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January 7, 2009

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Mr. Joseph Lapka
U.S.EPA
Region IX
75 Hawthorne Street
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DOCKET
08-AFC-10
DATE JAN 07 2009
RECD. JAN 27 2009

RE: Northern California Power Agency Lodi Energy Center
Application for a PSD Permit

Dear Mr. Lapka:

The Northern California Power Agency's Lodi Energy Center (LEC) project is currently undergoing review by your office for a PSD permit. Because the San Joaquin Valley Air Pollution Control District was redesignated attainment for PM_{10} effective December 12, 2008, and the LEC project has not yet received its Authority to Construct, it is our understanding that EPA will require the project to undergo PSD review for PM_{10}. The original PSD application that was submitted for the project in September 2008 included a demonstration of compliance with PSD requirements for NOx and CO. We are submitting the attached supplemental PSD analysis for PM_{10} in compliance with the newly applicable requirement. The PM_{10} modeling results used in the attached analysis were provided on the CD of ambient air quality modeling files that accompanied the original submittal.

We hope that this information, combined with the material previously provided, will allow you to complete your review of the proposed project. If you have any questions regarding the proposed project, please contact Nancy Matthews or Jeff Adkins of Sierra Research at (916) 444-6666.

Sincerely,

Ed Warner
Project Manager

Enclosures (10)

cc: Jeff Adkins, Sierra Research
Jagmeet Kahlon, SJVAPCD
Andrea Grenier, Grenier & Associates
Scott Galati, Galati Blek

Compliance with Federal Prevention of Significant Deterioration Program Requirements: Amendment to NCPA Lodi Energy Center Application to Include PSD Analysis for PM_{10}

USEPA has promulgated PSD regulations for areas that are in compliance with national ambient air quality standards (40 CFR 52.21). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., specific national parks and wilderness areas). This amendment to the previous PSD application submitted by the NCPA Lodi Energy Center (LEC) in September 2008 provides a supplemental analysis for PM_{10}, which became an attainment pollutant in the San Joaquin Valley APCD effective December 12, 2008. The PM_{10} ambient air quality modeling results shown in this analysis were included on the CD that was submitted with the original PSD application in September 2008.

The five principal areas of the federal PSD program are as follows:

1) Applicability

2) Best available control technology

3) Pre-construction monitoring

4) Increments analysis

Air quality impact analysis

Each of these elements of the program is discussed individually below.

Applicability

The PSD program was established to allow emission increases (increments of consumption) that do not result in significant deterioration of ambient air quality in areas where criteria pollutants have not exceeded NAAQS. The federal PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing stationary source.[1] In the SJVAPCD, PSD requirements may be applicable for NOx, SO_2, CO, and now PM_{10}, since the District is an attainment area for these pollutants.[2] PSD requirements do not apply for VOC since the District is a nonattainment area for ozone. The determination of applicability is based on evaluating the NOx, SO_2, CO, and PM_{10} emissions changes associated with the proposed project in addition to all other emissions changes at the same location since the applicable PSD baseline dates (40 CFR 52.21).

For the purposes of determining applicability of the PSD program requirements to PM_{10} emissions from the LEC project, the following regulatory procedure is used:

Emissions from the existing NCPA Lodi facility are compared with major source thresholds to determine whether the existing facility is a major source. This comparison is made in Table 1.

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[1] These terms are defined in federal regulations at 40 CFR 52.21.

[2] The SJVAPCD redesignation to attainment for the federal PM_{10} standard was effective December 12, 2008.

Maximum potential emissions from the LEC are compared with regulatory significance thresholds to determine whether the modification itself is major and thus may be subject to PSD. If the facility emissions exceed these thresholds, the proposed modification is subject to PSD review. The comparison in Table 2 indicates that the CO emissions from LEC exceed the major source threshold for the applicable source category,[3] and thus the project is subject to PSD review.

Contemporaneous emissions increases and decreases at the facility are included in the netting calculation to determine the net emissions changes at the facility. The net emissions changes in PM_{10} are compared with the PSD significance levels in Table 3 to determine whether PSD review for PM_{10} is required.

If a PSD review is required, an ambient air quality impacts analysis is first used to determine if the impacts are significant. The determination of significance is based on whether the PM_{10} impacts exceed regulatory significance levels (40 CFR 51.165) shown in Table 4.

TABLE 1

NCPA Lodi CT#2 Emissions and PSD Major Source Thresholds

Pollutant	NCPA Lodi CT#2 Emissions (tpy)	PSD Major Source Thresholds (tpy)	Major?
NO_x	20.4	100	No
SO_2	5.7	100	No
CO	58.8	100	No
PM_{10}	8.8	100	No

TABLE 2

LEC Proposed Emissions and PSD Major Source Thresholds

Pollutant	LEC Emissions (tpy)*	PSD Major Source Thresholds (tpy)	Major?
NO_x	71.5	100	No
SO_2	24.3	100	No
CO	254.9	100	Yes
PM_{10}	44.0	100	No

Note: LEC emissions include CTG/HRSG, auxiliary boiler, and cooling tower.

3 The determination that a combined-cycle gas turbine system is considered an "electric utility steam generating unit" for purposes of determining applicability of PSD requirements was made in an August 6, 2001 letter from John Seitz, Director Office of Air Quality Planning and Standards, USEPA, to Patrick M. Raher of Hogan & Hartson L.L.P (accessed at www.epa.gov/region07/programs/artd/air/nsr/nsrmemos/cgtsd.pdf.

TABLE 3

PM_{10} Net Emission Increase and Significant Emissions Level

Pollutant	Facility Net Increase (tpy)	PSD Significance Levels (tpy)	Are Increases Significant?
PM_{10}	44.0	15	Yes

TABLE 4

PSD Significant Impact Levels (SILs) and Class II Increments

Pollutant	Averaging Time	SILs[a]	Maximum Allowable Class II Increments[b]
PM_{10}	24-Hour	5 $\mu g/m^3$	30 $\mu g/m^3$
	Annual	1.0 $\mu g/m^3$	17 $\mu g/m^3$

Notes:

a. 40 CFR 51.165

b. 40 CFR 52.21

Table 1 shows that the existing NCPA Lodi turbine plant is not a major source under the PSD regulations. Table 2 shows that CO emissions from LEC will exceed the 100 ton major source threshold, so the project will be a major modification and thus subject to PSD review. Table 3 above shows that the PM_{10} emissions from the project will exceed the applicable PSD significance level, so the project is subject to PSD review for PM_{10}.

If the significant impact levels (SILs) are exceeded, an analysis is required to demonstrate that the allowable increments will not be exceeded, on a pollutant-specific basis. Increments are the maximum increases in concentration that are allowed to occur above the baseline concentration. The PM_{10} increments are also shown in Table 4. Modeling results for PM_{10} are compared with the SILs in Table 5 below. These results show that both annual average and 24-hour average modeled impacts are below the SILs.

TABLE 5

PM_{10} Modeled Impacts and Significant Impact Levels (SILs)

Pollutant	Averaging Time	Maximum Modeled Impacts[a]	SILs[a]	Significant?
PM_{10}	24-Hour	3.7 $\mu g/m^3$	5 $\mu g/m^3$	No
	Annual	0.9 $\mu g/m^3$	1.0 $\mu g/m^3$	No

Notes:

a. From Table 5.1-27 of the Application for Authority to Construct/PSD Permit.

b. 40 CFR 51.165

Best Available Control Technology

BACT is defined in 40 CFR 52.21(j) as:

"an emissions limitation...based on the maximum degree of reduction for each pollutant subject to regulation under the Clean Air Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant..."

A top-down BACT analysis is required for PM_{10}, since the project is now subject to PSD review for that pollutant. The required top-down BACT analysis is provided in Attachment I, and concludes that BACT for the proposed project is as shown in Table 6.

TABLE 6

BACT Required Under Federal PSD for LEC

Pollutant	Controlled Emission Rate	Control Technique
PM_{10}	9 lb/hr without duct firing 11 lb/hr with duct firing	Natural gas fuel

Preconstruction Monitoring

To ensure that the impacts from the LEC will not cause or contribute to a violation of an ambient air quality standard or an exceedance of a PSD increment, an analysis of the existing air quality in the project area is necessary. If a source is subject to PSD review, PSD regulations generally require preconstruction ambient air quality monitoring data for the purposes of establishing background pollutant concentrations in the impact area (40 CFR 52.21(m)). However, a facility may be exempted from this requirement if the predicted air quality impacts of the facility do not exceed the *de minimis* levels. Modeled PM_{10} impacts from the LEC are compared with the *de minimis* levels in Table 7. Since modeled impacts are below the *de minimis* levels, the project may be exempted from the requirement.

TABLE 7

PSD Preconstruction Monitoring Exemption Levels

Pollutant	Averaging Period	Maximum Modeled Concentration	De minimis Level	Exceed Monitoring Threshold?
PM_{10}	24 hours	3.9 $\mu g/m^3$	10 $\mu g/m^3$	No

The purpose of the preconstruction monitoring requirement is to verify that background concentrations are adequately characterized to ensure that the national ambient air quality standards are protected. With EPA's approval, a facility may rely on air quality monitoring data collected at local air district monitoring stations to satisfy the requirement for preconstruction monitoring. In such a case, in accordance with Section 2.4 of the USEPA PSD guideline, the last 3 years of ambient monitoring data may be used if they are representative of the area's air quality where the maximum impacts occur due to the proposed source.

The background data need not be collected on site, as long as the data are representative of the air quality in the subject area (40 CFR 51, Appendix W, Section 9.2). Three criteria are applied in determining whether the background data are representative: (1) location, (2) data quality, and (3) data currentness.[4] These criteria are defined as follows:

Location: The measured data must be representative of the areas where the maximum concentration occurs for the proposed stationary source, existing sources, and a combination of the proposed and existing sources.

Data quality: Data must be collected and equipment must be operated in accordance with the requirements of 40 CFR Part 58, Appendices A and B, and PSD monitoring guidance.

Currentness: The data are current if they have been collected within the preceding 3 years and they are representative of existing conditions.

All of the data used in this analysis meet the requirements of Appendices A and B of 40 CFR Part 58, and thus all meet the criterion for data quality. All of the data have been collected within the preceding 3 years, and thus all meet the criterion for currentness. The location and overall representativeness of the data are discussed further below.

Data from the Hazelton Avenue monitoring station in Stockton, about 12 miles from the project site, were used to characterize PM_{10} air quality at the project site. This station was chosen because of its proximity to the site and because data recorded there represent area-wide ambient conditions rather than the localized impacts of any particular facility. Because of the proximity of the monitoring station to the project, the data measured there are believed to be representative of the areas where the maximum project impacts will occur.

PSD Increment Consumption

The maximum modeled impacts from the LEC facility were compared with the PM_{10} significant impact levels in Table 5. These comparisons show that the maximum modeled PM_{10} impacts from the proposed project do not exceed the SILs. Therefore, no PM_{10} increments analysis is required for the proposed project.

Air Quality Impacts Analysis

Because the maximum modeled PM_{10} impacts from the project are below the significance thresholds, no additional assessment of the impacts on ambient air quality is required under the PSD program requirements. However, a complete ambient air quality impacts analysis for PM_{10} was provided in Section 5.1.5 of the Application for Authority to Construct/PSD Permit. The AQIA demonstrated that the project will not cause or contribute to any violations of federal standards for which PSD review applies.

Impacts on Growth, Soils, Vegetation, and Sensitive Species

PSD requirements include an assessment of the secondary impacts from projects subject to review. These potential secondary impacts include growth, soils and vegetation, and sensitive species.

Growth: There will be minimal growth associated with the proposed project during the construction phase, due to the relatively short 24-month construction schedule and the

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4 Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD), USEPA, 1987.

broad regional availability of construction labor in the southern Sacramento and northern San Joaquin Valleys. Further, no direct project-related long-term growth is expected to occur in the area because only 21 additional permanent employees will be added as a result of the new plant.

The proposed project will not induce growth as a result of the additional power available. NCPA provides power to member agencies in northern California and is not a local power provider. The project is being developed by LEC in response to the growth in demand in the northern part of the state and will be available to back up non-fossil supplies such as hydro, solar, and wind generating resources.

Vegetation, Soils, and Sensitive Species: The LEC will be located in an area that is primarily agricultural. Criteria for evaluating impacts on soils and vegetation are provided by EPA guidance.[5] This document includes minimum impact levels for effects on sensitive vegetation and crops, but does not include specific impact levels for PM_{10}. The document indicates that the NAAQS appear to protect against vegetative damage, and the compliance of the project's PM_{10} impacts with the NAAQS is summarized in Table 8. Since total project impact including background is expected to remain well below the NAAQS, no damage to vegetation is expected as a result of the proposed project.

TABLE 8

Maximum Modeled PM_{10} Impacts Plus Background

Pollutant	Averaging Time	Maximum Facility Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
PM_{10}	24-hour	3.7	85	88.7	150

The maximum annual predicted concentration of particulate matter from the project (chiefly from the cooling tower) is 0.94 µg/m3. Assuming a deposition velocity of 2 cm/sec (worst-case deposition velocity, as recommended by the California Air Resources Board), this concentration converts to an annual deposition rate of 0.58 $\mu g/m^2/year$, which is several orders of magnitude below the 365 $\mu g/m^2/yr$ that is expected to result in mechanical injury to vegetation (Lerman and Darley, 1975).

Project impacts on agriculture and soils are discussed in detail in Sections 5.6 and 5.11 of the AFC. Project impacts on fauna are discussed under Biological Resources, Section 5.2 of the AFC. These sections were provided as part of the original PSD permit application for this project and are incorporated herein by reference.

Class I Area Impact Analysis and Class II PSD Significance Thresholds

In general, projects located within 100 km of Class I areas are required to evaluate impacts to visibility and other air quality-related values at those Class I areas as part of a PSD permit evaluation. The nearest Class I areas and their distances from the project are listed below.

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[5] Smith, A. E., and J. B. Levenson. A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, 1980.

Mokelumne Wilderness	106 km
Emigrant Wilderness	120 km
Desolation Wilderness	122 km
Yosemite National Park	124 km
Point Reyes National Seashore	127 km
Pinnacles Wilderness	180 km

Since all of these areas are more than 100 km from the project site, visibility and AQRV analyses should not be required. However, since the Mokelumne Wilderness is only slightly more than 100 km away, an assessment could otherwise be required for that area. The Federal Land Managers (FLMs) have developed a screening methodology for determining whether a proposed project is likely to have a significant impact on a Class I area when located within, or near to, the 100 km threshold. Under this procedure, the estimated sum of maximum NOx, SOx, and PM_{10} emissions (in tons per year) from the project is divided by the distance of each Class I areas from the project (in km) (National Park Service, 2007). The sum of the NOx, SO_2, and PM_{10} emissions from the project is 139.8 tons.[6] Using the distance to the closest Class I area, 106 km, the quotient is 1.32. Because this quotient is substantially less than the FLM threshold level of 10, it is expected that even if the project is subject to PSD review it will not be required by the FLMs to evaluate impacts to visibility and other air quality related values at Class I areas.

[6] 71.5 tons (NOx) plus 24.3 tons (SO_2) plus 44.0 tons (PM_{10}).

Attachment I

BACT Analysis for PM_{10}

BACT for the CTG/HRSG: Normal Operations

Achievable Controlled Levels and Available Control Options

PM emissions from natural gas-fired turbines and HRSGs primarily result from carryover of noncombustible trace constituents in the fuel. PM emissions are minimized by using clean burning pipeline quality natural gas with low sulfur content.

The CARB BACT Clearinghouse, as well as the BAAQMD and SJVAPCD BACT guidelines, identify the use of natural gas as the primary fuel as "achieved in practice" for the control of PM_{10} for combustion gas turbines. The SJVAPCD also requires the use of an air inlet filter and a lube oil vent coalescer to remove ambient particulate matter from the inlet air and to minimize the formation of lube oil mists.

The CARB's BACT guidance document for stationary gas turbines used for combined-cycle and cogeneration power plant configurations[1] indicates that BACT for the control of PM emissions is an emission limit corresponding to natural gas with fuel sulfur content of no more than 1 grain/100 standard cubic foot.

Title 40 CFR Part 60 Subpart KKKK contains the applicable NSPS for combustion gas turbines. Subpart KKKK does not regulate PM_{10} emissions.

Published prohibitory rules from the District, SCAQMD, SJVAPCD, SMAQMD, and SDCAPCD were reviewed to identify the PM_{10} standards that govern natural gas-fired combustion gas turbines. These prohibitory rules do not regulate PM_{10} emissions. The applicable NSPS (40 CFR 60 Subpart KKKK) limits SOx emissions to 0.56 lb/MWh, well above permitted limits for natural gas-fired turbines.

EPA's April 2008 PSD BACT determination for the Colusa Generating Station stated:

PM emissions from turbines primarily result from carryover of noncombustible trace constituents in the fuel. The applicant proposed that PM/PM10 emissions, as well as SO2 emissions, be controlled through the use of clean burning pipeline quality natural gas for the CTs and DBs. Based on other similar recently permitted gas turbine operations, EPA concurs that the exclusive use of pipeline-quality natural gas represents BACT for the CTs and DBs.

Recent PM_{10} BACT determinations for similarly-sized gas turbines/HRSGs are summarized in Table I.

BACT for Startup/Shutdown

Startup and shutdown periods are a normal part of the operation of combined cycle power plants such as LEC. BACT must also be applied during the startup and shutdown periods of gas turbine/HRSG operation. The BACT limits discussed in the previous section apply to

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[1]CARB, "Guidance for Power Plant Siting and Best Available Control Technology," July 1999, Table I-2.

steady-state operation, when the turbine, HRSG, and steam turbine have reached stable operations and the emission control systems are fully operational.

During gas turbine startup, there are equipment and process requirements that must be met in sequential order to protect the equipment. Many of these require holding the gas turbine at low loads, where operation is inefficient and emissions are relatively high, to allow the HRSG to warm up and steam turbine seals and condenser vacuum to be established. At low turbine loads, the combustors are not yet operating in lean pre-mix mode and the post-combustion controls that are used to achieve additional emissions reductions have not yet reached the specific exhaust temperature ranges to be fully effective. However, since PM_{10} emissions result from the characteristics of the fuel burned and do not rely on any emissions control system, the BACT determination for PM_{10} emissions is applicable during startup and shutdown as well.

Conclusions

Based upon the results of this analysis, the SJVAPCD BACT guideline reflects the most stringent PM_{10} emission limit. The District established a requirement for the use of natural gas as the primary fuel to control PM_{10} emissions from combustion gas turbines. Therefore, the use of natural gas as the primary fuel source constitutes BACT for PM_{10} emissions from combustion gas turbines. Through the use of natural gas, the turbine is expected to be able to meet the proposed emission limit of 9.0 lb/hr without duct firing and 11.0 lb/hr with duct firing. These limits are consistent with or lower than the limits shown in the summary table, with the exception of the Blythe II project and the Russell City Energy Center draft permit. Since these projects have not yet been constructed or operated and no performance data are available, these permit limits are not considered achieved in practice.

BACT for the Auxiliary Boiler

Achievable Controlled Levels and Available Control Options

PM_{10} emissions from natural gas combustion result from sulfur and other impurities in the fuel. Emissions of these pollutants will be minimized through the use of low sulfur pipeline quality natural gas. There are no add-on control technologies that are effective in reducing PM_{10} emissions from naturally low-emitting natural gas-fired boilers.

District BACT Determinations

The SJVAPCD and BAAQMD BACT guidelines both indicate that the use of natural gas fuel is considered BACT for boilers.

Conclusions

Use of pipeline quality natural gas is considered BACT for this boiler application. The proposed emissions limitations are expected to be achievable with natural gas firing.

TABLE I

Recent PM_{10} BACT Determinations for Combustion Turbines/HRSGs

Facility	District/State	PM_{10} Limit, no duct firing	PM_{10} Limit, with duct firing	Date Permit Issued	Source
Russell City Energy Center	BAAQMD	9 lb/hr	9 lb/hr	December 2008 (draft)	BAAQMD website
Colusa Generating Station	EPA Region 9	12.9 lb/hr	20.0 lb/hr	May 2008	CEC final decision
Blythe Energy LLC (Blythe II)	MDAQMD		6.0 lb/hr[a]	December 2005	CEC website
Magnolia Power Project	SCAQMD	--	11.0 lb/hr	February 2004	SCAQMD website
Vernon City Power & Light	SCAQMD	--	11.0 lb/hr	February 2004	SCAQMD website
Rocky Mountain Energy Center	Colorado	--	0.0074 lb/MMBtu	May 2006	EPA RBLC
Sierra Pacific Power Company	Nevada	--	0.011 lb/MMBtu	August 2005	EPA RBLC
Crescent City Power, LLC	Louisiana	29.6 lb/hr	0.01 lb/MMBtu[b]	June 2005	EPA RBLC
Turner Energy Center[c]	Oregon	--	18 lb/hr	January 2005	EPA RBLC

Notes:

a. Construction on hold.

b. Annual limit.

c. RBLC record indicates that project will not be built.