South Coast
Air Quality Management District
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February 8, 2013

Stephen O'Kane
Vice-President
AES Southland Development, LLC
690 N. Studebaker Road
Long Beach, CA 90803

Subject: Permit Applications for the Redondo Beach Energy Project, located at 1100 North Harbor Drive, Redondo Beach, CA 90277 (Facility ID# 115536)

Dear Mr. O'Kane:

The South Coast Air Quality Management District (AQMD) has received your letter dated January 11, 2013 in response to the information requested in our letter dated December 21, 2012 regarding the permit applications for the Redondo Beach Energy Project (RBEP) received on November 21, 2012. The AQMD staff has reviewed your January 11, 2013 letter and other information available to AQMD and determined that your applications are not complete and additional information is still needed.

Subsequent to our initial review of your application package, the AQMD's Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) Rule 1714 provided AQMD the authority for issuance of PSD permits to GHG sources located within the AQMD effective January 9, 2013. Prior to this date, AQMD was not the permitting authority and therefore was not required to evaluate your proposed RBEP for compliance with the GHG PSD requirements. In addition, EPA recently provided several comments on the GHG PSD requirements for another proposed repowering project with a similar design configuration on January 25, 2013. As a result, the AQMD needs additional information to determine compliance with GHG PSD requirements for your proposed project.

Based on the above, AQMD has determined that your applications are not complete and the following additional information is still required:

1. Start-up Emissions

In response to item 3a of our letter dated December 21, 2012 requesting a discussion on how a turbine trip would affect the definitions, durations, and emissions of each start up event, your letter stated that "start trips are unplanned events that would be treated like any maintenance outage of equipment and would not affect the definition, duration or emissions of a start event since, by definition, the start event would not have been completed." To clarify, EPA requires that periods during which BACT limits are not achieved shall be limited. Permit conditions will specify the BACT limits for NOx, CO, and VOC shall not apply to turbine commissioning, cold startups, non-cold startups and shutdown periods. The beginning of startup occurs at initial fire in the combustor and the end of startup occurs when the BACT levels are achieved. If during startup the process is

aborted the process will count as one startup. Does this clarification change your response?

2. Fast Start Technology
In response to item 4 requesting a technical discussion of the design considerations for the "fast start technology," your letter provided a general discussion with insufficient operational details on the proposed equipment. Please provide a step-by-step process description for the cold start-up of the combustion turbine, combustion turbine generator, heat recovery steam generator and steam turbine generator. Also, please include a discussion of the key design changes from a conventional combined cycle system.

3. Health Risk Assessment
In response to item 6 requesting a health risk assessment using AP-42 emission factors, including for formaldehyde, your letter sets forth the HRA results in Table AQMD-2. Formaldehyde, however, continues to be based on 120 ppm for an emission factor of 2.88 x 10^{-4} lb/mmBtu. Section 5.9.3.1.1 on pg. 5.9-8 does not explain why the 120 ppm is applicable.

a. Please explain why the 120 ppm formaldehyde is applicable to the proposed natural gas fired turbine.

b. It was determined for a related project that the 120 ppm formaldehyde is not applicable. If that continues to be the case, please use the controlled emission factor of 3.6 x 10^{-4} lb/mmBtu formaldehyde listed in Table 3.4-1 of AP-42 (not the uncontrolled emission factor of 7.1 x 10^{-4} lb/MMBtu in Table 3.1-3).

4. Dispersion Modeling
In response to item 8, your letter provided clarification regarding the dispersion modeling. Subsequent to the receipt of your letter, AQMD Planning Staff identified deficiencies in the dispersion modeling performed for a related project (Huntington Beach Energy Project (HBEP)) and requested a revised modeling. If these same deficiencies are included in the dispersion modeling performed for this project, please revise the dispersion modeling to correct those deficiencies.

5. GHG BACT Emissions Rate Calculations
In response to item 7 requesting supporting calculations for the BACT for GHG emission rate of 1,082 pounds CO_2/MWhr of gross energy output, your letter provided supporting calculations.

a. In your letter, Table AQMD-3 provided five estimated gross heat rates, LHV, for each state for the base load. (State 1 represents a 1 on 1 configuration, State 2 represents a 2 on 1 configuration, and State 3 represents a 3 on 1 configuration.) These five heat rates resulted in an average Btu/KWh for each state. Further, footnote 2 states that the five estimated gross heat rates range from 3.3 to 5.7% station load, and a 3% station load was selected to convert the gross heat rates to net heat rates.

1) Please identify the loads for each of the five estimated gross heat rates for each state.

2) Footnote 2 appears to state that the gross heat rates were converted to net heat rates, but it is unclear from the table whether the results are for net heat rates. Please explain whether the heat rates are for gross or net heat rates.

3) Please explain why the table is for an ambient air temperature of 71 deg F. On pg. 3-20, Table 3-2—Comparison of Heat Rates and GHG Performance of Recently Permitted Project, the RBEP results were based on 63.3 deg F. The revised calculations should be based on the ambient temperature that results in worse-case emissions.

b. Your letter stated that "the operating profile assumed here reflects a realistic estimate of RBEP's GHG efficiency for the project application and is not equivalent to the operating profile being used in the permitting effort." Specifically, the GHG efficiency was based on 125 hr for State 1, 1600 hr for State 2, and 730 hr for State 3, with a total of 350 startups per year for the block.

For the purpose of PSD compliance, the operating profile for the GHG emissions rate calculation is required to be the same as the operating profile being used in the permitting effort.

1) Please provide revised emission rate calculations based on the Annual Operating Profile provided in your letter in Table AQMD-1 in response to item 3b.

2) Table AQMD-4 provided effective heat rates from startup and shutdown data. The data was based on fuel gas usage and net MW for a **hot** start (9 minutes) and shutdown (9.5 minutes), for a total of 350 starts/shutdowns for the combined cycle system. The revised calculations are required to be based on the number and duration of cold starts, warm starts, hot starts, and shutdowns set forth in Table AQMD-1.

3) Revised calculations are required to be provided for three operating loads. Since the stated load range is 70% to 100% load, please include 70%, 100% and another load in between.

c. Your calculations were based on CO_2 only. The revised calculations are required to be based on CO_2e, including the combustion emissions of CH_4 and N_2O.

d. The emissions rate was stated to be based on MWh gross. The revised calculations are required to be based on MWh net.

6. GHG BACT Analysis—Other Turbine Models

Please identify other turbine models or other potential facility configurations that may result in higher thermal efficiencies and therefore lower GHG emissions from the proposed equipment at the facility. Please consider and analyze as necessary other potential turbine models and configurations that would make the specific project more thermally efficient.

In addition, our literature search seems to indicate that the proposed turbine has been available for a long period of time and was not designed for the "fast start technology."

Other newer turbines have become available on the market. Please explain how the proposed turbine has been modified to use the "fast start technology." Also, please explain how the determination was made that the proposed turbine is more thermally efficient than the newer turbines available today.

7. Carbon Capture and Storage

Pursuant to EPA requirements for GHG BACT Analysis, sections 3.2.2.2.1 through 3.2.2.4.1 on pages 3-6 through 3-18 provide a technology evaluation to assess the technical feasibility of carbon capture and storage. As the evaluation is not sufficiently detailed to support the conclusion that this technology is infeasible, please provide the following additional information.

a. Capture and Compression

1) Please provide cost estimates, including for development, licensing, procurement, and construction, for the following types of carbon capture systems:

a) Sorbent adsorption
b) Physical absorption
c) Chemical absorption

2) Please examine both partial and full-capture options.

3) Please quantify the "significant reduction of plant output due to the high energy consumption of capture and compression systems," listed as an additional cost to RBEP in Section 3.2.2.4.1 on pg 3-17.

b. Transport

1) Please elaborate on the concerns with transporting CO_2 via a new pipeline in an urban area mentioned in section 3.2.2.1.1 on pg 3-4:

a) Development of new rights-of-way, and

b) Public concern about potential for leakage.

2) Section 3.2.2.2.1 on pg. 3-12 indicates that Figure 3 from the Interagency Task Force shows that there are no existing CO_2 pipelines in California. Further, petroleum product pipelines are not suitable for re-use of CO_2 transport.

a) Please investigate whether there are other types of available pipelines that are suitable for re-use for CO_2 transport.

b) Please identify such pipelines that may potentially be re-used for CO_2 transport for this project.

c. Storage

1) Enhanced Oil Recovery (EOR)

a) Please investigate oil fields amenable to EOR within pipeline distance of RBEP and potential EOR projects with the companies that operate them.

b) Please estimate the storage capacity and costs, including transportation for best options.

c) Please evaluate options.

2) Deep Saline Aquifer

a) Please identify formations within pipeline distance of RBEP and create a detailed evaluation.

b) Please estimate the storage capacity and costs, including transportation for best options.

c) Please evaluate options.

d. Additional RBEP Concerns

1) Please quantify the costs of "hiring of labor to operate, maintain, and monitor the capture, compression, and transport systems," listed as an additional cost to RBEP in Section 3.2.2.4.1 on pg 3-17.

2) Please elaborate on the "resolving of issues regarding project risk that would jeopardize the ability to finance construction," listed as an additional cost to RBEP in Section 3.2.2.4.1 on pg 3-17.

8. Application for Oil/Water Separator

On pg. 2-31, Section 2.1.9.3 Water and Wastewater Treatment discusses an oil/water separator for removal of accumulated oil that may result from equipment leakage and small spills. A permit application is required for this proposed or existing oil/water separator, unless the wastewater equipment is exempt under Rule 219(p)(16). This exemption does not include treatment processes where VOC and/or toxic materials are emitted. If you believe this exemption is applicable, please confirm there will be no VOC and/or toxic materials emitted from the separator. (As clarification, the wastewater oil/water separator is not covered by Device E78 for Rule 219 Exempt Equipment, Oil Water Separators, Gravity-Type, <45 ft2 Air/Liquid Interfacial Area, because the Rule 219(n)(6) exemption is for natural gas and crude oil production equipment.)

If you have any questions regarding your permit applications please contact me at (909) 396-2584 or Mr. Andrew Lee at (909) 396-2643.

Sincerely,

Brian Yeh
Senior Engineering Manager
Engineering and Compliance

MN:BLY:AYL:JTY:VL

cc: Mohsen Nazemi
Patricia Kelly, CEC