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Secretary for
Environmental
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Air Resources Board

Barbara Riordan, Chairman
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Gray Davis
Governor

January 21, 1999

Mr. Charles L. Fryxell
Air Pollution Control Officer
Mojave Desert Air Quality Management District
15428 Civic Drive, Suite 200
Victorville, California 92392-2383

Dear Mr. Fryxell:

We have reviewed your December 16, 1998 revised preliminary determination of compliance (DOC) for the High Desert Power Plant. Our analysis has raised several issues and concerns which are identified below. My staff has discussed our concerns with Mr. Alan DeSalvio of your staff.

PROJECT DESCRIPTION

The High Desert Power Plant, Limited Liability Company, has proposed to site the High Desert Power Plant at Victorville in the Mojave Desert Air Quality Management District (MDAQMD). The MDAQMD is currently nonattainment for federal and state ambient air quality standards for both ozone and PM10.

The project, as proposed, consists of two alternative gas turbine design configurations, one of which will be chosen at the time of construction depending on market considerations. The project will consist of two (2G configuration) or three (3F configuration) combined-cycle gas turbines operated in "merchant mode" with a combined rated output of 678 or 730 MWe, respectively. The heat recovery steam generators will be supplementary fired. The 3F configuration is expected to result in worse-case emission impacts. Proposed best available control technology and annual emissions limits are as follows:

Pollutant	Proposed Best Available Control Technology (BACT)	Emissions (tpy) by Configuration	
		3F	2G
Oxides of Nitrogen (NOx)	Dry low-NOx combustors and selective catalytic reduction with control to 2.5 ppmvd at 15% O2 with 3-hour averaging time	205	189
VOC	Oxidation catalyst with 40 % control	144	103

Pollutant	Proposed Best Available Control Technology (BACT)	Emissions (tpy) by Configuration	
		3F	2G
Carbon Monoxide (CO)	Oxidation catalyst with control to 8 ppmvd at 15% O2 with 3-hour averaging time	914	631
Oxides of Sulfur (SOx)	Natural-gas firing	13	13
PM10	Natural-gas firing	155	104

Emission offsets for mitigating the project's impacts will come from within the MDAQMD and the South Coast Air Quality Management District (SCAQMD). VOC emission reductions credits from the SCAQMD are proposed for mitigation of VOC and NOx emission increases from the project at a ratio of 1.3:1.

GENERAL COMMENTS

We are concerned that the emission offset package is not yet complete. The PM10 emission reductions have not been quantified and analyzed. Such materials are generally included in the preliminary determination of compliance or proposed decision to grant an authority to construct. As a result, we suggest that the MDAQMD allow for further review and comment on the emission offset package, once completed, by the agencies and interveners involved in the certification process.

SPECIFIC COMMENTS

-BACT-

1. **BACT for NOx:** The MDAQMD has proposed an emission level of 2.5 ppmvd at 15 percent oxygen with a 3-hour averaging time as BACT for NOx emissions from gas-fired, combined-cycle gas turbines with duct burners. The United States Environmental Protection Agency (U.S. EPA) has recognized 2.0 ppmvd at 15 percent oxygen averaged over 3 hours as demonstrated in practice for gas turbines. In addition, it is our understanding that the U.S. EPA accepts the SCAQMD BACT determination of 2.5 ppmvd at 15 percent oxygen with a 1-hour averaging time¹ for gas turbines as

¹Although MDAQMD staff does not believe the SCAQMD stated their BACT limit as having a one-hour averaging time, SCAQMD staff has indicated that the absence of a one-hour averaging time specification was an oversight, and that staff reports justifying the BACT limit assume and mention a one-hour averaging time.

equivalently stringent. The proposed BACT determination is less stringent than either of the above. Furthermore, the Feather River Air Quality Management District has required 2.5 ppmvd at 15 percent oxygen with a 1-hour averaging time for the Sutter Power Plant on similar-sized turbines. Therefore, we do not believe the applicant has complied with BACT as defined in MDAQMD Rule 1301(J) and as required by MDAQMD Rule 1303(A).

2. BACT for VOC: Two successive years of source testing at C&H Sugar in Crockett, California, indicate that levels below 1 ppmvd of VOC at 15 percent oxygen have been achieved for a combined-cycle General Electric Frame 7FA. In addition, the recent DOC for the Sutter Power Plant included a limit of 1 ppmvd VOC at 15 percent oxygen. ARB staff recommends the MDAQMD reconsider the proposed BACT determination for VOCs to be consistent with an achieved-in-practice VOC BACT limit of 1 ppmvd at 15 percent oxygen.
3. BACT for CO: We do not believe 8 ppmvd CO at 15 percent oxygen averaged over 3 hours is the most stringent emission level achieved in practice for combined-cycle gas turbines. The MDAQMD should make its determination consistent with available performance data and other BACT determinations. Such information has been provided. We suggest that the MDAQMD require 4 ppmvd at 15 percent oxygen averaged over 1 hour for a CO BACT limit.
4. "Bubbled" Emission Rate Limits as a Surrogate for BACT Emission Concentration Limits: We believe that emission concentration levels established as BACT should be included in the permit conditions as emission concentration limits for each unit. The MDAQMD determined BACT for NO_x and CO emissions from the proposed gas turbines based on emission concentration limits (i.e., ppmvd at 15 percent oxygen). In lieu of the BACT determination, the MDAQMD has required emission rate limits "bubbled" over all gas turbine emissions at the facility. "Bubbled" hourly emission rate limits are less stringent than per unit emission concentration limits. For instance, if one gas turbine is shutdown, an emission concentration limit would not allow maximum emission from the other turbine(s) to increase as would a "bubbled" emission rate limit. As a result, we do not believe that "bubbled" emission rate limits can be surrogates for the BACT emission concentration limits in this case. Furthermore, MDAQMD Rules 1301(J) and 1303 require BACT for "permit units" emitting over 25 lb/day.

-PROJECT MITIGATION-

5. PM₁₀ Offsets: We are concerned that PM₁₀ offsets have not been secured for this project as required in MDAQMD Rule 1303(B) and determined by Rule 1305. MDAQMD Rule 1302(C)(3)(b)(iii) states that "After determining that the Offsets are

real, enforceable, surplus, permanent and quantifiable and after any permit modifications required pursuant to District Rule 1305 or Regulation XIV have been made, the APCO shall approve the use of the Offsets subject to the approval of CARB and U.S. EPA during the comment period . . .". Such approvals by the U.S. EPA and ourselves are not possible without specific information identifying roads to be paved and corresponding emission calculations. There is also no assurance that the emission reductions are permanent without an enforceable, long-term maintenance plan. Finally, we would like the MDAQMD to provide justification for the use of emission reductions from the paving of public roads. It is our understanding that emission reductions from the paving of specific roads may be encumbered by the "Stabilization of Public Unpaved Roads" control measure in the Mojave Desert Planning Area Federal Particulate Matter (PM10) Attainment Plan.

-OTHER COMMENTS-

6. Conditions Governing Design and Operation: Restrictive design and operational assumptions used for emission calculations in the engineering analysis should be documented as permit conditions. Although assumptions for emission calculations are provided in application materials for the number of startups and shutdowns, as well as hours of online operation, these assumptions are not documented as permit conditions. Instead, it appears that the MDAQMD is proposing to regulate hourly, daily, and annual emissions with facility-wide emission caps. For example, permit conditions for the following should be included in the permit:
 - a. Daily and annual limitations on the number of cold, warm, and hot startups, and shutdowns. Such daily limitations should correspond or be consistent with assumptions used for worse-case air quality modeling scenarios. Annual limitations should correspond with assumptions used to calculate annual emissions.
 - b. Operation should be limited to 6456 hours per year.
 - c. The stack height should be limited to no less than that used in modeling air quality impacts (39.6 m).

We believe that reliance on emission limits alone is imprudent, especially in light of problems we anticipate with continuous emission monitoring during startup and shutdown. Furthermore, since other pollutant emissions are not monitored with continuous emission monitors, we do not believe compliance with daily and annual emission limits can be ensured without operational limits included in the permits.

7. Enforcement of "Bubbled" Emission Limits without Continuous Emission Monitors: Emission limits "bubbled" over multiple units for VOC, PM10, and SOx are not enforced with continuous emission monitors. As proposed, emission limits for these pollutants are

only enforced with periodic source testing. If compliance with a "bubbled" emission limit is to be enforced with source testing, one would have to simultaneously source test all units subject to the "bubbled" emission limit to establish a violation. Therefore, we suggest that permit conditions be added to enforce short-term emission rate limits or, if applicable, emission concentration limits, separately for each unit.

8. Monitoring of Startup and Shutdown Emissions: It is our understanding that due to the varying nature of exhaust flow during startup and shutdown, continuous emission monitors are not reliable for measurement of emissions during these periods. If this is the case, the MDAQMD may want to consider developing a daily and annual emission calculation protocol with assumed emissions attributable to startups and shutdowns. We suggest that the MDAQMD initially use the emission values provided by the applicant. These emissions estimates can be verified during initial source testing prior to granting the permit to operate. Changes in startup and shutdown emissions over time can be monitored with periodic source testing. Using this compliance method, time spans of startups and shutdowns would also need to be limited, since startup and shutdown emission quantities are assumed to occur over a specific period of time.
9. Emission Estimates of Oxides of Sulfur (SO_x): ARB staff conversations with a natural gas industry representative indicate 0.2 gr/100 scf may be a low estimate of the total sulfur content of natural gas sold in California. It is our understanding that Pacific Gas and Electric and Southern California Gas specify contractual limits for gas purchases from their suppliers of 1.0 and 0.75 gr/100 scf for total sulfur content, respectively. Since SO_x emissions are not continuously monitored, we believe that total sulfur content should be limited to 0.2 gr/100 scf and monitored with at least monthly fuel sampling and analysis. Otherwise, the emission offsets required by MDAQMD Rule 1303 may be underestimated and the applicant will need to provide additional emission offsets.
10. Regulation of PM₁₀ Emissions: Application materials indicate PM₁₀ emissions have been estimated using U.S. EPA Method 5, which would provide only filterable PM₁₀. As a result, it appears that condensible particulate matter has not been included in PM₁₀ emission estimates and limits. We suggest that the emission estimates, permit limits, emission offset liabilities, and the required source testing method be revised to account for condensible particulate matter.
11. Enforcement of Ammonia Slip Limits: Although a limit on ammonia slip is mentioned in the permit conditions, there is no compliance monitoring required. We suggest that ammonia slip levels be tested annually along with other pollutants, and that testing be used to establish a correlation between rates of ammonia injection and slip (or the relationship could be conservatively approximated with a mass balance analysis). A permit condition could then be added to monitor ammonia slip using the ammonia injection rate as a surrogate parameter and limit the injection rate to a value corresponding with 10 ppmvd at 15% oxygen.

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12. Recordkeeping Requirements: Since the proposed facility will be a major source, fuel use and other data for emission records should be maintained on site for a minimum of five, not two, years in order to comply with Title V recordkeeping requirements in MDAQMD Rule 1203(D)(1)(d)(iii).

Thank you for this opportunity to comment. If you have any questions, or need further clarification on any of our comments, please contact Mr. Bob Giorgis, Air Resources Engineer, of my staff at (916) 327-5601.

Sincerely,

Raymond E. Menebroker, Chief
Project Assessment Branch
Stationary Source Division

cc: Mr. Mike Kenny, EO
Mr. Mike Schieble, EO
Mr. Peter Venturini, SSD
Mr. Chris Tooker, CEC
Mr. Rick Buell, CEC
Mr. Matt Haber, USEPA