

DOCKETED

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AES Southland Development
690 N. Studebaker Road
Long Beach, CA 90803

tel 562 493 7891
fax 562 493 7320

September 11, 2015

Vicky Lee
Air Quality Engineer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

**Re: Redondo Beach Energy Project Response
(Facility ID 115536)**

Dear Ms. Lee:

This letter provides the information you requested via electronic mail to support your updates to the Redondo Beach Energy Project (RBEP) Final Determination of Compliance (FDOC), as well as to help address comments received for the RBEP.

RBEP Clarifying Questions Set 5

6. Please provide an assessment of RBEP's compliance with the newly promulgated New Source Performance Standards Subpart TTTT – Standards of Performance for Greenhouse Gas Emissions for Electrical Generating Units (Title 40, Code of Federal Regulations, Part 60.5508). As noted in the PDOC, the design efficiency for RBEP is 46% and RBEP would need to meet the Subpart TTTT emission standard of 1000 lbs per gross megawatt-hours when the turbine block supplies more than 46% capacity on a 3-year rolling average. Since the previous analysis AES provided (shown on pages 150-163 of the RBEP PDOC) is for an annual capacity of 72.7%, please provide a scenario for a capacity slightly above 46%.

Response: Subpart TTTT includes two potentially applicable emission limits for newly constructed combustion turbines. These limits are summarized below.

Newly constructed or reconstructed stationary combustion turbine that supplies more than its design efficiency times its potential electric output as net-electric sales on a 3 year rolling average basis and combusts more than 90% natural gas on a heat input basis on a 12-operating-month rolling average basis - 450 kilograms (kg) of carbon dioxide (CO₂) per megawatt-hour (MWh) of gross energy output (1,000 pounds [lb] of CO₂ per MWh); or 470 kg of CO₂ per MWh of net energy output (1,030 lb CO₂/MWh)

Newly constructed or reconstructed stationary combustion turbine that supplies its design efficiency times its potential electric output or less as net-electric sales on a 3 year rolling average basis and combusts more than 90% natural gas on a heat input basis on a 12-operating-month rolling average basis - 50 kg CO₂ per gigajoule (GJ) of heat input (120 lb CO₂ per million British thermal units [MMBtu])

The applicable emission standard depends on whether a combustion turbine sells more electricity than its potential electrical output, which is calculated by multiplying the design efficiency and the potential electrical output, and combusts more than 90% natural gas. The RBEP is exclusively fueled by natural gas and its design efficiency is approximately 46%. Assuming a potential net electrical output of 492.265 megawatts (MW)¹, RBEP's expected annual net electric sales, based on the South Coast Air Quality Management District's requested capacity factor slightly above 46%, is 1,423,322 MWh-Net (see Attachment 1). The potential RBEP electrical output threshold is 1,983,631 MWh-Net, based on the design efficiency of 46% and the net electrical output of 492.265 MW for 8,760 hours per year. Since the expected annual net electric sales are less than the potential electrical output, the applicable Subpart TTTT emission limit is 50 kg CO₂ per GJ of heat input (120 lb CO₂/MMBtu). The RBEP is expected to emit CO₂ at a rate of 117 lb/MMBtu, thereby complying with the applicable emission limit in Subpart TTTT.

If the RBEP were to operate in a manner that exceeds the electrical output threshold of 1,983,631 MWh-Net, the CO₂ emission rate is estimated at 981.7 lb CO₂/MWh, in compliance with the 1000 lb CO₂/MWh limit in Subpart TTTT (see Attachment 1).

If you have any additional questions, please contact either me or Jerry Salamy (916-286-0207).

Sincerely,



Stephen O'Kane
Vice-President
AES Southland Development, LLC

Attachment

cc: J. Didlo/AES
G. Wheatland/ESH
J. Salamy/CH2M
C. Salazar/CH2M HILL
CEC Dockets

¹ South Coast Air Quality Management District RBEP Preliminary Determination of Compliance Table 48, page 159.

Attachment 1

RBEP NSPS Subpart TTTT Compliance Assessment

Estimated 49 Percent Capacity Factor	1 on 1	2 on 1	3 on 1	Notes
Net Heat Rate - btu/kWh-HHV	8578	8154	8335	From PDOC Table 48
Operating Hours/Year	84	3716	492	Hours from Table 48 reduced to a 49% CF
Average Net Plant Power Output - kW	151346	300575	414031	From PDOC Table 48
Estimated Annual Sales - MWh Net	1423322			$(84 * 151.346 + 3716 * 300.575 + 414.031 * (492 + 45 + 122.3 + 47.5 + 2.5))$
Design Efficiency - Percent	46%			Assumed
Potential Electrical Output - MWh Net	1983631			$(0.46 * 492.265 * 8760)$ MWs from Table 48 of PDOC
Startup hours/year (9 min/start)	45			From PDOC Table 50
Startup hours/year (balance of startup)	122.3			From PDOC Table 50
Shutdown hours/year (9.5 min/shutdown)	47.5			From PDOC Table 50
Shutdown hours/year (balance of startup)	2.5			From PDOC Table 50
Startup net heat rate (9 minutes) - btu/kWh-HHV	20094			From PDOC Table 50
Startup net heat rate (balance) - btu/kWh-HHV	8766			From PDOC Table 50
Shutdown net heat rate (9.5 minutes) - btu/kWh-HHV	18172			From PDOC Table 50
Shutdown net heat rate (balance) - btu/kWh-HHV	8766			From PDOC Table 50
Net Heat Rate - btu/kWh-HHV	8423.3			$(84 * 8578 + 3716 * 8154 + 492 * 8335 + 45 * 20094 + 122.3 * 8766 + 47.5 * 18172 + 2.5 * 8766) / (84 + 3716 + 492 + 45 + 122.3 + 47.5 + 2.5)$
CO2 Emission Rate - kg CO2/MMBtu-HHV	52.91			The Climate Registry 2015, Table 12.1.
Net GHG Efficiency (without degradation) - lb CO2/MWh	982.5			$(8423.3 * 1000 / 1000000 * 52.91 * 2.2046)$
Gross GHG Efficiency (without degradation) - lb CO2/MWh	953.1			$(982.5 * 0.97)$
Degradation - Percent	3%			Assumed
Net GHG Efficiency (with degradation) - lb CO2/MWh	1012.0			$(982.5 * (1 + 0.03))$
Gross GHG Efficiency (with degradation) - lb CO2/MWh	981.7			$(953.1 * (1 + 0.03))$
NSPS Subpart TTTT Standard lb CO2/MWh- Gross	1000			