

## DOCKETED

<b>Docket Number:</b>	00-AFC-14C
<b>Project Title:</b>	El Segundo Power Redevelopment Project Compliance
<b>TN #:</b>	201599
<b>Document Title:</b>	CEC Staff comments on PDOC
<b>Description:</b>	N/A
<b>Filer:</b>	Craig Hoffman
<b>Organization:</b>	California Energy Commission
<b>Submitter Role:</b>	Public Agency
<b>Submission Date:</b>	1/27/2014 10:32:28 AM
<b>Docketed Date:</b>	1/27/2014

**CALIFORNIA ENERGY COMMISSION**

1516 NINTH STREET  
SACRAMENTO, CA 95814-5512  
www.energy.ca.gov



January 24, 2014

Mr. Mohsen Nazemi, Deputy Executive Officer  
South Coast Air Quality Management District  
21865 Copley Drive  
Diamond Bar, CA 91765

**Re: Comments on SCAQMD Preliminary Determination of Compliance for the El Segundo Power Redevelopment Project (00-AFC-14C), SCAQMD Facility Permit #115663, dated 12/24/2013**

Dear Mr. Nazemi:

Energy Commission staff appreciate the effort your staff made to prepare the South Coast Air Quality Management District (District) Preliminary Determination of Compliance (PDOC) for the El Segundo Power Redevelopment Project (00-AFC-14C), dated December 24, 2013. In our review of the PDOC, we previously provided most of the comments as shown below though e-mail to Mr. Ken Coats and Mr. John Yee of your staff. We have also included several more comments here that we had not previously discovered or communicated to your staff. We hope that these comments assist the District's preparation of the Final Determination of Compliance (FDOC).

1. SOx emission factor:

The PDOC used an oxides of sulfur (SOx) emission factor of 0.6 lb/mmscf (pounds of SOx per million standard cubic feet, see, for example, pages 72, 73, 82, 83, 85...), which is equivalent to sulfur content of 0.21 grains/100 scf ( $0.6 \text{ lb/mmscf} * 7000 \text{ grains/lb} * [1 \text{ mmscf}/10^6 \text{ scf}] * 100 * 32 [\text{molecular weight of S}]/64 [\text{molecular weight of SO}_2] = 0.21 \text{ grains}/100 \text{ scf}$ ).

The facility owner used a sulfur content of 0.25 grains/100 scf for long-term, and 0.75 grains/100 scf for short-term emission calculations. The PDOC condition B61.2 (on page 58) limits the sulfur content to 0.25 grains/100 scf. Energy Commission staff would like to know if the sulfur content should be limited to 0.21 grains/scf to be consistent with the SOx emission factor of 0.6 lb/mmscf.

2. PM10 emissions for the Trent 60 combustion turbines:

Energy Commission staff found inconsistencies in the commissioning emissions of the Trent 60 combustion turbines submitted to the District and Energy Commission. The PDOC Table B-5 (page 85) shows the total particulate matter less than 10 microns (PM10) emissions of 1,729 lbs during commissioning of each Trent 60 turbine. This was based on the data the facility owner sent to the District on August 23, 2013 (TN# 200346), which leads to the maximum hourly PM10 emissions of 11 lb/hr per turbine. However, the limit for the hourly PM10

emissions is 5 lb/hr as shown in the equipment description on page 5 of the PDOC. The data response to the Energy Commission dated September 12, 2013, (TN# 200464) shows the total PM10 emissions of 1,021 lbs during commissioning of each Trent 60 turbine, which is consistent with the 5 lb/hr PM10 limit per turbine.

Staff also found inconsistencies in the PM10 emissions limits in the equipment description for combustion turbine units No. 11 and No. 12. Page 4 of the PDOC shows the PM10 emission limit is 9.5 lb/hr for combustion turbine unit No. 11 according to Rule 1303, while page 5 shows the PM10 emission limit is 5 lb/hr for same model combustion turbine unit No. 12. Based on the engineering evaluation in the PDOC, Energy Commission staff believes the emission limit for the combustion turbine unit No. 11 in the equipment description should be corrected to 5 lb/hr.

Staff believes the 24-hour PM10 modeled results shown in Table 7 on page 33 (and Table 12 on page 39) also correspond to the maximum hourly PM10 emissions of 11 lb/hr for each Trent 60 turbine. The facility owner provided the Energy Commission a revised modeling analysis (TN# 200666) using 5 lb/hr for each Trent 60 turbine, and the 24-hour PM10 modeled result for the new units would be 1.2 microgram per cubic meter ( $\mu\text{g}/\text{m}^3$ ), which is lower than 1.8  $\mu\text{g}/\text{m}^3$  shown in the PDOC. While the revised results do not affect the conclusions in the PDOC stating that the project would not cause a violation of the federal 1-hour  $\text{NO}_2$  standard nor make existing conditions significantly worse, the numbers should be corrected for consistency.

3. Emissions for the GE 7FA combustion turbine and the duct burner:

The PDOC separated the emissions estimation for the GE 7FA turbine and the duct burner. It is unclear whether the exhaust flow rate of 1,236,686 acfm (actual cubic feet per minute, occurring during cold peak scenario) used on page 74 of the PDOC includes exhaust from both the GE turbine and the duct burner or from the GE turbine only. If the exhaust flow rate of 1,236,686 acfm includes exhaust from both the GE turbine and the duct burner, the exhaust from the duct burner needs to be subtracted from the exhaust flow rate before it can be used to calculate the emissions for the GE turbine.

The equipment description on page 2 of the PDOC shows that the PM10 emission limits for GE combustion turbine and the duct burner are each listed at 9.5 lb/hr. The duct burner is located in the Heat Recovery Steam Generator (HRSG) attached to the GE turbine. Staff would like to have a clarification on the total PM10 emission limit for the GE turbine/HRSG stack when the duct burner is firing. If the total allowable PM10 emission from the GE turbine/HRSG stack with duct firing is 9.5 lb/hr, adding the PM10 emissions from the GE turbine (9.5 lb/hr as in Table A-4 on page 74) and the duct burner (1.76 lb/hr as in Table C-1 on page 93) would exceed 9.5 lb/hr.

4. Auxiliary boiler emissions:

On page 94, staff noticed inconsistency in the hourly oxides of nitrogen (NOx) emissions calculated for the auxiliary boiler in the text and in Table C-2. In the text on page 94, the NOx emission was calculated to be 0.104 lb/hr, but in Table C-2, the NOx emission was shown to be 0.059 lb/hr. The NOx emission rate of 0.059 lb/hr also leads to the corresponding RECLAIM Trading Credit (RTC) requirement of 521 lbs/year as specified in condition I297.6 on page 70. If the NOx emission rate is corrected to 0.104 lb/hr, the corresponding RTC requirement would be 911 lbs/year for the auxiliary boiler.

Staff would like to have a clarification on how the monthly emissions and 30-day average lb/day emissions for the auxiliary boiler were calculated in Table C-2 on page 94. Staff would like to know how many hours of operation were used to calculate the monthly emissions. Staff tried to double check the 30-day average lb/day based on the monthly emissions shown in Table C-2 but wasn't able to get the same lb/day values shown in Table C-2. For example, Table C-2 shows the monthly carbon monoxide (CO) emissions would be 251.47 lb/month and the 30 day average CO emissions would be 8.22 lb/day. However, 251.47 divided by 30 should be 8.38, instead of 8.22. Staff also tried to calculate the daily CO emission rate with the hourly emission rate of 0.338 lb/hr, assuming 24 hours of operation per day, and staff got 8.11 lb/day-which is less than 8.38 and 8.22.

On page 30 of the PDOC, it says Rule 409 applies to the combustion turbines and auxiliary boiler. Compliance with Rule 409 is demonstrated for the combustion turbines. However, the PDOC does not evaluate compliance with Rule 409 for the auxiliary boiler.

5. RECLAIM Trading Credit (RTC) requirement inconsistencies:

The PDOC mentioned total RTC requirements in multiple locations. For example, page 51 mentioned the total RTC requirements as 183,989 lbs for the 1<sup>st</sup> year and 144,736 lbs after the 1<sup>st</sup> year. These are inconsistent with the total numbers shown on page 110, which are 242,088 lbs for the 1<sup>st</sup> year and 194,067 lbs after the 1<sup>st</sup> year. In addition, the total of the NOx emissions shown in the first table of page 110 (calculated to be 242,097 lbs) is slightly inconsistent with the number in the text (242,088 lbs). In the second table of page 110, the NOx emissions for the GE 7FA should be 117,768 lbs (based on page 81), instead of 117,786 lbs. The RTC requirements need to be corrected so that they are consistent throughout the FDOC and the RTC requirement of the auxiliary boiler needs to be revised as noted above.

6. Capacity (MW) replacement for Rule 1304:

Page 34 of the PDOC shows total combined rating for the proposed new turbines would be 447 megawatts (MW, gross) but does not state the ambient temperature corresponding to this level of power output. However, the GE

combined cycle turbine has a rating of 334 gross MW and each of the Trent 60 simple cycle turbines has a rating of 57.4 gross MW (see page 7 of the PDOC). Using these values, the combined capacity for the two Trent 60 turbines would be 114.8 gross MW, instead of 112 MW as shown on page 34 of the PDOC. Using these values, the total combined rating for all proposed new turbines would be 448.8 gross MW, instead of 447 MW as shown on page 34.

Note also that the PDOC on page 10 lists the GE combustion turbine and steam turbine at 334 MW at an ambient temperature of 41 degrees Fahrenheit (°F) while the PDOC on page 11 lists the Trent 60 turbines at 57 MW each at an ambient temperature of 78 °F, but the total gross power generation from the two Trent 60 turbines was listed as 112 MW, which is not the sum of two 57 MW ratings. The PDOC is not consistent regarding the total output from the two Trent 60 turbines. Page 34 shows the total credits from the remaining portion of boiler #3 combined with the retirement of boiler #4 would be 447 MW. Using the logic on page 34, there would not be enough retired MW to offset the 448.8 gross MW from the proposed new turbines. Staff would like to know whether the MW replacement for Rule 1304 should be based on gross or net power output ratings.

The total rating for the original El Segundo Units 1 through 4 is 1052 gross MW and 1020 net MW (page 1-3 of the Petition to Amend submitted to the Energy Commission, April 2013); the total rating for the future units 5 through 12 would be 1021.8 gross MW and 995 net MW. The total rating for the future units 5 through 12 would be less than the total rating for the original El Segundo Units 1 through 4 whether the basis for the comparison is gross MW or net MW, meaning that the requirement of Rule 1304 is met and there is no net increase in electric utility capacity. However, the FDOC should explicitly state the basis for meeting Rule 1304 requirements, using corrected MW ratings and consistent ambient temperatures.

7. Greenhouse Gas emissions:

On page 68 of the PDOC, the greenhouse gas (GHG) emission limit specified in condition E193.6 is shown to be 878,679 tons per year of carbon dioxide equivalent (CO<sub>2</sub>e) emissions. On page 101, the annual GHG emission of the GE combustion turbine itself was calculated to be 681,830 tons per year of CO<sub>2</sub>e. On page 105, the annual GHG emission of both the GE combustion turbine and the duct burner was calculated to be 763,684 tons per year for the 100 percent load case. Staff believes the number 878,679 is the amount of the MWh per year estimated for the 45 percent load case. Staff believes condition E193.6 needs to be revised to be consistent with the GHG emissions calculations in Appendix E.

The PDOC did not include sulfur hexafluoride (SF<sub>6</sub>) emissions in the GHG equivalent emissions. The facility owner provided additional information regarding the SF<sub>6</sub> emissions in the data response to Energy Commission dated

Sept. 12, 2013 (TN# 200464). The SF<sub>6</sub> emissions should be added to fully account for all facility GHG emissions in CO<sub>2</sub>e.

8. Inconsistencies in the conditions and equipment description:

The equipment description for the auxiliary boiler on page 6 of the PDOC shows the auxiliary boiler is limited by conditions A63.4, B61.2, C1.9, D29.4, E193.2, E193.5, I297.6, and K40.1. The equipment description on page 14 of the draft Permit to Construct and Operate shows the auxiliary boiler is limited by conditions B61.2, C1.9, D29.13, E193.2, I297.6, and K40.5. Staff believes the emission limits in condition A63.4 apply to the Trent 60 turbines, not the auxiliary boiler. The draft Permit to Construct and Operate shows E193.5 applies to the combustion turbines, not the auxiliary boiler. Staff was not able to find conditions D29.4 and K40.1 in the PDOC or draft permit. The draft permit shows D29.13 applies to the auxiliary boiler, but the PDOC does not include it in the equipment description.

The equipment description on page 2 of the PDOC shows condition E193.6 applies to the GE combustion turbine only. The draft permit (pages 2, 4 and 56) shows condition E193.6 applies to both the GE combustion turbine and the duct burner.

The equipment description on page 2 of the PDOC shows condition I297.3 applies to both the GE combustion turbine and the duct burner. The draft permit (pages 2 and 59) shows condition I297.3 applies to the GE combustion turbine only. Staff believes revisions are needed to make sure the conditions and equipment description in the DOC and in the permit are consistent.

9. Maximum impacts:

Maximum modeled impacts in Table 12 on page 39 are not consistent with most recent modeling analysis that the facility owner submitted to the Energy Commission. The comparison of the results is shown in the following table. Staff also noticed in Table 13 on page 39, the maximum 1-hour NO<sub>2</sub> impacts are 25.1 µg/m<sup>3</sup> from the proposed units 9, 11, and 12 and 25.2 µg/m<sup>3</sup> from all 5 units (units 5, 7, 9, 11, and 12) at El Segundo. These are inconsistent with the impacts shown in Table 12. However, the inconsistencies in the results do not affect the conclusions in the PDOC.

Pollutant	Averaging Period	Maximum impact, µg/m <sup>3</sup> in PDOC	Maximum impact, µg/m <sup>3</sup> in revised modeling (TN# 201210)
NO <sub>2</sub>	1-hour	23.1	25.2
CO	1-hour	109.0	160
PM10	24-hour	1.8	1.2

Staff would also like to know the source for the 1-hour 98<sup>th</sup> percentile nitrogen dioxide (NO<sub>2</sub>) modeling impact of 20.9 µg/m<sup>3</sup> in the table on page 51.

From the middle of page 33: "*Modeling on an individual equipment basis is currently being conducted by the applicant and the results will be forwarded to SCAQMD when completed.*" The PM10 impacts from all the units are modeled and they are lower than the significant change threshold of 2.5 µg/m<sup>3</sup>.

10. Source test location for the auxiliary boiler:

Condition D29.13 on page 64 specifies the source test location is the outlet of the selective catalyst reduction(SCR). According to the draft permit, this condition applies to the auxiliary boiler, which does not have SCR. Staff believes the test location of this condition needs to be revised.

11. Source test report date:

Staff would like to have a clarification on why the draft permit (and PDOC) has different timing restrictions regarding when the source test results should be submitted in different conditions. K40.4 (for the previous licensed El Segundo combustion gas turbines No. 5 and 7) on page 61 of the draft permit, D29.11 and D29.12 (for the proposed combustion turbines No. 9, 11, and 12) on pages 63-64 of the PDOC (or pages 45-47 of the draft permit) require the source test results be submitted no later than 60 days after the source test was conducted. K40.5 (for the proposed combustion turbines No. 9, 11, and 12 and the auxiliary boiler) on page 71 of the PDOC (or pages 61-62 of the draft permit) and D29.13 (for the auxiliary boiler) on pages 64-65 of the PDOC (or pages 47-48 of the draft permit) require the source test results be submitted no later than 90 days after the source test was conducted.

12. Typographical errors:

In the middle of third paragraph on page 28, it says: "*The Scattergood facility ...*", which should be reworded: "*The El Segundo facility ...*".

On page 30: Rule 431.1: "*This rule requires that natural gas the sulfur content as H<sub>2</sub>S [hydrogen sulfide] shall be less than 16 ppmv.*" The wording of the sentence doesn't seem correct.

Also on page 30: "*Pipeline quality natural gas is certified to has sulfur content...*" "*has*" should be "*have*".

Last paragraph of page 32: "*SCAQMD's BACT/LAER determination for a natural gas fired auxiliary boiler is based on the use of pipeline quality natural gas for both VOC.*" Staff would like to know if "*both VOC*" is supposed to be both VOC and PM10 or just VOC.

Middle of page 38: *"The following methodology was used in performing the PSD analysis for NO<sub>2</sub>."* Staff would like to know if this is supposed to be both NO<sub>2</sub> and CO.

Last paragraph of page 49 mentioned the CO<sub>2</sub> emissions per net megawatt hours at 45 percent and 100 percent load. However, the middle of this paragraph says *"Because BACT must apply at all loads the applicable BACT limit is set at 50% load, to be 967 lb/<sub>net</sub>MWh."* Staff would like to know if the "50% load" is supposed to be "45% load".

Middle of page 50: *"In addition, no offsets are required for CO because this pollutant is in attainment in the South Coast Air Basin."* Given the wording of the paragraph, it is unclear whether "CO" is correct or if the reference should be to "CO<sub>2</sub>".

It seems the table number on page 51 should be "14" instead of "7".

On page 54, condition F52.1 says: *"The facility shall submit a detailed retirement plan for the permanent shutdown of Boiler #4 (Device D13) describing in detail the steps and schedule that will be taken to render Boiler #4 permanently in operable."* Staff believes "in operable" should be "inoperable".

The top of page 65 says: *"The test shall be conducted after District approval of the source test protocol, but no later than the later of 180 days after the de-rate project."* The second half of the sentence doesn't seem correct; the words "the later of" should probably be struck. And staff has not seen the project being called "the de-rate project" in other places in the PDOC.

**13. Visibility Impairment Analysis Results:**

Page 40 of the PDOC says *"SCAQMD Modeling staff have reviewed the applicant's analysis [Class II Visibility Impairment Analysis] and have determined that the approach and methodology are acceptable."* The PDOC does not provide the results or conclusions from the Class II Visibility Impairment Analysis.

**14. Proposed New Source Performance Standard for Greenhouse Gases:**

Page 46 of the PDOC says the proposed new source performance standard (NSPS) for GHG emissions exempts simple cycle generating systems. On January 8, 2014, the U.S. EPA proposed new Standards of Performance for new electric power plants (Federal Register, Volume 79, No. 5). According to U.S. EPA, most simple cycle "peaking" stationary combustion turbines selling less than one-third of their potential electric output to the grid would not be affected by the proposed NSPS. However, the facility owner expected the proposed Trent 60 turbines to operate with about 55 percent capacity factor (based on 3,840 hours of normal operation plus 480 startup hours and 480 shutdown hours per year divided by 8,760 hours per year). The Trent 60 turbines would be subject to the

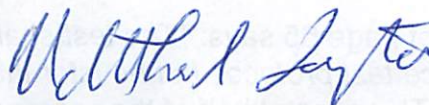


proposed NSPS for GHG if they would actually operate with more than 33 percent (one third) capacity factor.

The proposed NSPS GHG emission limits are 1,000 lb CO<sub>2</sub>/MWh for new combustion turbines with a heat input rating greater than 850 MMBtu/h (approximately 100 MWe) and 1,100 lb CO<sub>2</sub>/MWh for new combustion turbines with a heat input rating less than or equal to 850 MMBtu/h. Page 47 of the PDOC shows the Trent 60 turbines would have GHG emissions of 1,502 – 1,113 lbs CO<sub>2</sub> per net megawatt hour depending on load factors. The Trent 60 turbines would not comply with the proposed NSPS GHG limits using the calculations in the PDOC. In addition, the proposed emissions limits are on a gross output basis. The FDOC should compute the GHG emissions in terms of lb CO<sub>2</sub>/MWh on a gross output basis in order to show compliance with the proposed NSPS for GHG.

We appreciate the opportunity to provide these comments, and we would be pleased to provide you any assistance in preparation and publication of the FDOC. If you have any questions, please contact Dr. Wenjun Qian at (916) 651-3768 or [Wenjun.Qian@energy.ca.gov](mailto:Wenjun.Qian@energy.ca.gov), or please call me at (916)-654-3868.

Sincerely,



MATTHEW S. LAYTON  
Supervising Mechanical Engineer  
Siting, Transmission and Environmental  
Protection Division

cc: Wenjun Qian, Energy Commission  
Gerry Bemis, Energy Commission  
John Yee, SCAQMD  
Ken Coats, SCAQMD  
Dockets