C	03-02-04	REVIEW	CE	BA	BA		

DRAWN BY	ETHRIDGE C
DATE	01-29-04
CHECKED BY	ANDERS B
DATE	01-29-04
ENGINEER	
DATE	
PROJECT ENGINEERING MANAGER	
DATE	- -
PROJECT MANAGER	
DATE	- -

Site Plan
Figure 5

CALPINE

Mankato Energy Center
Mankato,Minnesota

GENERAL ARRANGEMENT

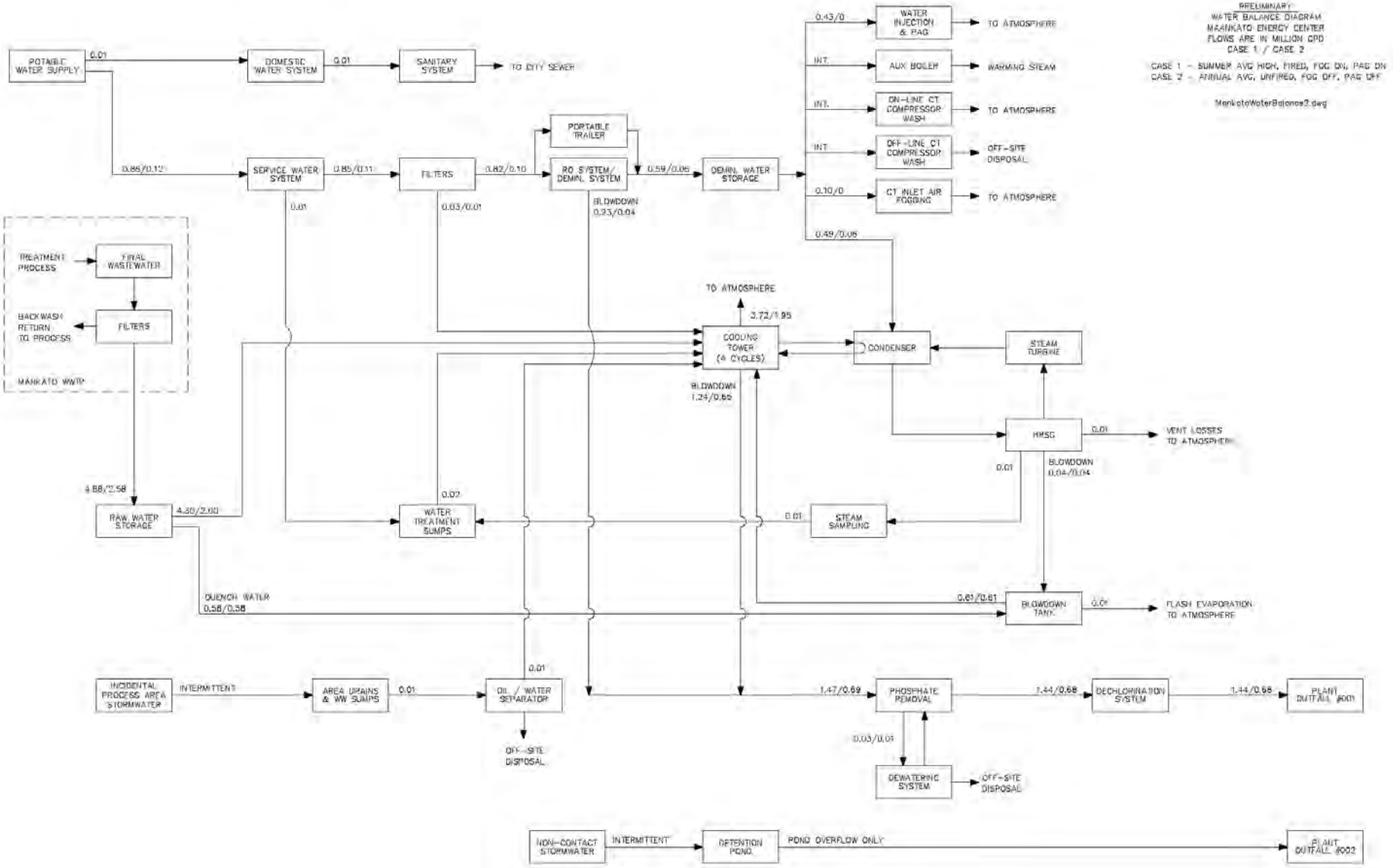
SCALE: NONE

DWG. NO.	SHEET NO.	REVISION
MK-CSG-G-1001	01	C

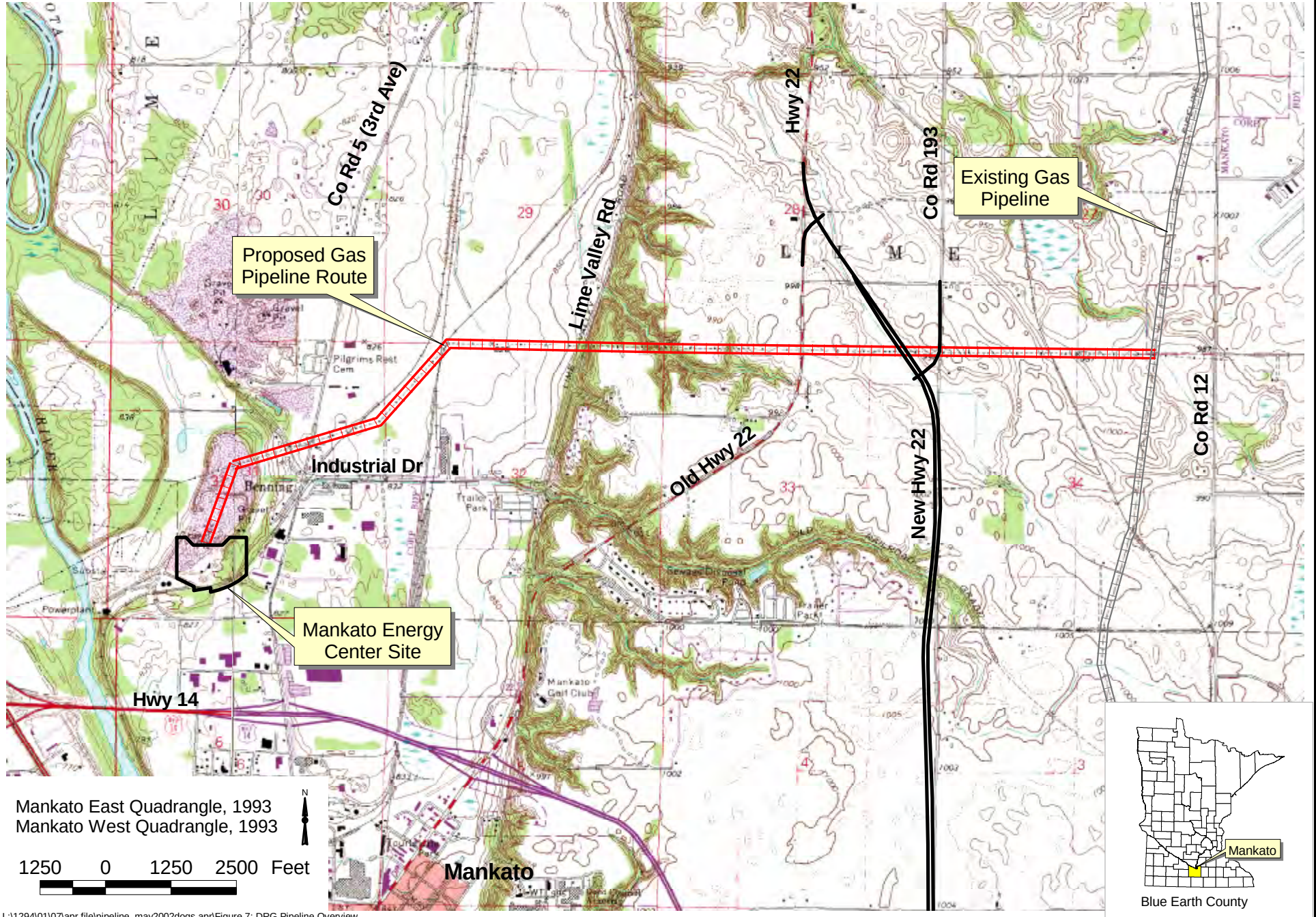
02-MAR-2004
ETHRIDGE
E:\PROJECTS\Mankato_MK\Calpine\MK-CSG-G-1001_REVC.dgn

Mankato Energy Center

Plant Water Usage



MANKATO ENERGY CENTER	Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359	MAR 2004
Water Usage Flow Diagram		Figure 6



L:\1294\01\07\apr file\pipeline_may2002doqs.apr\Figure 7: DRG Pipeline Overview

MANKATO ENERGY CENTER

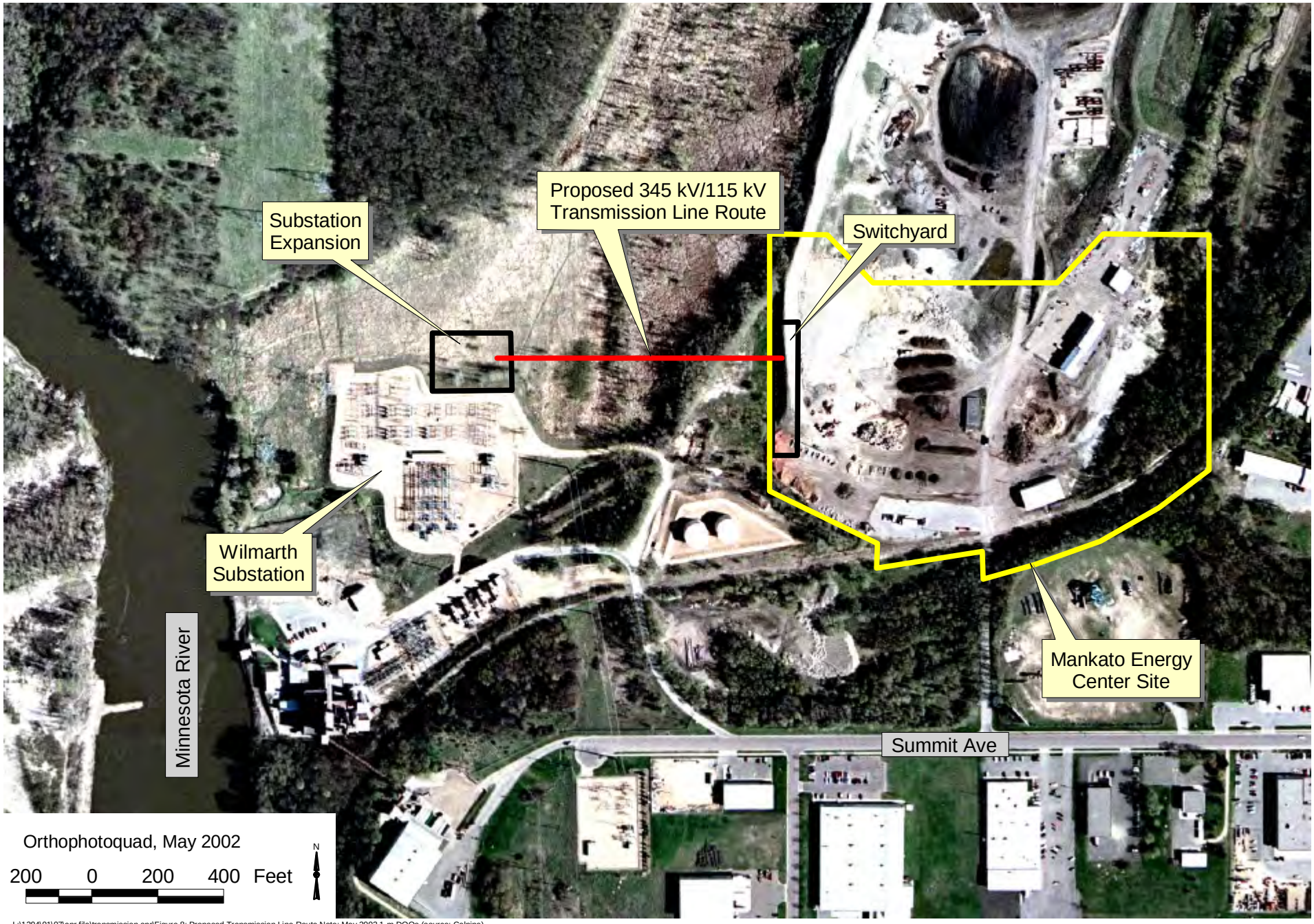
Proposed Natural Gas Pipeline Route

Wenck

Wenck Associates, Inc.
Environmental Engineers
1800 Pioneer Creek Center
Maple Plain, MN 55359-0249

MAR 2004

Figure 7



L:\1294\01\07\apr file\transmission.apr\Figure 8: Proposed Transmission Line Route Note: May 2002 1-m DOQs (source: Calpine)

MANKATO ENERGY CENTER

Proposed Transmission Line Route

Wenck

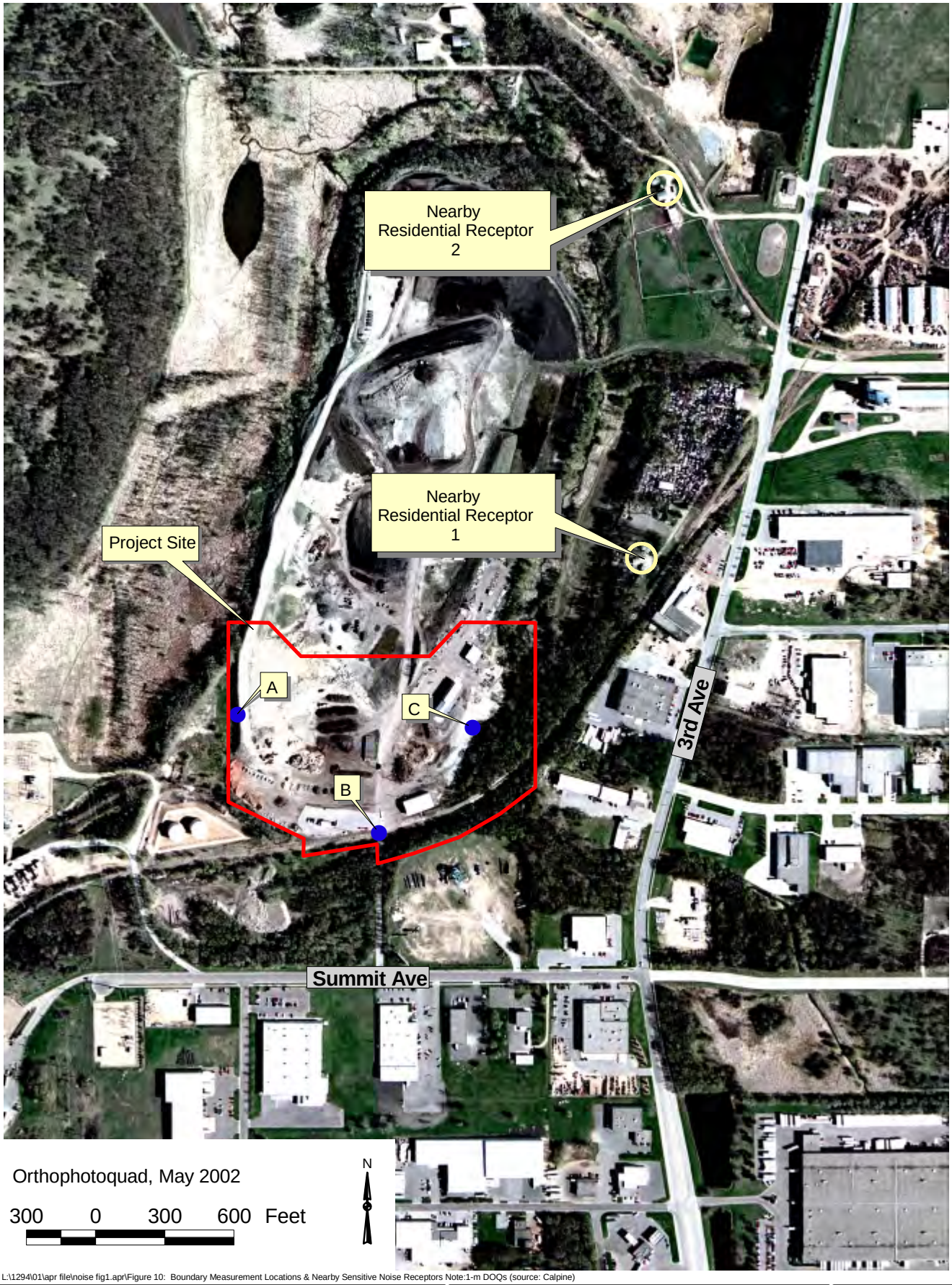
Wenck Associates, Inc.
Environmental Engineers
1800 Pioneer Creek Center
Maple Plain, MN 55359-0249

MAR 2004

Figure 8

L:\1294\01\apr file\Photo_figureView.apr\Figure 9: May 2002 DOQ Views of Existing Site Conditions Note:1-m DOQs (source: Calpine)

MANKATO ENERGY CENTER	Wenck Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359-0249	MAR 2004
Views of Existing Site Conditions		Figure 9



L:\1294\01\apr file\noise fig1.apr\Figure 10: Boundary Measurement Locations & Nearby Sensitive Noise Receptors Note:1-m DOQs (source: Calpine)

MANKATO ENERGY CENTER

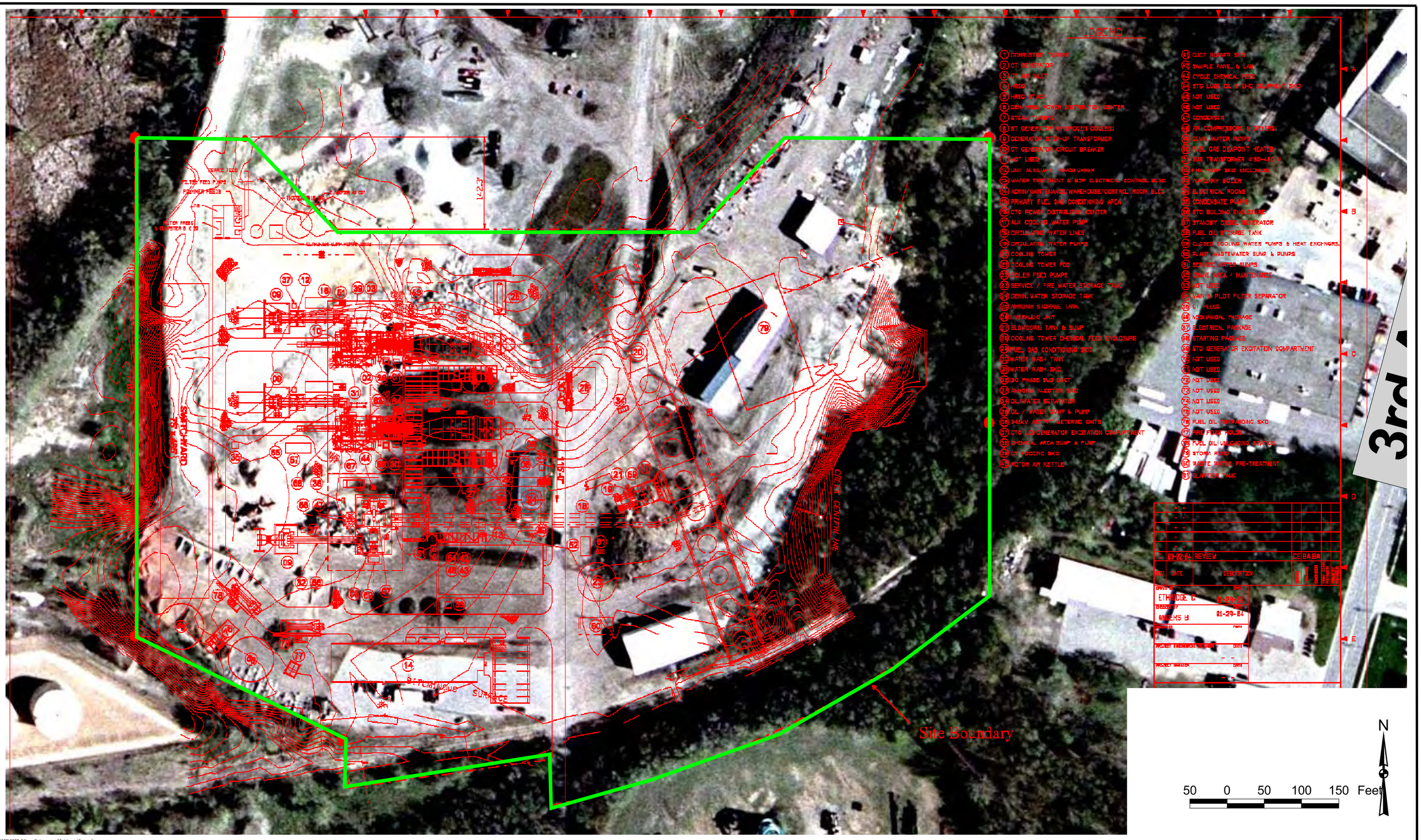
Boundary Measurement Locations
& Nearby Sensitive Noise Receptors

Wenck

Wenck Associates, Inc. 1800 Pioneer Creek Center
Environmental Engineers Maple Plain, MN 55359-0249

MAR 2004

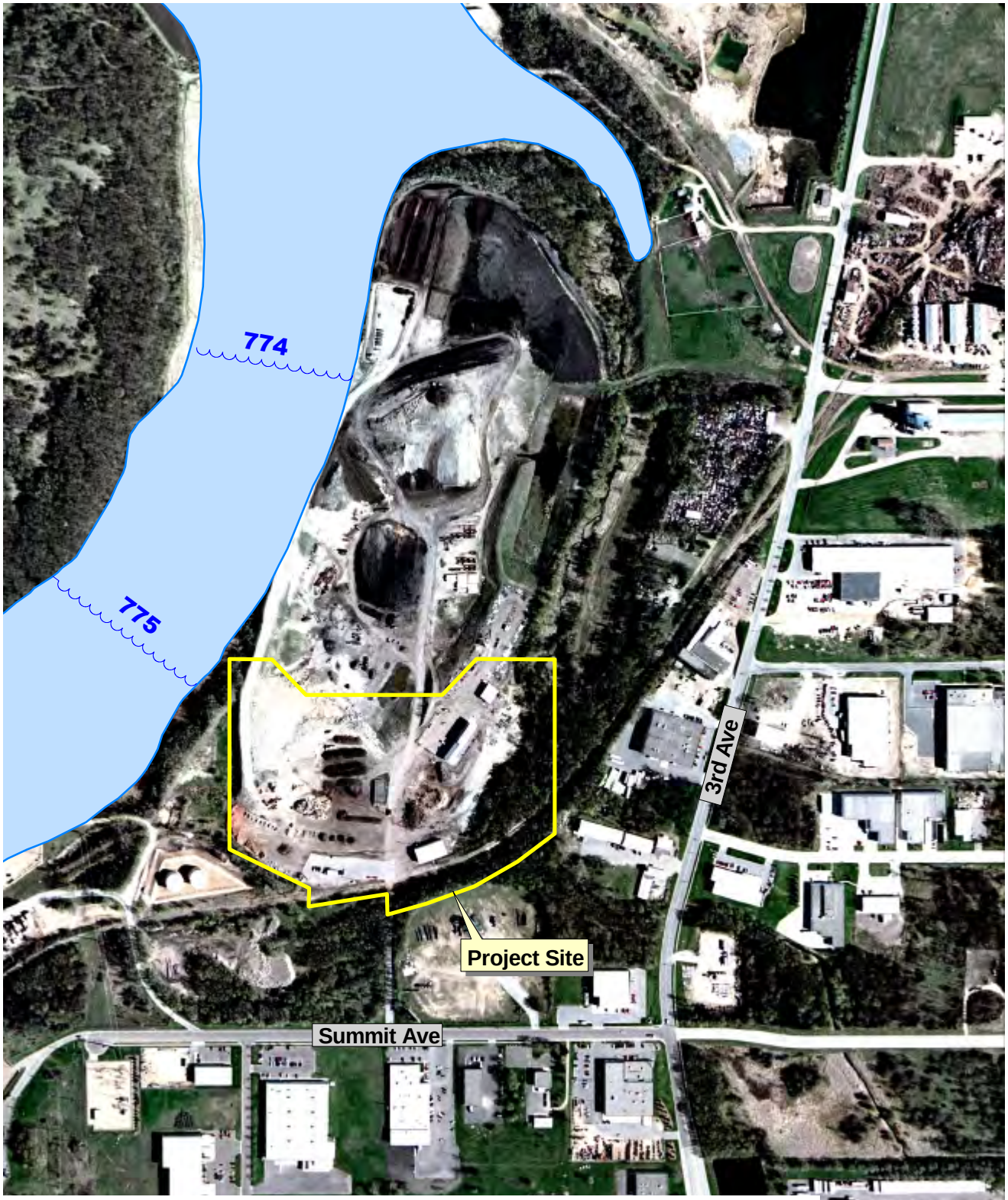
Figure 10



L:\0052\0052-01\apr file\summer00stdy.apr\figure 1

MANKATO ENERGY CENTER	March 2004
Site Plan Aerial Overlay	Figure 11

Wenck
Wenck Associates, Inc.
Environmental Engineers
1800 Pioneer Creek Center
Maple Plain, MN 55359



Orthophotoquad, May 2002

300 0 300 600 Feet

N

Legend

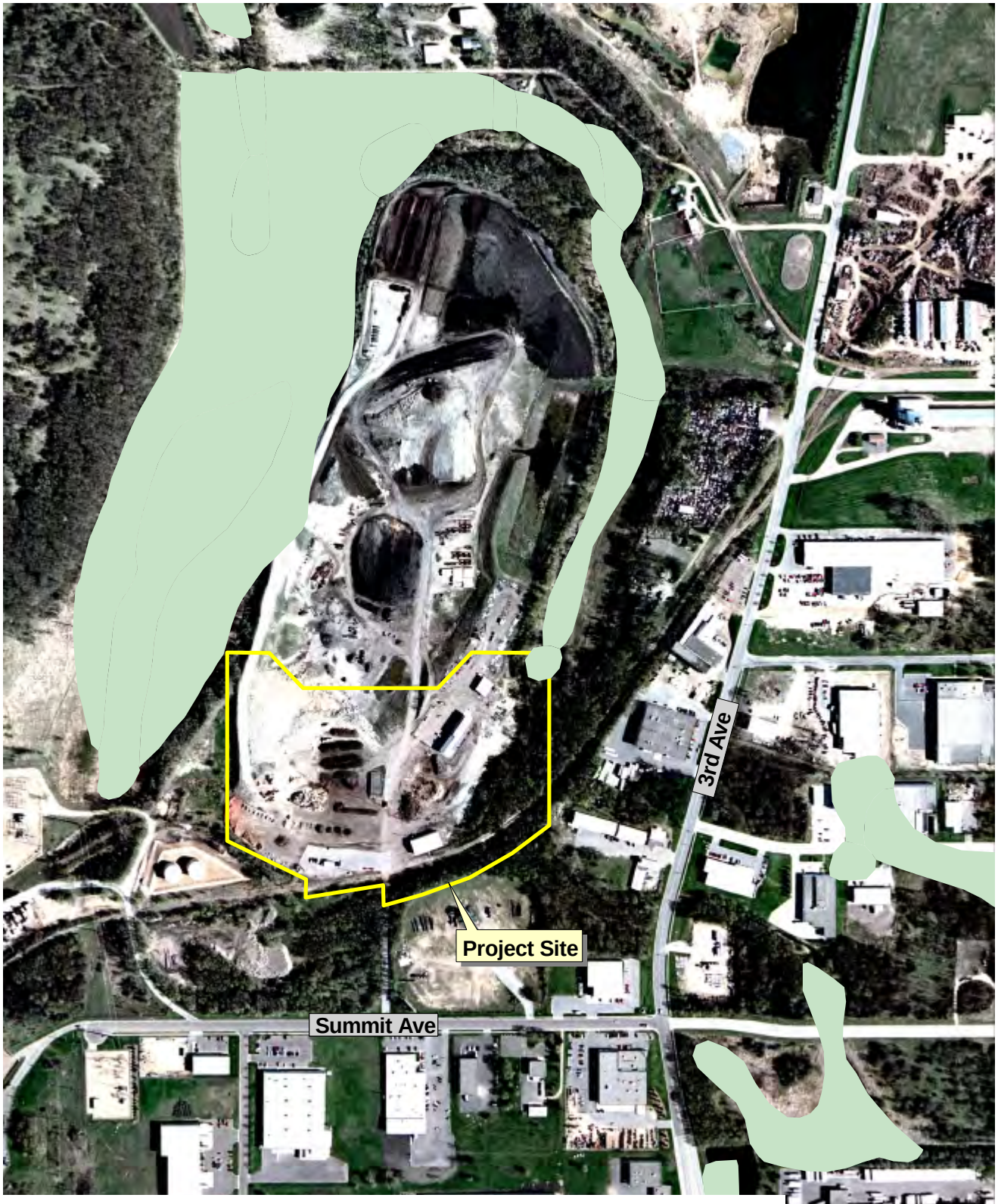
774 — 100-year Flood Elevation

100-year Floodplain

Based on FIS Rate Maps from Blue Earth County (Jul-21-99) and City of Mankato (Nov-20-00)

L:\1294\01\apr file\FINAL_Figures\Figure 12: FEMA 100yr Floodplain Note:1-m DOQs (source: Calpine)

MANKATO ENERGY CENTER	Wenck	MAR 2004
100-year Floodplain Areas	Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359-0249	Figure 12



Orthophotoquad, May 2002

300 0 300 600 Feet

N

Legend

Wetland Areas

Based on 1990 National Wetland Inventory Maps

L:\1294\01\apr file\FINAL_Figures\Figure 13: NWI w 2002 DOQ Note:1-m DOQs (source: Calpine)

MANKATO ENERGY CENTER	Wenck Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359-0249	MAR 2004
Wetland Areas		Figure 13

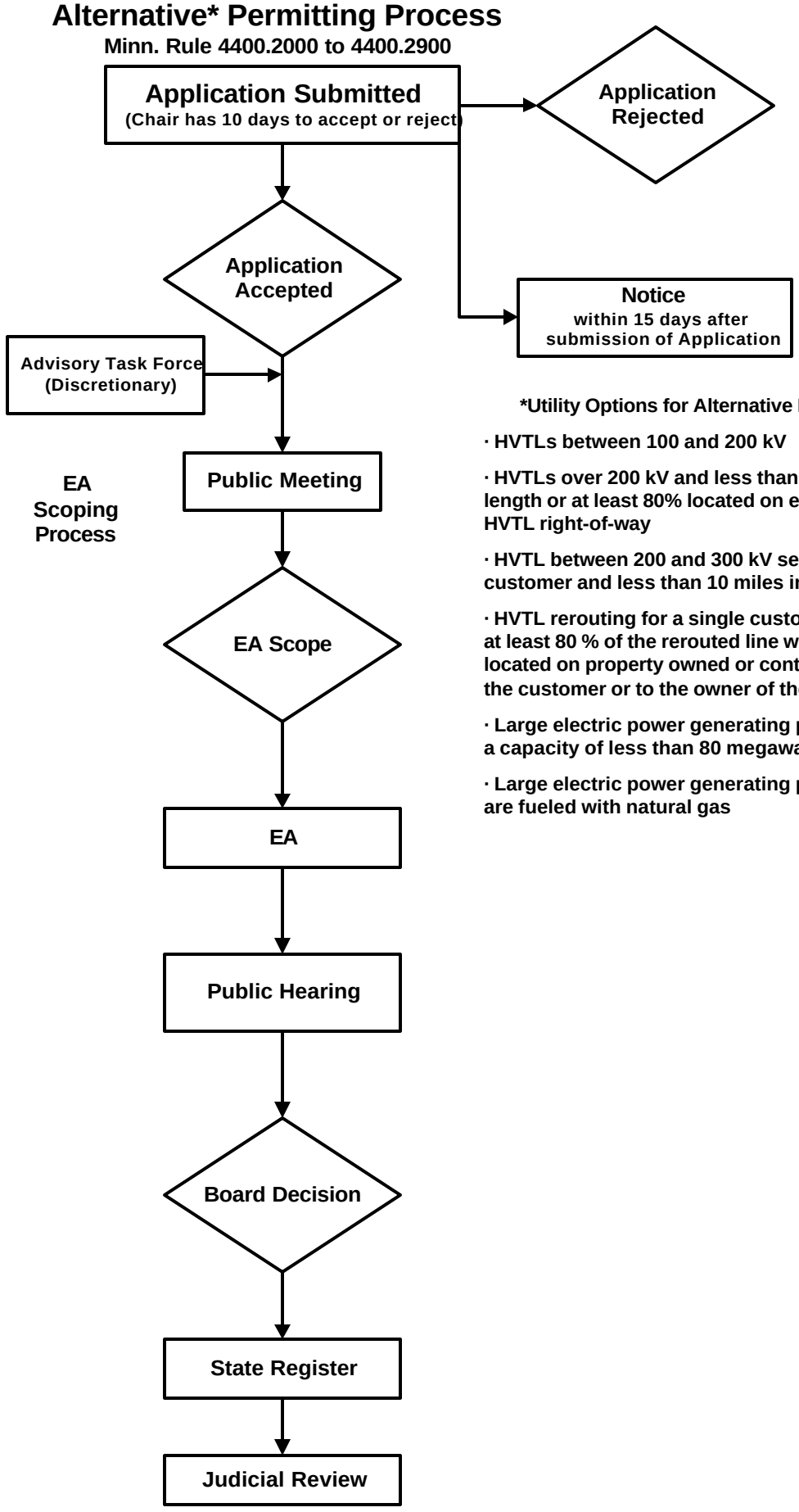
Appendix A

Alternative Site Permitting Process Schematic

HVTL Route and Power Plant Site Alternative* Permitting Process

Approved December 19, 2002

Minn. Rule 4400.2000 to 4400.2900



***Utility Options for Alternative Review**

- **HVTLs between 100 and 200 kV**
- **HVTLs over 200 kV and less than 5 miles in length or at least 80% located on existing HVTL right-of-way**
- **HVTL between 200 and 300 kV serving one customer and less than 10 miles in length**
- **HVTL rerouting for a single customer where at least 80 % of the rerouted line will be located on property owned or controlled by the customer or to the owner of the line**
- **Large electric power generating plants with a capacity of less than 80 megawatts**
- **Large electric power generating plants that are fueled with natural gas**

Appendix B

Baseline Environmental Noise Survey

and

Predicted Noise Levels During Facility Operations

Wenck Associates, Inc.
1800 Pioneer Creek Ctr.
P.O. Box 249
Maple Plain, MN 55359-0249

(763) 479-4200
Fax (763) 479-4242
E-mail: wenckmp@wenck.com

TECHNICAL MEMORANDUM

To: Jason Goodwin, PE
Calpine Corporation

From: Tim Colliton, PE, CIH
Wenck Associates, Inc.

Re: Baseline Environmental Noise Survey and Predicted Noise Levels During Facility Operation
Calpine Mankato Energy Site
Wenck Project No. 1294-01

Date: March 3, 2004

This technical memorandum presents the summary of the baseline environmental noise measurements at the Calpine Mankato Energy Site in Mankato, Minnesota. The noise measurements were made during daytime (7 am – 10 pm) and nighttime (10 pm – 7 am) hours on November 25 and 26, 2003. The purpose of the measurements was to assess the existing noise environment at the site boundary and at selected receptors in the area. Also included is an estimation of the plant operation noise.

1.0 BASELINE NOISE SURVEY

1.1 Summary of the Basic Noise Measurement Results

The measurement results are summarized below by type of location and time of day, in military format. During all of the measurements, weather conditions were pleasant with cool temperatures and relative humidity ranging from 55 – 60 percent.

The maximum and minimum sound levels, in dBA, are listed in the results tables for information only. The relevant regulatory limits are the L_{10} and L_{50} levels.

Residential Receptors – Daytime

Location	Results				Site Conditions & Comments
	L_{max}	L_{min}	L_{10}	L_{50}	
1	77.8	45.6	54.8	51.8	1613 to 1715 November 25th – Clear sky with 3 mph winds from the SW and 34°F to 35°F – Audible traffic noise on 3rd Avenue; two heavy trucks pass by on 3rd Avenue; two light plane flyovers; geese flock flyovers at 1647 and 1658
2	61.7	42.7	49.5	46.6	1720 to 1821 November 25th – Clear sky with 2-3 mph winds from the SW and 33°F to 34°F – Two heavy trucks pass by on 3rd Avenue; geese flock flyovers at 1736 and 1758.
	N/A	N/A	60	65	Minnesota Daytime Noise Limits for NAC 1 receptors

Site Boundary Locations – Daytime

Location	Results				Site Conditions & Comments
	L_{max}	L_{min}	L_{10}	L_{50}	
A	81.1	45.7	57.9	52.1	1239 to 1345 November 25th – Sunny with 5-6 mph wind gusts from the SW and 36°F – Audible traffic noise from U S highways 169 and 14; five small trucks and 2 heavy trucks pass by measurement location; two light plane flyovers.
B	86.2	46.7	67.8	54.9	1354 to 1455 November 25th – Sunny with 5-6 mph wind gusts from the SW and 35°F to 40°F – Two cars, fifteen small trucks, fifteen heavy trucks and four heavy equipment vehicles pass by measurement location; front end loader driven to salt shed at 1450.
C	86.9	45.6	56.9	52.3	1502 to 1603 November 25th – Sunny with 5-6 mph wind gusts from the SW and 35°F to 36°F – Two heavy trucks pass by in the vicinity of the measurement location.
	N/A	N/A	75	80	Minnesota Daytime Noise Limits for NAC 3 receptors

The daytime readings are indicated at each location on the map in Figure 1.

Residential Receptors – Nighttime

Location	Results				Site Conditions & Comments
	L_{max}	L_{min}	L_{10}	L_{50}	
1	82.2	38.1	47.9	43.3	0141 to 0243 November 26th – Clear sky with 5 mph winds from the SW and 23°F to 24°F – Audible traffic noise from three cars passing by on 3rd Avenue; one with defective muffler/loud music.
2	62.4	38.7	46.6	43.8	0253 to 0353 November 26th – Clear sky with 2-5 mph winds from the SW and 22°F – Intermittent noise from industrial operation east of 3rd Avenue.
	N/A	N/A	50	55	Minnesota Nighttime Noise Limits for NAC 1 receptors

Site Boundary Locations – Nighttime

Location	Results				Site Conditions & Comments
	L_{max}	L_{min}	L_{10}	L_{50}	
A	61.9	43.6	52.1	48.9	2218 to 2319 November 25th – Clear sky with 5 mph wind from the SW and 24°F to 26°F – Audible traffic noise from U S highways 169 and 14; noise from nearby industries.
B	62.1	44.1	52.6	49.4	2325 to 0025 November 25th & 26th– Clear sky with 5 mph wind from the SW and 24°F – No nearby traffic noted.
C	62.7	41.5	52.1	48.1	0033 to 0133 November 26th – Clear sky 5 mph wind gusts from the SW and 22°F to 24°F.
	N/A	N/A	75	80	Minnesota Nighttime Noise Limits for NAC 3 receptors

The nighttime readings are indicated at each location on the map in Figure 2.

1.2 Comparison of the Results with Minnesota Noise Rules

Description of the Noise Rules

These results are compared with the requirements of the Minnesota Rules pertaining to community noise. The regulations are contained in Minnesota Rules, Chapter 7030 and are administered by the Minnesota Pollution Control Agency. The noise rules are summarized below:

- Noise area classifications (NACs) are defined for various types of land uses in the state. The NAC's are numerically labeled from 1 through 4 and are described in Chapter 7030.0050.
- The noise emanating from an NAC and impacting a neighboring NAC is limited by the rules. Different levels are specified for daytime (0700-2200) and nighttime (2200-0700) periods. The noise is (usually) evaluated at the property line of the receiving NAC.
- NAC 1 generally includes land uses such as household units & other residential (including farmhouses), medical services, transient lodging (e.g., hotels) and other cultural, entertainment and recreational activities.
- For NAC 2, transportation facilities, retail trade, service establishments and some outdoor activities are included.
- NAC 3 covers manufacturing, utilities, agricultural and "all other activities not otherwise listed".
- NAC 4 covers undeveloped and unused land and water areas.
- The noise limits are listed below for NACs 1, 2, & 3:

Receiver Noise Area Classification	Daytime		Nighttime	
	L_{50}	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

The noise limits are in decibels, abbreviated dB, on the A scale, further abbreviated dBA. The L_{10} is the level exceeded for 10 percent of the time; the L_{50} is the level exceeded for 50 percent of the time and is considered the "average" sound level.

The residential receptors at locations 1 and 2 are NAC 1. The plant site and the immediately adjacent properties are NAC 3.

Results Comparison – Daytime Measurements

At the residential receptors, the measured noise levels were below the daytime NAC 1 limits. The L_{10} readings were about 5 to 10 dBA below the limit; the L_{50} readings were 13 to 18 dBA below the limit. The major noise sources were traffic on nearby 3rd Avenue and flyovers of geese flocks.

At the boundary locations, the measured noise levels were below the daytime NAC 3 limits. The L_{10} readings were about 7 to 18 dBA below the limit; the L_{50} readings were 25 to 28 dBA below the limit. The most prominent noise source was truck and equipment traffic associated with the landfill operations. This was most notable at location B that was near the entrance driveway to the landfill. Traffic noise from nearby U S highways 169 and 14 was a contributing noise source at location A.

Results Comparison – Nighttime Measurements

At the residential receptors, the measured noise levels were below the nighttime NAC 1 limits. The L_{10} readings were about 2 to 3 dBA below the limit; the L_{50} readings were 11 to 12 dBA below the limit. The major noise sources were traffic on nearby 3rd Avenue and local industrial operations.

At the boundary locations, the measured noise levels were below the nighttime NAC 3 limits (which are the same as the daytime limits). The L_{10} readings were about 22 to 23 dBA below the limit; the L_{50} readings were 31 to 32 dBA below the limit. The landfill was closed during these measurements and the prominent noise sources were traffic on nearby U S highways 169 and 14 and nearby industrial operations.

1.3 Measurement Methodology

The noise measurements were made using an automated data logging sound level meter. This type of meter accumulates average noise level readings every second in its memory. The stored data is used to calculate the L_{10}, L_{50} and other statistical data for the measurement period.

The measurement methodology followed that specified in Minnesota Rules 7030.0060. The meter was mounted on a tripod positioned at the measurement location. A windscreen provided by the meter manufacturer was placed over the microphone for all measurements. Each measurement period was at least one-hour duration.

The measurement locations are described in greater detail in the following table:

Location	Description
1	Two hundred fifty feet northeast of residential dwelling and fifteen feet east of driveway
2	One hundred thirty feet east of residential dwelling and twenty five feet east of the centerline of 230 Lane
A	Fifty feet east of the western landfill haul road

Location	Description
B	At south entrance to SMC landfill 30 feet east of N-S driveway and 25 feet north of the E-W railroad tracks
C	180 feet southeast of the sorting shed

The sound level meter was a Larson Davis Model 820, serial number 1402. It was used with a Larson Davis Model PRM 828 microphone preamplifier (serial number 2121) and a Larson Davis ½ inch diameter microphone (serial number 2216). The meter was calibrated according to the manufacturer instructions using a Larson Davis Model CAL-200, serial number 2162, acoustic calibrator. The meter was calibrated at the beginning of the noise measurements, midway during the measurements and at the conclusion of the measurements. The meter calibration was stable throughout the measurements.

2.0 PREDICTED NOISE LEVELS DURING FACILITY OPERATION

Noise generation data for various pieces of equipment and the results of the baseline noise survey (Appendix B-1) were used to estimate the noise levels at nearby receptors. Noise levels were calculated in accordance with methodologies specified in ISO 9613-2, *Attenuation of Sound During Propogation Outdoors*, 1996. The provisions for attenuation due to topography and vegetation were not exercised due to the height of the noise sources.

2.1 Sound Levels from Plant Noise Source Components

Calpine provided the sound levels produced by the various pieces of plant equipment. The data has been "normalized" to a 50-foot distance so that relative source strengths are apparent. The listing of the equipment and their sound levels, from highest to lowest, is provided below:

Data Source	Equipment Description	Sound Level at 50 ft., dBA
Fox Energy Center Noise Impact Assessment, July, 2003 with Noise Suppression	Two Combustion Turbine Generators	71.9
Nooter/Eriksen Estimate 1/15/04	Two HRSGs	70.2
Marley Cooling Technology, 2/24/04	12 Cell Cooling Tower with 13 ft Wall	67
Fox Energy Center Noise Impact Assessment, July, 2003 with Noise Suppression	One Steam Turbine Transformer	64.7
Fox Energy Center Noise Impact Assessment, July, 2003 with Noise Suppression	Two Gas Turbine Transformers	61.9

2.2 Estimation of Operational Noise

The sound levels produced by the major equipment noise sources were used to calculate the noise impact of the plant. To calculate the noise impact, in dBA L_{50}, the following information was used:

- The proposed plant equipment layout provided by Calpine on February 12, 2004.
- The HRSG's discharge via a 200-foot high stack.
- The noise reduction with increasing distance from the source was calculated at the rate of 6 dBA per doubling of the distance.
- Excess noise reduction due to atmospheric effects was added for distances over 1000 feet from the sources.
- The noise impact of the plant is expressed in dBA L_{50}.

The distances from the noise sources to five noise level isopleths were calculated around the proposed plant site. The calculations included only the plant noise sources; the ambient sound levels were not added for this part of the evaluation. The results of these calculations are shown in Figure 3.

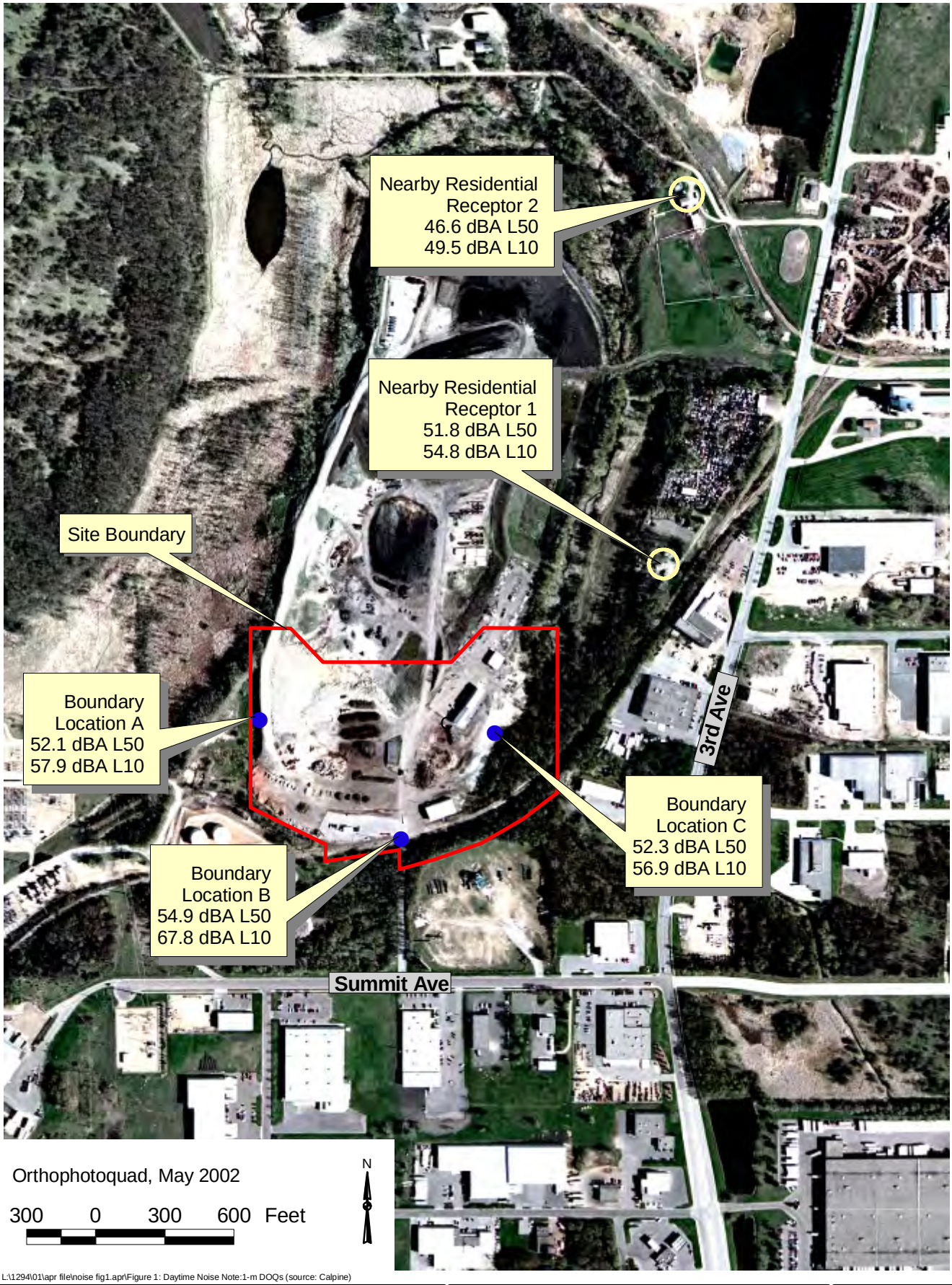
At the two nearby residential receptors, the calculated noise impact from the plant was added to the measured baseline L_{50} sound levels. The results of these calculations are shown in Figure 4.

At receptor 1, the estimated daytime L_{50} is 53.2 dBA and the estimated nighttime L_{50} is 49.1 dBA.

At receptor 2, the estimated daytime L_{50} is 48.1 dBA and the estimated nighttime L_{50} is 46.4 dBA.

The Minnesota daytime and nighttime noise standards will be met at both nearby residential receptors.

Figures



L:\1294\01\apr file\noise fig1.apr\Figure 1: Daytime Noise Note:1-m DOQs (source: Calpine)

MANKATO ENERGY CENTER

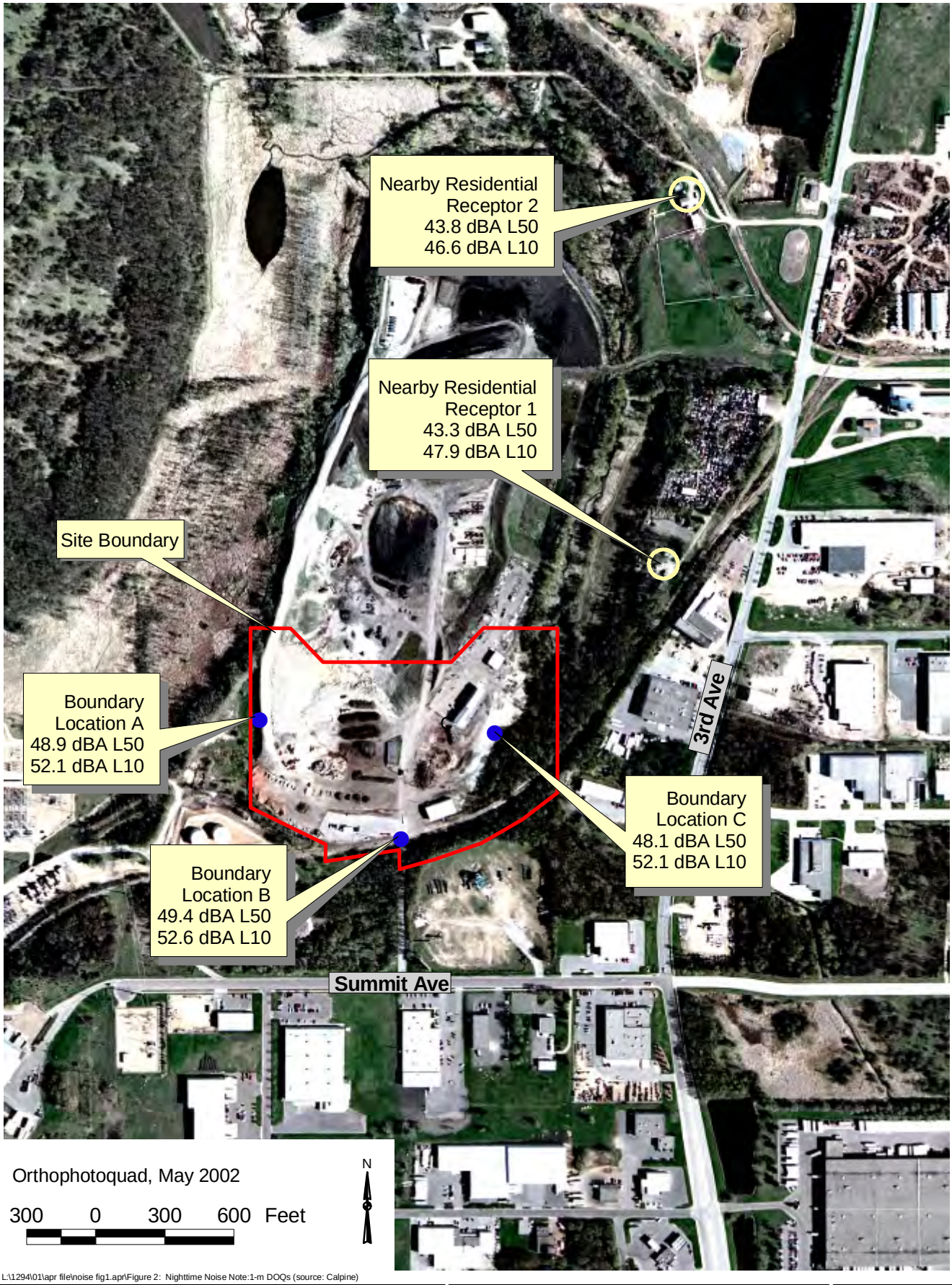
Daytime Baseline Noise Measurement Results

Wenck

Wenck Associates, Inc. Environmental Engineers
1800 Pioneer Creek Center Maple Plain, MN 55359-0249

MAR 2004

Figure 1



L:\1294\01\apr file\noise fig1.apr\Figure 2: Nighttime Noise Note:1-m DOQs (source: Calpine)

MANKATO ENERGY CENTER

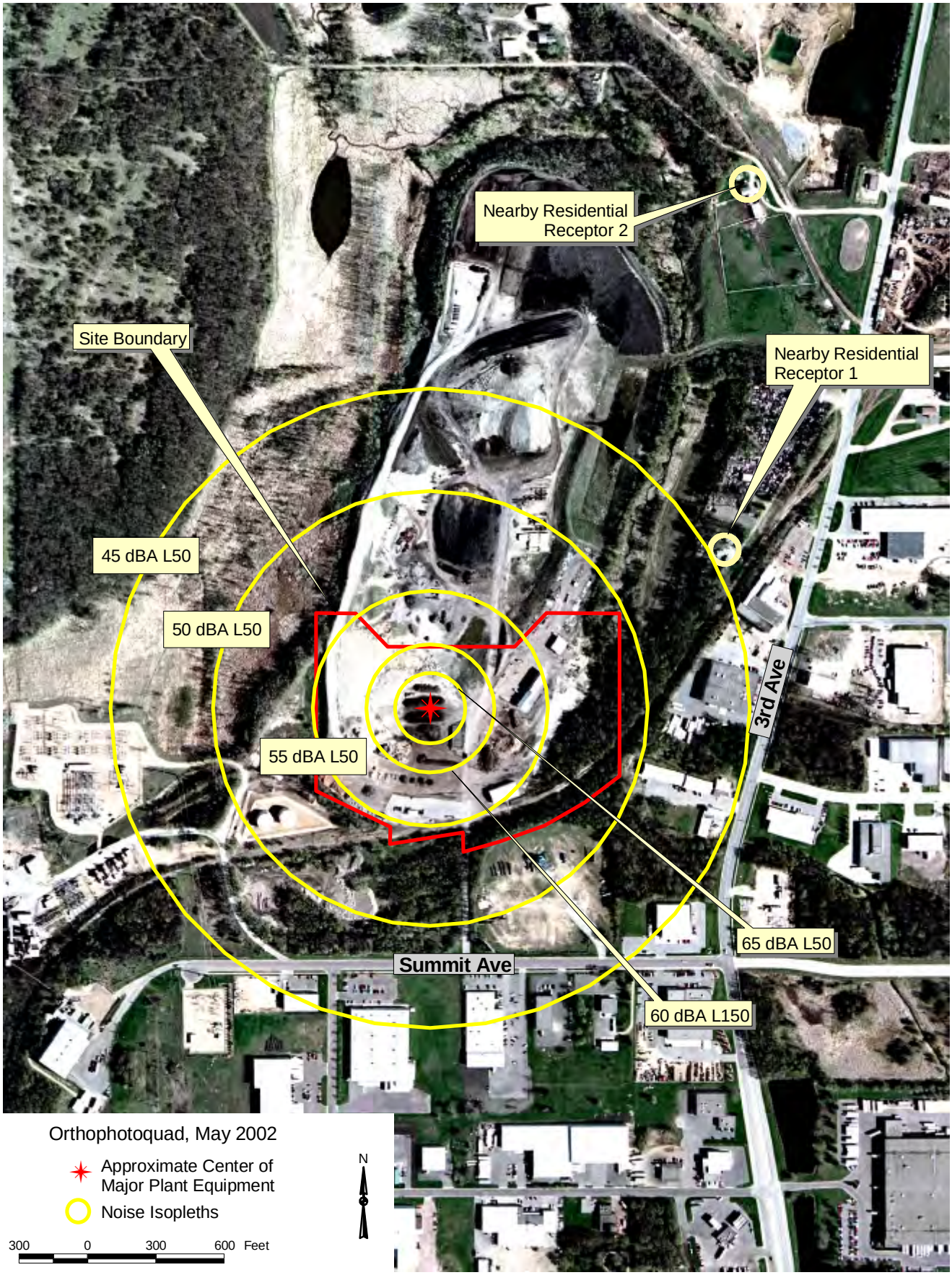
Nighttime Baseline Noise Measurement Results

Wenck

Wenck Associates, Inc. Environmental Engineers
1800 Pioneer Creek Center Maple Plain, MN 55359-0249

MAR 2004

Figure 2



L:\1294\01\apr file\noise fig1.apr\Figure 3: Noise Iso Pleths Note:1-m DOQs (source: Calpine)

MANKATO ENERGY CENTER	Wenck	MAR 2004
Calculated Plant Operational Noise Isopleths	Wenck Associates, Inc. Environmental Engineers 1800 Pioneer Creek Center Maple Plain, MN 55359-0249	Figure 3

L:\1294\01\apr file\noise fig1.apr\Figure 2: Nighttime Noise Note:1-m DOQs (source: Calpine)

MANKATO ENERGY CENTER

Calculated Operational Noise
at Nearby Residential Receptors

Wenck

Wenck Associates, Inc.
Environmental Engineers
1800 Pioneer Creek Center
Maple Plain, MN 55359-0249

MAR 2004

Figure 4

Appendix C

SHPO Response Letter

MINNESOTA HISTORICAL SOCIETY
STATE HISTORIC PRESERVATION OFFICE

September 9, 2003

RECEIVED BY
SEP 10 2003
WENCK ASSOCIATES, INC.

Mr. Dale Claridge
Wenck Associates
PO Box 249
Maple Plain, MN 55359-0249

RE: Caipine Mankato Energy Center
T109 R26 S31 SW, Lime Twp., Blue Earth County
SHPO Number: 2003-3616

Dear Mr. Claridge:

Thank you for consulting with our office during the preparation of an Environmental Assessment Worksheet for the above referenced project.

Based on our review of the project information, we conclude that there are no properties listed on the National or State Registers of Historic Places, and no known or suspected archaeological properties in the area that will be affected by this project.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36CFR800, Procedures of the Advisory Council on Historic Preservation for the protection of historic properties. If this project is considered for federal assistance, or requires a federal permit or license, it should be submitted to our office with reference to the assisting federal agency.

Please contact us at (651) 296-5462 if you have any questions regarding our comments on this project.

Sincerely,

Kelly Gragg-Johnson

Dennis A. Gimmestad
Government Programs and Compliance Officer

Appendix D

DNR Response Letter

Minnesota Department of Natural Resources

Natural Heritage and Nongame Research Program, Box 25

500 Lafayette Road

St. Paul, Minnesota 55155-40__

Phone: (651) 296-7863 Fax: (651) 296-1811 E-mail: sarah.hoffmann@dnr.state.mn.us

September 11, 2003

RECEIVED BY

SEP 16 2003

WENCK ASSOCIATES, INC.

Dale Claridge
Wenck Associates, Inc.
P.O. Box 249
Maple Plain, MN 55359

Re: Request for Natural Heritage information for vicinity of proposed Calpine Mankato Natural Gas Plant, T109N R26W Section 31, Blue Earth County
NHNRP Contact #: ERDB 20040172

Dear Mr. Claridge

The Minnesota Natural Heritage database has been reviewed to determine if any rare plant or animal species or other significant natural features are known to occur within an approximate one-mile radius of the area indicated on the map enclosed with your information request. Based on this review, there are 9 known occurrences of rare species or natural communities in the area searched (for details, see enclosed database printout and explanation of selected fields). However, based on the nature and location of the proposed project I do not believe it will affect any known occurrences of rare features.

The Natural Heritage database is maintained by the Natural Heritage and Nongame Research Program, a unit within the Division of Ecological Services, Department of Natural Resources. It is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, natural communities, and other natural features. Its purpose is to foster better understanding and protection of these features.

Because our information is not based on a comprehensive inventory, there may be rare or otherwise significant natural features in the state that are not represented in the database. A county-by-county survey of rare natural features is now underway, and has been completed for Blue Earth County. Our information about natural communities is, therefore, quite thorough for that county. However, because survey work for rare plants and animals is less exhaustive, and because there has not been an on-site survey of all areas of the county, ecologically significant features for which we have no records may exist on the project area.

The enclosed results of the database search are provided in two formats: index and full record. To control the release of locational information which might result in the damage or destruction of a rare element, both printout formats are copyrighted.

The index provides rare feature locations only to the nearest section, and may be reprinted, unaltered, in an Environmental Assessment Worksheet, municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the index for any other purpose, please contact me to request written permission. Copyright notice for the index should include the following disclaimer:

> "Copyright (year) State of Minnesota, Department of Natural Resources. This index may be reprinted, unaltered, in Environmental Assessment Worksheets, municipal natural resource plans, and internal reports. For any other use, written permission is required."

The full-record printout includes more detailed locational information, and is for your personal use only. **If you wish to reprint the full-record printouts for any purpose, please contact me to request written permission.**

Please be aware that review by the Natural Heritage and Nongame Research Program focuses only on *rare natural features*. It does not constitute review or approval by the Department of Natural Resources as a whole. If you require further information on the environmental review process for other wildlife-related issues, you may contact your Regional Environmental Assessment Ecologist, Shannon Fisher, at (507) 359-6073.

An invoice for the work completed is enclosed. You are being billed for map and database search and staff scientist review. Please forward this invoice to your Accounts Payable Department. Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

Chandra Carter for

Sarah D. Hoffmann
Endangered Species Environmental Review Coordinator

encl: Database search results
Rare Feature Database Print-Outs: An Explanation of Fields
Invoice

TWP	RNG	PRIMARY SECTION	FED STATUS	MN STATUS	S RANK	ELEMENT and OCCURRENCE NUMBER	MANAGED AREA
T108N	R26W	06		SPC		COLUBER CONSTRICTOR (RACER) #50	
T108N	R27W	01		NON		ELAPHE VULPINA (FOX SNAKE) #165	
T109N	R26W	31			S1	MESIC PRAIRIE (SOUTHEAST) #38	
T109N	R27W	25			S3	FLOODPLAIN FOREST SILVER MAPLE SUBTYPE #64	
T109N	R27W	36		NON		ELAPHE VULPINA (FOX SNAKE) #164	
T109N	R27W	36	LT	SPC		HALIAEETUS LEUCOCEPHALUS (BALD EAGLE) #1380	
T109N	R27W	36				MUSSEL SAMPLING SITE #121	
T109N	R27W	36		THR		POLYODON SPATHULA (PADDLEFISH) #6	
T109N	R27W	36		NON		SCAPHIRHYNCHUS PLATORYNCHUS (SHOVELNOSE STURGEON) #12	

RECORDS PRINTED = 9