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# AIR QUALITY

Testimony of Tuan Ngo, P.E.

## SUMMARY OF CONCLUSIONS

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Staff finds that, with the adoption of the attached conditions of certification, the proposed amendment to the Russell City Energy Center (RCEC) would comply with all applicable laws, ordinances, regulations, and standards (LORS) and would not result in any significant air quality-related impacts. Staff also finds that:

- The project ozone precursor emissions (oxides of nitrogen (NO<sub>x</sub>) and precursor organic compounds (POC) would be mitigated to a level of less than significant by the surrender of emission reduction credits (ERCs or offsets), or the installation of suggested technologies to reduce start-up time;
- The project would comply with the Bay Area Air Quality Management District (District) Rules and Regulations, including the New Source Review requirements;
- The project would not cause new violations of any nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), or carbon monoxide (CO) ambient air quality standards, and therefore, its emission impacts are not significant for those pollutants;
- The project's particulate matter less than 10 and 2.5 microns (PM<sub>10</sub>/PM<sub>2.5</sub>) emissions contribution would be mitigated to a level that is less than significant by the surrender of sulfur oxides and PM<sub>10</sub>/PM<sub>2.5</sub> ERCs and/or the successful implementation of the wood stove/fireplace improvement program; and
- The project's PM<sub>10</sub> construction impacts would be mitigated to a level that is less than significant.

## INTRODUCTION

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On November 17, 2006, Russell City Energy Company, LLC ("project owner"), filed a petition to modify the September 11, 2002, California Energy Commission's Decision (Decision) approving the RCEC (01-AFC-07). The proposed modifications would move the project facilities approximately 1,300 feet from the originally permitted location, to a site southwest of the intersection of Depot Road and Cabot Boulevard. In addition, the project owner also requested to amend numerous conditions of certification to reflect the following changes:

1. Reducing the combustion turbines' NO<sub>x</sub> emissions to conform to the District's Best Available Control Technology (BACT) emission limit.
2. Installing new oxidation catalyst systems to reduce the combustion turbine CO emissions.
3. Revising the project's fuel use and emission limits for NO<sub>x</sub>, POC, CO, sulfur dioxide (SO<sub>x</sub>), and PM<sub>10</sub> and PM<sub>2.5</sub> emissions.
4. Eliminating the previously approved emergency generator and engine.
5. Replacing the previously approved fire pump Cummins engine with a Clarke engine.

6. Deleting the requirement that restricts simultaneous start up of the combustion turbines.
7. Revising the project's PM10/PM2.5 mitigation plan to include the use of ERCs or interpollutant trading.
8. Administrative revisions to various air quality conditions of certification.

## **LAWS, ORDINANCES, REGULATION, AND STANDARDS (LORS) - COMPLIANCE**

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The project's proposed amendment is subject to all the LORS described in the Final Staff Assessment (FSA) (CEC 2002a).

Staff has received a copy of the District's Amended Preliminary Determination of Compliance (PDOC) (BAAQMD-2007) for the requested amendment to the project, issued on April 2, 2007. The PDOC included a set of Air Quality conditions that are drafted to ensure continuous compliance during construction and operation of the facility. Staff has incorporated the District conditions in this Staff Assessment.

## **SETTING**

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Since the project is being proposed to move its foot print 1,300 feet from the original site, staff does not expect that the project settings have changed from the original FSA. For convenience, staff includes a table, **AIR QUALITY Table 1**, which summarizes the area's attainment status for various applicable state and federal air quality standards.

**AIR QUALITY Table 1 BAAQMD Attainment Status**

<b>Pollutant</b>	<b>Averaging Time</b>	<b>California Status</b>	<b>Federal Status</b>
Ozone (O <sub>3</sub> )	8 Hour	N/A	Non-attainment
	1 Hour	Non-attainment	N/A
Carbon Monoxide (CO)	8 Hour	Attainment	Attainment
	1 Hour	Attainment	Attainment
Nitrogen Dioxide (NO <sub>x</sub> )	Annual	N/A	Attainment
	1 Hour	Attainment	N/A
Sulfur Dioxide (SO <sub>2</sub> )	Annual	N/A	Attainment
	24 Hour	Attainment	Attainment
	1 Hour	Attainment	N/A
PM10	Annual	Non-attainment	Attainment
	24 Hour	Non-attainment	Unclassified
PM2.5	Annual	Non-attainment	Attainment
	24 Hour	N/A	Attainment

**Notes:**

Unclassified means the area is treated as it is attainment  
 N/A= no standard applies or not applicable

## **ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION**

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### **METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE**

The facility was certified in 2002. The annual criteria emissions and mitigation were specified in the Decision. In this proposed revision to the Decision, the facility's annual emission limits, except PM10/PM2.5, would not change. The facility's PM10/PM2.5 annual emission limit would increase slightly from 86.4 tons per year (TPY) to 86.8 TPY. However, the facility's daily and hourly emissions limits for all but PM10/PM2.5 could increase significantly. As such, staff will analyze the project's short-term impacts to verify that the project would not cause a new violation or make worse an existing violation of any applicable air quality standards in the area.

There are two criteria that staff used to determine whether the project emissions would be significant. The first is the status of the ambient air quality standards in the area. Staff considered that all non-attainment air contaminants and their precursors released during the construction and operation of this facility are significant and must be mitigated appropriately. For example, the area is currently non-attainment for ozone and PM10 and PM2.5; therefore, all directly emitted PM10, and PM10 and ozone precursors (NOx, POC and SOx) that the facility released during construction and operation would potentially cause significant impacts through their contribution to the existing violations of the standards and interfere with the applicable air quality plan.

The second criterion that staff used is whether the project's construction and operational emissions would cause a new violation to the ambient air quality standards. Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions. In general, the inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific turbine emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. The model results are often described as a unit of mass per volume of air, such as micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). Staff added the modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. Staff then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or if the emissions would contribute to an existing violation.

The ambient air quality standards that staff used as a basis for determining project significance are health-based standards. They are set at levels to adequately protect the health of all members of the public, including those most sensitive to adverse air quality, such as the aged, people with existing illnesses, and infants and children, while providing a margin of safety.

### **PROJECT AMENDMENT DESCRIPTION**

The project owner asked to amend the RCEC project as follows:

- Move the facility approximately 1,300 feet northwest of the original location;
- Revise the turbines' NO<sub>x</sub> emissions from 2.5 to 2 parts per million at 15 percent oxygen (ppm @ 15 % O<sub>2</sub>) to reflect the District BACT standard;
- Install a CO oxidation catalyst system to ensure compliance with the turbines' CO emission limits as licensed in the original application;
- Revise the facility's commissioning emissions that would increase the daily and hourly emissions of CO, POC, and SO<sub>x</sub>, and slightly decrease the daily PM<sub>10</sub>/PM<sub>2.5</sub> emissions;
- Increase fuel consumption rates of turbines from 2,179 to 2,238.6 million British Thermal Units (mmBTU) per hour;
- Increase the turbines' NO<sub>x</sub>, CO and POC emission limits during start-up and shut down periods;
- Eliminate previous licensing condition that restricts the simultaneous start up of the turbines;
- Increase the facility's daily emission limits of NO<sub>x</sub>, CO, POC and SO<sub>x</sub>;
- Reduce the facility's daily PM<sub>10</sub>/PM<sub>2.5</sub> emission limit;
- Increase the facility's annual PM<sub>10</sub>/PM<sub>2.5</sub> emissions limit;
- Revise the mitigation package for the facility's PM<sub>10</sub>/PM<sub>2.5</sub> emissions;
- Increase the cooling tower recirculation water total dissolved solids (TDS) concentration from 2,000 to 8,000 (ppm);
- Realigned the cooling tower from a north-south orientation to a northwest-southeast orientation; and
- Remove the standby generator and engine that was approved as part of the original project.

It should be noted that even as the short term emission limits are proposed to increase, the project owner has not proposed to change the annual emission limits.

## **DIRECT/SECONDARY IMPACTS AND MITIGATION**

Staff assessed three kinds of primary and secondary<sup>1</sup> impacts: construction, operational, and cumulative effects. Construction impacts result from the emissions occurring during the site preparation and construction of the project. The operational impacts result from the emissions of the proposed project during normal operation, which include maintenance, start-ups and shutdowns. Cumulative impacts result from the proposed project's incremental effect viewed over time, together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.)

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<sup>1</sup> Primary impacts potentially result from facility emissions of NO<sub>x</sub>, SO<sub>x</sub>, CO and PM<sub>10</sub>/2.5. Secondary impacts result from air contaminants that are not directly emitted by the facility but formed through reactions in the atmosphere that result in ozone, and sulfate and nitrate PM<sub>10</sub>/PM<sub>2.5</sub>.

## **Construction Impacts and Mitigation**

Staff reviewed the amendment request and finds that the construction of RCEC would result in emissions and impacts that are no different from those evaluated in the original application. Thus staff believes there is no need to conduct a new analysis for the project construction emission and impacts. However, staff recommends the use of standard construction conditions **AQ-SC1** to **AQ-SC5** in place of the standard construction conditions AQ-C1 through AQ-C4 in the Decision. The new standard construction conditions reflect current United States Environmental Protection Agency (USEPA) and the California Air Resources Board (ARB) engine requirements that match the new construction schedule, and address potential impacts and provide mitigation.

## **Operation Impacts and Mitigation**

The project owner requested that the project be analyzed without an assumed number of start-up, shutdowns, or hours of operation over a year. The project owner submitted information related to the potential maximum hourly, daily and annual emissions (RC 2006a, Table 3.1-3, and Appendix Table 3.1-4), but they requested that the facility be certified with specific conditions that restrict the annual operation of the facility based solely on the annual emission limits of NO<sub>x</sub>, CO, POC, SO<sub>x</sub> and PM<sub>10</sub>/PM<sub>2.5</sub> (RC 2006a, pp. 8). These annual emission limits would be set in accordance with the available ERCs that the project owner proposed to provide to mitigate the project emission impacts.

Staff had problems duplicating the project owner's submitted facility emissions, and requested clarifications of the emission estimates. Staff re-calculated the facility's emissions, attached as an **AIR QUALITY Appendix 1** to this analysis. Staff summarized and tabulated the results of **AIR QUALITY Appendix 1** for the facility's expected maximum hourly, daily and annual emissions for NO<sub>x</sub>, POC, PM<sub>10</sub>, SO<sub>x</sub> and CO in **AIR QUALITY Table 2** below.

The emissions listed in the first three rows of **AIR QUALITY Table 2** are the maximum potential of criteria air contaminants of each turbine operating in different modes, i.e., during commissioning when air pollution control equipment may not fully engaged, during start up, and during normal operation when all control devices are fully operated. The next few rows show the facility maximum potential emissions on a daily and annual basis. These maximum potential emissions were calculated by staff (see **AIR QUALITY Appendix 1**) using information provided by the project owner. For example, the maximum daily emissions were calculated by using the emissions of two start up/shut down cycles for each turbine (RC 2006a, RC 2007a) and 16 hours of normal operation. The annual potential to emit emissions in **AIR QUALITY Table 2** (row 7) was also calculated by staff using the operating hours provided by the project owner (8,464 hours per turbine per year), the owner provided start up and shut down emissions and the number of start up/shut down cycle (RC 2007a). And the bottom row shows the annual emission limits that the project owner wishes to be incorporated into the license. The whole purpose of **AIR QUALITY Table 2** was to show the different between the facility's maximum potential emissions compare to the limits that the project owner wanted to accept.

**AIR QUALITY Table 2**  
**Facility's Potential and Estimated Hourly, Daily and Annual Emissions**

Equipment	NOx	POC	SOx	CO	PM10 <sup>1</sup>
<b>Maximum Hourly Emissions (lb/hr)</b>					
Turbine/HRSG during commissioning <sup>2</sup>	400	123.7 <sup>5</sup>	74.4 <sup>5</sup>	5,000	108 <sup>5</sup>
Turbine/HRSG (start-up)	97.2	19.2 <sup>5</sup>	5.5 <sup>5</sup>	1348.8	10.8 <sup>5</sup>
Turbine/HRSG (normal operation)	16.17	2.82	6.2	19.69	9
Cooling tower	-	-	-	-	2.83
<b>Maximum Daily Emissions (lb/day)<sup>3</sup></b>					
Daily Emissions (during commissioning) <sup>3</sup>	4,805	495	297.6	20,000	432
Daily Emissions (normal operation) <sup>3</sup>	2,212.8	431	300	19,603	500
Annual Potential to Emit <sup>4</sup> (tons/year)	<b>227.4</b>	<b>42.5</b>	<b>13.08</b>	<b>1,346</b>	<b>87.1</b>
<b>Reasonably Expected Emissions<sup>6</sup></b>					
Daily Normal (lbs/day)	848	156	67	3200	476
<b>Proposed Annual Limits (tons/year)<sup>7</sup></b>					
	<b>134.6</b>	<b>28.5</b>	<b>12.2</b>	<b>584.18</b>	<b>86.8</b>

**Notes:**

1. All PM10 emissions from natural gas combustion are treated as PM2.5 (California Emission Inventory and Reporting System, CARB).
2. The turbine/HRSG maximum hourly emissions occur during commissioning (Table 3.1-22).
3. Daily emissions include 2 start-ups (480 pounds NOx per cold start-up, 240 pounds NOx per hot start-up), 2 shut downs (80 pounds of NOx per each), and approximate 14 hours (16.17 pounds NOx/hr) of normal operation for the turbine/HRSG and duct firing.
4. Staff estimated 8,364 hours per turbine per year operation, see **AIR QUALITY Appendix 1**.
5. Staff estimated, see **AIR QUALITY Appendix 1**.
6. Staff estimated using one hot or warm start, followed by 16 hours of normal operation and one shut down for each calendar day.
7. Project owner proposed annual emission limits.  
Source: AFC Amendment Request Section 6 (RC 2006a)

The project owner provided an air quality modeling analysis using the EPA-approved ISCST3 model to estimate the impacts of the project's directly emitted NOx, PM10, CO, and SOx emissions resulting from project operation (RC 2006a). The results of the modeling analysis for turbines, fire pump engine and cooling tower are shown in **AIR QUALITY Table 3**. The modeling analysis showed that the project does not cause any new violations of NO<sub>2</sub>, CO or SO<sub>2</sub> air quality standards, even with recent worst-case ambient concentrations used as background. The project, however, would contribute to existing violations of the state 24-hour and annual PM10 standards, the state annual PM2.5 standard, and the state 1-hour and the federal 8-hour ozone standards. Therefore, staff recommends that mitigation, in the form of ERCs for particulate matter and its precursors and ozone and its precursors be provided.

## **MITIGATION**

### **Ozone Precursors: NOx**

The project owner has requested that staff evaluate the project emissions and mitigation from just the project's annual emission limitations that would be specified in a condition of certification. The project owner requested that no specific number of start-ups, shutdowns, or hours of operation restrict the project's operation, and that these not be

**AIR QUALITY Table 3  
Project Operation Emission Impacts**

Pollutants	Avg. Period	Impacts ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	Total Impacts ( $\mu\text{g}/\text{m}^3$ )	Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard
NO <sub>2</sub>	1-hour (start-up)	77.08	143	220.08	470 <sup>1</sup>	47%
	1-hour (steady state) <sup>3</sup>	226.8	143	369.8	470 <sup>1</sup>	79%
	Annual	0.14	32	32.1	100 <sup>2</sup>	32%
SO <sub>2</sub>	1-hour	4.92	102.2	107.12	655 <sup>1</sup>	16%
	24-hour	1.1	23.5	24.6	105 <sup>1</sup>	23%
CO	1-hour	1,069.71	3,680	4,749.71	23,000 <sup>1</sup>	21%
	8-hour	178.23	2,178	2,356.23	10,000 <sup>1</sup>	23%
PM10	24-hour	2.94	51.7	54.64	50 <sup>1</sup>	109%
	Annual	0.15	18.1	18.25	20 <sup>1</sup>	91%
PM2.5	24-hour	2.94	39.9	42.48	65 <sup>2</sup>	65%
	Annual	0.15	9.4	9.55	12 <sup>1</sup>	80%

**Notes**

1. State standards
  2. Federal standards
  3. Including impacts from fire pump engine.
- Source: RC 2006a.

specified in any condition of certification for the project (CH2MHILL 2007a). For example, as long as the project's total annual NOx emissions, verified once per year, stay at or below the 134.5 tons, then the facility would be considered to be in compliance. The project owner proposed to accept a condition of certification to limit the project's NOx emissions to 134.5 tons a year and agreed to mitigate the project's emission impacts with 102.97 tons of NOx and 51.825 tons of POC ERCs interpollutant traded for NOx, for a total of 154.8 tons NOx and NOx equivalent ERCs (certificates # 815 and 855<sup>2</sup>). This amount of equivalent NOx credits would satisfy the District's New Sources Review Rule offset requirement, which specifies an offset ratio of 1.15 lbs of ERCs for every new pound of NOx emissions from the facility.

**Do the proposed ERCs adequately mitigate the project potential emissions?**

As mentioned earlier, the project, as revised, could potentially emit approximately 227.4 tons of NOx per year (see **AIR QUALITY Table 2**), which is much greater than the project owner's proposed annual limit. Additionally, for this particular project, staff believes the facility's contribution to area 1-hour and 8-hour ozone violations may not be properly identified and mitigated because the facility's daily potential NOx emissions are much higher than the calculated equivalent daily ERCs. Note that the number of violations in 2006 of the 8-hour national ozone standard was the highest since 1998, and the number of violations of the 1-hour state ozone standard has been relatively flat since 1998. Both suggest that ozone violations in the Bay Area are real and ongoing.

On any given day, including days that experience ozone violations, staff estimated that the project could potentially emit 2,213 lbs of NOx (see **AIR QUALITY Table 2**) while

<sup>2</sup> These credits originated from shutting down of equipment at the Potrero power plant in San Francisco and the Pacific Refining Refinery in Hercules (CH2MHILL 2007a).



the emissions reduction credits provided would only equal 848 lbs per day on an equivalent basis, which is approximately 38 percent (848 lbs/2,213 lbs) of the project's potential emissions for NOx. It should be noted that the project owner has stated the staff estimated facility's daily NOx potential emissions (**AIR QUALITY Table 2**) are based on a rare event, which could only happen a few times in a year.

**Do the proposed ERCs adequately mitigate the project's expected daily emissions?**

The project owner has asserted that the more typical, normal operating day of the facility could include a hot start-up, about 16 hours of normal operation followed by a shutdown. Staff believes that this pattern is consistent with operations data from other combined cycle facilities in the state. Therefore, staff attempted to estimate a reasonably expected operating profile for the facility and the associated emissions, and verify whether the proposed ERCs could adequately mitigate the facility emissions.

Staff estimated probable daily facility NOx emissions to be approximately 1,093 lbs per day (see **AIR QUALITY Appendix 1**) from one hot start-up followed by 14 hours of normal operation and one shutdown each day for each gas turbine/HRSG power unit. Even at this level, the proposed ERCs of 848 lbs of NOx a day would mitigate only 78 percent<sup>3</sup> of the facility emission impacts on any given day.

The District's PDOC contains a facility NOx emissions limit of 1,553 pounds per day (BAAQMD - 2007), which is also twice the amount of ERCs proposed. Thus, regardless of whether the facility operated in maximum worst-case or reasonably expected case, the provided ERCs would not adequately mitigate the project's daily NOx emission impacts.

**Is there alternative technology that can reduce the project's emission liability?**

The project, as proposed, is designed to operate most efficiently in base load mode. The project owner is interested in operating the facility as a load-following facility, i.e., frequent, or daily start-ups and shutdowns. The majority of the facility daily NOx emissions are caused by start-up and shutdown events, as shown in **AIR QUALITY Table 2**, where hourly start-up emissions rates are six, seven and 68 times higher than normal operation for NOx, POC and CO, respectively. Because of this, staff investigated if design changes to the project could shorten start-up durations and reduce start-up emissions. Staff found that if the project used the Siemens-Westinghouse Benson Once-Through boiler technology, start-up and shutdown emissions would be significantly reduced such that the proposed offsets would be adequate to mitigate the project's daily NOx emissions. Alternatively, some projects have incorporated an auxiliary boiler or solar array to provide steam that can shorten start-up times.

According to a vendor of this technology, the Siemens-Westinghouse, Benson Once-Through or Fast-Start technology can be designed to fit the proposed 501 FD combustion turbines without additional capital costs above that of the standard, off-the-

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<sup>3</sup> 848 lbs/day divided by 1093 lbs/day = 0.78 or 78 percent

shelf, HRSG that the project owner has proposed<sup>4</sup>. If the project is built with the aforementioned Fast-Start technology, the project start-up NOx emissions are expected to be reduced from the proposed 480 lbs to 22 lbs for each cold start-up event, and from 240 lbs to 28 lbs for hot or warm start-up events. This represents a 95 percent and 88 percent emission reduction of NOx for cold, and hot or warm start-up events, respectively. In addition to reducing the facility's NOx and POC emissions, the use of Fast-Start technology at the RCEC would result in cost saving from less fossil fuel used to create steam that is vented during start-ups. Staff has not estimated the actual fuel savings because this cost will tie directly to how many start-up and shutdown cycles the facility has during a year.

Staff believes that the Siemens-Westinghouse Fast-Start technology is an alternative technology that would mitigate the project impacts to the environment; Staff therefore recommends that, unless the project owner accepts conditions that restrict the start-up duration and emissions, the RCEC should be built employing the Fast-Start technology or its equivalent to reduce the start-up and shutdown event emissions. Staff's recommendation is incorporated into Condition of Certification **AQ-SC7** through **-SC10**.

Alternatively, the 600 MW combined cycle Palomar Project in Escondido has installed a proprietary control system, OpFlex from General Electric, which allows ammonia to be injected at the earliest time to shorten start-up times and reduce start-up emissions at the facility. Preliminary, non-optimized results from their March 7, 2007, Petition for Variance 4703 Extension indicated that they have reduced NOx emissions from 120 lbs to 28 lbs for hot or warm start-up events.

Staff provided a comment on May 29, 2007, to the District on the PDOC for RCEC that the District consider hardware and software modifications to the project to shorten start-up times and significantly reduce start-up emission as BACT.

**Is there alternative operational change that can reduce the facility emission liability?**

The project owner claims that redesign of the project with Fast-Start technology would involve significant costs as they have purchased some equipment and designed the project and systems. These cost increases and redesign may require extensive renegotiations with their financing entities. However, Staff notes that the El Segundo Power Redevelopment Project (00-AFC-14), in order to meet changing electricity market demands, just filed a major amendment (June 15, 2007) redesigning their project from a "traditional" combined cycle to a Rapid Response Combined Cycle that will use Siemens combustion turbines (replacing the previously approved GE CTGs) and Benson once-through boilers.

Staff has asked for and the project owner has provided an expected operational scenario for the facility. The owner states that most likely, each turbine would undergo a cold start-up and combustor tuning about once a year. This is the activity that causes the highest start-up emissions of 480 lbs of NOx per start; most other non-cold start-ups would be in the range of 30 to 40 lbs of NOx per event and there are some rare events

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<sup>4</sup> May 2, 2007, telephone conversation with Thomas Karastamatis - Siemens Power System Sales

when the start-up emissions would exceed the 40 lbs of NOx per start<sup>5</sup>. Thus for most of the year the project would be either in a hot start-up event, normal operation with the SCR fully operational, shutdown event or not operating. The ERCs provide 424 lbs of NOx per day per turbine (848 lbs/day divided by two turbines). On a daily basis with about 16 hours of normal operation, the project NOx daily emissions would be 259 lbs per turbine, which leaves about 165 lbs of NOx for start-up and shutdown event emissions<sup>6</sup>. Thus for most days of the year, assuming typical shutdown emissions of 40 lbs of NOx per event, the remaining 125 lbs of NOx per day can be dedicated to one hot start-up event. During these days, the project owner proposed ERCs would adequately mitigate the project's probable NOx emission liability. To ensure proper mitigation during other periods, the project owner agreed to conditions that restricted the facility maximum daily emissions to 1,225 lbs per day during the ozone season (between June 1 and September 30), and will put aside additional ERCs to mitigate any NOx emissions in excess of 848 lbs/day if that happened. Thus on any one day, the project emissions would be fully mitigated with ERCs.

To facilitate the project owner concerns about the cost of redesigning the project, staff has developed and recommends the adoption of Conditions of Certification **AQ-SC7** and **AQ-SC8** to address the project emissions and its mitigation.

Condition of Certification **AQ-SC7** would place a facility maximum NOx emission limit of 1,225 lbs/day during the June 1 through September 30 time period, and that any NOx emissions greater than 848 lbs/ day shall be mitigated with ERCs.

Condition of Certification **AQ-SC8** places a NOx emission limit of 125 lbs for each hot/warm start-up event per combustion turbine and 40 lbs for each shutdown event per combustion turbine.

### **Ozone Precursors: POC**

Similar to the project NOx emissions, the project POC emissions also correlate strongly with the start-up and shutdown events. Staff estimated that the project potential POC emissions would be 42.5 tons per year (see **AIR QUALITY Table 2**), for which the project owner proposed to mitigate with 28.5 tons of ERCs (CH2MHILL 2007a). On a daily basis, the project potential POC emissions can be as high as 431 lbs (worst case), while the reasonable maximum daily<sup>7</sup> POC emissions are approximately 207 lbs/day (see **AIR QUALITY Appendix 1**). The proposed POC ERCs, on an average daily basis, would be equivalent to 157 lbs<sup>8</sup>, thus the proposed ERCs are not enough to adequately mitigate the project's potential POC contribution to atmospheric ozone.

Similar to NOx emissions, the Fast-Start technology would be expected to reduce the combustion turbine start-up POC emissions from 96 lbs to 21 lbs per cold start-up event, and from 48 lbs to 32 lbs for a hot or warm start-up event. Staff estimated that

<sup>5</sup> June 1, 2007, telephone conversation with Barbara McBride - Calpine

<sup>6</sup> 424 lbs/day ERC - 259 lbs/day (normal operation emissions) = 165 lbs/day for start up and shut down emissions.

<sup>7</sup> Based on one hot start-up, 14 hours of normal operation and one shutdown for each combustion turbine/HRSG unit.

<sup>8</sup> (28.7 tons per year x 2000 lbs/ton) / 365 days/year = 157 lbs/day

with the Fast-Start technology, the project's POC emissions would be 223 lbs/day for the maximum (worst case) potential and approximately 163 lbs/day for the most probable (reasonable) case. The provided POC ERCs could be adequate to mitigate the project's POC contribution to the atmospheric ozone.

Alternatively, staff believes that restricting the period of cold start-up, combustor tuning activities similar to the aforementioned NOx emissions would also reduce the facility POC emission liability to the point that the project owner's provided ERCs would adequately mitigate both the POC and NOx emissions from the project. Staff recommends the adoption of Conditions of Certification **AQ-SC7** to **AQ-SC9**.

### **Ozone Precursors: Simultaneous Start of Both Turbines**

The project owner requested the deletion of existing Condition of Certification **AQ-22** in the Decision to enable them to simultaneously start both combustion turbine/HRSG units. The project owner believes that because the submitted air dispersion modeling shows that the NOx emissions from simultaneous start-up of both combustion turbine/HRSG units would not cause a violation of the ambient air quality standard for NO<sub>2</sub>, such start-up scenarios should be allowed (CH2MHILL 2007a).

Even though the modeling shows that the NO<sub>2</sub> standard is not violated during the simultaneous start-up of both combustion turbine/HRSG units, the project owner has not provided evidence or modeling that shows that putting such a large quantity of NOx and POC emissions from a start-up (960 lbs of NOx and 192 lbs of POC for simultaneous cold start-up of both combustion turbines) would not adversely affect the 1-hour and 8-hour ozone air quality standards, which are violated on a regular basis. Again, if the facility is intended to operate as a load-following facility, then using combustion turbines with the Fast-Start technology can significantly reduce emissions.<sup>9</sup> In short, staff cannot recommend the deletion of simultaneous start of both turbines without the facility using Fast-Start technology or its equivalent to reduce start-up times and emissions. This requirement is incorporated into Conditions of Certification **AQ-SC9** and **AQ-SC10**.

### **SOx**

The project owner will provide 12.2 tons of SOx ERCs from banking certificate number 989 for emission reductions from the Potrero facility in San Francisco to mitigate the project's SOx emissions. Staff has shown the amount in **AIR QUALITY Table 4** and incorporated the amount of SOx ERCs to mitigate the project's SOx emission impacts into Condition of Certification **AQ-SC11**.

### **PM10/PM2.5**

The project owner stated that because the project is not required by the District to provide ERCs to mitigate its PM10 emissions, they do not have to mitigate the annual emissions liability. They proposed to mitigate the project's PM10 emissions during the times of the year when the area experiences violation of the PM10 standards, which is during the fall and winter times, or about half a year. According to this logic, the project

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<sup>9</sup> This would facilitate staff's recommendation that the facility should be designed and built with the Siemens-Westinghouse Fast-Start technology (mentioned above) to minimize unnecessary emissions to the atmosphere.

owner has proposed to mitigate half of the project annual limits of 86.8 tons with only 43.4 tons of wintertime PM10 emission reductions (CH2MHILL 2007a).

The project owner proposed to mitigate the wintertime PM10 emissions through a wood stove/fireplace improvement program (RC2002a). The proposed program would be open to any Hayward resident who wished to participate on a voluntary basis. Each participant could replace or retrofit their existing wood stove or fireplace with a natural gas-fired unit. The rebate or incentive would be at least \$300 and could be used to either replace the existing wood stove with a modern stove with improved combustion and emission controls, or retrofit the existing fireplace with an insert or artificial gas log. Staff estimates that to mitigate the RCEC wintertime 43.4 tons of PM10 emissions, the project owner needs to have 933 Hayward participants that currently own a wood stove (at 93 lbs PM10/unit), or 8,346 participants who own a fireplace (at 10.4 lbs PM10/unit), or a combination of the two as long as the total emission reductions achieve 43.4 tons of PM10.

Identical stove and fireplace replacement programs were implemented in the Bay Area with highly localized and uneven results; therefore, staff recommends the project owner develop a plan to implement the woodstove/fireplace replacement program as the project mitigation measure. This plan must be submitted to the Compliance Project Manager (CPM) for approval and must incorporate specific milestones into the program to track its progress. Staff recommends that milestones include: 15 percent of the tons per year at six months, 30 percent of the tons per year at nine months, 50 percent of the tons per year at one year, 80 percent of the tons per year at 18 months, and a completion milestone, in tons per year for the program at the end of year two, which would be approximately coincident with the completion of construction and initiation of commissioning activities. The mitigation plan and its specific milestones are specified in staff recommended Condition of Certification **AQ-SC12**.

Additionally, staff believes that gas logs and fireplace inserts are not the most efficient means to heat homes. Thus, even though these gas logs offer the necessary PM10 emission reductions, they represent a waste of non-renewable resources and a potential ongoing cost to the user. This is because much of the heat generated in these devices is lost through the chimney. Staff recommends an optional element be added to the woodstove and fireplace replacement program that allows the participant to use the "offered rebate" toward improvement or replacement of the participant's natural gas or electric central heating units.

Staff also recommends adoption of a backstop mitigation plan should the woodstove/fireplace improvement program not work or does not meet the milestones specified in **AQ-SC13**. Based on input from the project owner (CH2MHILL 2007a), in case the woodstove/fireplace improvement program fails to achieve the PM10 reductions, SOx ERCs would be used to mitigate the project's PM10 emission contribution to the atmospheric PM10. The project owner provided an analysis<sup>10</sup> of the

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<sup>10</sup> The analysis assumed equilibrium exists between sulfur compounds and sulfur based particulate matter in the area ambient air. Therefore, by examining the measured ambient concentrations of PM10, sulfur dioxide, and sulfate-based particulate matter; one can derive a ratio that can be used as a basis to determine the appropriate interpollutant trading ratio for SOx to PM10.

ambient air quality data collected from the nearest air quality monitoring station (Concord, CA) as well as incomplete ambient air quality data collected in the Fremont, Richmond and San Jose areas. According to this analysis of atmospheric inventories, the SOx for PM10 inter-pollutant trading ratio can range from 1.5 (in San Jose) to 7.24 (in Fremont) pounds of SOx for every pound of PM10 emissions. The project owner believes that the average of 1.5 and 7.24, which is approximately 3 to 1, should be used.

Staff does not agree with the project owner's analysis, as the ratios were determined with only one complete data set from the Concord monitoring station and the rest of the data used in the analysis were, at best, extrapolated data. Staff attempted to duplicate the submitted analysis with complete ambient air quality data collected from the Concord, San Pablo, and San Francisco areas, which staff believes better represent the overall air pollution levels and chemical equilibriums for the area surrounding the project site. Using these ambient air quality data, staff calculated that the inter-pollutant trading ratio of SOx for PM10 can range from 4.66 to 5.91, or 5.3 to 1 on average.

Based on staff's analysis, staff recommends that if the project owner wants to use the SOx for PM10 interpollutant trading to mitigate the project's 86.8 tons of PM10 per year with SOx ERCs, the necessary SOx credits would total 460 tons of SOx per year<sup>11</sup>. Note that the District issues ERCs on an annual basis, and would not be able to separate out the winter season portion of annual ERCs. Therefore, to achieve a PM10 emission reduction, in pounds per day that matches the project's potential to emit in pound per day, the owner would need to submit ERCs that mitigate the annual project PM10 emissions. This requirement is shown in **AIR QUALITY Table 4** and incorporated into Condition of Certification **AQ-SC13**.

In summary, staff tabulated the project annual emission limits and the proposed offset mitigations, in the form of ERCs, or woodstove/fireplace improvement program, in **AIR QUALITY Table 4**. The project owner has purchased ERCs for NOx, POC and SO<sub>2</sub>, in the form of District issued banking certificates, from sources of offsets located in the San Francisco and Hercules areas to mitigate the project's new emissions. The project owner proposes to initiate a woodstove/fireplace improvement program to mitigate the project's PM10 emissions. If these not work, they will use ERCs of SO<sub>2</sub> to trade for the project's PM10 emissions. Staff recommends a "5.3 to 1" ratio, i.e., for every pound of new PM10 emissions from the proposed facility, 5.3 pounds of SO<sub>2</sub> are purchased to offset such increase.

## **GREENHOUSE GASES**

The generation of electricity can produce air emissions known as greenhouse gases (GHGs) in addition to the criteria air pollutants. GHGs are known to contribute to the warming of the earth's atmosphere. These include primarily carbon dioxide, nitrous oxide (N<sub>2</sub>O, not NO or NO<sub>2</sub>, which are commonly know as NOx or oxides of nitrogen), and methane (unburned natural gas). Also included are sulfur hexafluoride (SF<sub>6</sub>) from

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<sup>11</sup> 86.4 TPY of PM10 emissions from the project times the interpollutant trading ratio of 5.29 = 460 TPY of SOx that should be surrendered.

transformers, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration chillers.

**AIR QUALITY Table 4  
Annual NOx, POC, SOx and PM10 Emissions and Offsets**

Pollutant	Emission Limits (tpy)	Offset Ratio	ERC Mitigation (tpy)	Proposed Offsets (tpy)
NOx	134.6	1.15:1 <sup>1</sup>	154.8 <sup>2</sup>	<b>53.11 tons</b> (Cert. #855-PG&E-San Francisco) <b>49.86 tons</b> (Cert. #815-Pacific Refining-Hercules) <b>51.83 tons</b> (Cert. #815-Pacific Refining-Hercules)
POC	28.5	1:1 <sup>1</sup>	28.5 <sup>2</sup>	<b>28.5 tons</b> (Cert. #815-Pacific Refining-Hercules)
SOx	12.2	1:1	12.2	<b>12.2 tons</b> (Cert. #989 -Potrero-San Francisco)
PM10	86.8	---	43.3	<b>43.4 "wintertime" tons</b> (if woodstove and fireplace replacement program is successfully implemented)
<b>OR</b> PM10	86.8	5.3:1 <sup>3</sup>	460.0	<b>460 tons</b> (if SO2 ERCs are use as interpollutant credit of PM10 precursors)

- Notes:**
1. Offset ratio as required by the District.
  2. Offset mitigation as required by the District.
  3. Staff recommended SO<sub>2</sub> for PM10 inter-pollutant offset ratio (See AIR QUALITY Appendix 2).

Climate change from rising temperatures represents a risk to California's economy, public health, and environment (CEC 2003). In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state should require reporting of GHG emissions as a condition of state licensing of new electric generating facilities (CEC 2003, p. 42). Such reporting would be done in accordance with reporting protocols currently in place or that will be adopted with the implementation of new laws.

The Intergovernmental Panel on Climate Change (IPCC), an international scientific body, has developed standard reporting protocols and methodologies for governments and agencies to follow in calculations for GHG inventories. The IPCC-approved methodology for calculating GHG emissions in an inventory is particular to the type of fossil fuel burned. In their *Revised 1996 Guidelines for National Greenhouse Gas Inventories: Reference Manual*, the IPCC established the factors for oxidation, fuel-based emissions, and global warming potential.

The California Global Warming Solutions Act of 2006 (AB32) requires the California Air Resources Board (ARB) to adopt a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990 to be achieved by 2020. To achieve this, ARB

has a mandate to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB is expected to adopt early action GHG reduction measures by July 2007 and establish a statewide emissions cap by January 2008. By January 1, 2008, ARB is scheduled to adopt regulations requiring mandatory GHG emissions reporting and define the statewide GHG emissions cap for 2020. ARB would adopt a plan by January 1, 2009 that would indicate how emission reductions would be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions. Then, during 2009, ARB staff would draft rule language to implement its plan and hold public workshops on each measure including market mechanisms (ARB, 2006c). Strategies that the state might pursue for managing GHG emissions in California are identified in the California Climate Action Team's Report to the Governor (CalEPA, 2006). Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy) and land use planning and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA, 2006).

The Electricity Greenhouse Gas Emission Standards Act (SB1368<sup>12</sup>) was also enacted in 2006, requiring base load generation resources or contracts be subject to a GHG or Environmental Performance Standard. At its January 25, 2007 meeting, the California Public Utilities Commission (CPUC) adopted an Emissions Performance Standard for the state's Investor Owned Utilities of 1,100 pounds (or 0.5 metric tons) CO<sub>2</sub> per megawatt-hour (MWh). The Emissions Performance Standard applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.<sup>13</sup> A similar performance standard is undergoing rulemaking by the Energy Commission for the Publicly Owned Utilities, and it should be adopted by June 30, 2007.<sup>14</sup>

Staff recommends Condition of Certification **AQ-SC14**, which requires the project owner to report the quantities of relevant GHGs emitted as a result of electric power production. Staff believes that **AQ-SC14**, with the reporting GHG emissions, will enable the project to be consistent with the regulations and policies described above. The GHG emissions to be reported in **AQ-SC14**, are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs and PFCs emissions that are directly associated with the production and transmission of electric power.

## **CUMULATIVE IMPACTS AND MITIGATION**

The project owner conducted cumulative modeling of other potential sources, including the proposed Eastshore Energy Center (EEC) (RC2007a and RC2007b) that might be built or operated near the RCEC. The cumulative modeling did not identify significant impacts. However, the modeling did not, and could not, model ozone impacts. Since both the RCEC and the EEC are intended, and under contract to, operate as load-

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<sup>12</sup> Public Utilities Code § 8340 et seq.

<sup>13</sup> See Rule at

<sup>14</sup> See CEC Docket # 06-OIR-1, <http://www.energy.ca.gov/ghgstandards/documents>.



following or peaking units, frequent start-ups and simultaneous operation during the summer peak demand and ozone season may result in unidentified and unmitigated ozone impacts. It is contingent on the project owner to provide ERCs for NO<sub>x</sub>, POC, SO<sub>x</sub> and PM<sub>10</sub>/PM<sub>2.5</sub> and operate the facility in compliance with staff recommended conditions of certification to reduce start-up and daily emissions and potential ozone impacts.

## **RESPONSE TO AGENCY AND PUBLIC COMMENTS**

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Staff received an oral comment from Mr. Mike Sweeney, the Mayor of the City of Hayward, regarding the project. Mr. Sweeney, at the December 15, 2006 Informational Hearing, expressed concerns over the impacts of the project's emissions and net air quality benefits of the emission mitigations on the local air quality. Staff believes that with incorporation of the recommended conditions of certification, concerns about the project's impacts on local air quality will be addressed.

## **CONCLUSIONS**

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- The project would comply with applicable District Rules and Regulations, including New Source Review requirements.
- The project would not cause new violations of any NO<sub>2</sub>, SO<sub>2</sub>, or CO ambient air quality standards, and therefore, the project direct NO<sub>x</sub>, SO<sub>x</sub> and CO emission impacts are not significant.
- Without proper mitigation, the project NO<sub>x</sub> and POC emissions would potentially contribute to existing violations of the state 1-hour and the federal 8-hour ozone air quality standards. Staff has determined that by restricting the period and the emissions of the facility start up events (**AQ-SC7** and **AQ-SC8**), or the incorporation of technologies specifically designed to reduce start-up times (**AQ-SC10**), restrictions of simultaneous start up (**AQ-SC9**), and surrender of ERCs in (**AQ-SC11**) would mitigate the project's ozone impact to a level that is less than significant.
- The project PM<sub>10</sub> emissions and PM<sub>10</sub> precursor emissions of SO<sub>x</sub> would contribute to the existing violations of the state 24-hour PM<sub>10</sub> air quality standard. However, staff has determined that mitigation, in the form of ERCs (**AQ-SC11**), and the successful implantation of the woodstove/fireplace improvement program (**AQ-SC12**) or the alternative PM<sub>10</sub> or SO<sub>x</sub> for PM<sub>10</sub> ERCs (**AQ-SC13**) would mitigate the project's PM<sub>10</sub> impacts to a level that is less than significant.
- The project's construction impacts would contribute to violations of the state 24-hour PM<sub>10</sub> standard. However, staff has determined that the implementation of Conditions of Certification **AQ-SC1** to **AQ-SC5** would mitigate the project PM<sub>10</sub> emissions contribution to a level that is less than significant.
- Staff recommends the addition of Condition of Certification **AQ-SC6** to enhance staff's ability to track the construction and operation of the project.

- Staff recommends the addition of Condition of Certification **AQ-SC14** to require GHG reporting.

## **AMENDED AND PROPOSED CONDITIONS OF CERTIFICATION**

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The conditions of certification below replace all the Air Quality Conditions of Certification contained in the original Decision (CEC 2002b). This includes staff's recommendation to replace Air Quality Conditions of Certification **AQ-C1** through **AQ-C4** pertaining to construction, with **AQ-SC1** through **AQ-SC14** below. The District issued an amended PDOC and the PDOC's conditions are included below as Air Quality Conditions of Certification **AQ-1** through **AQ-50**. Strikeout is used to indicate deleted language and underline for new language.

**AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM):** The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with **AQ-SC3, AQ-SC4 and AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

**Verification:** At least 60 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates.

**AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP):** The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with **AQ-SC3, AQ-SC4 and AQ-SC5**.

**Verification:** At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The District will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt.

**AQ-SC3 Construction Fugitive Dust Control:** The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report (MCR) that demonstrates compliance with the following mitigation measures for the purposes of preventing all fugitive dust plumes from leaving the Project. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

- a) All unpaved roads and disturbed areas in the project and linear construction sites shall be watered as frequently as necessary to comply with the dust

mitigation objectives of AQ-SC4. The frequency of watering can be reduced or eliminated during periods of precipitation.

- b) No vehicle shall exceed 10 miles per hour within the construction site.
- c) The construction site entrances shall be posted with visible speed limit signs.
- d) All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.
- e) Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.
- f) All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.
- g) All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the District.
- h) Construction areas adjacent to any paved roadway shall be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent run-off to roadways.
- i) All paved roads within the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.
- j) At least the first 500 feet of any public roadway exiting from the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff from the construction site is visible on the public roadways.
- k) All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.
- l) All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.
- m) Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

**Verification:** The project owner shall provide to the CPM a MCR to include:

- (1) a summary of all actions taken to maintain compliance with this condition;
- (2) copies of any complaints filed with the District in relation to project construction; and

- (3) any other documentation deemed necessary by the District and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

**AQ-SC4 Dust Plume Response Requirement:** The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (1) off the project site or (2) 200 feet beyond the centerline of the construction of linear facilities or (3) within 100 feet upwind of any regularly occupied structures not owned by the project owner indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if step 1 specified above fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the District any directive from the AQCMM or Delegate to shut down an activity, provided that the shutdown shall go into effect within one hour of the original determination, unless overruled by the District before that time.

**Verification:** The project owner shall provide to the CPM a MCR to include:

- (1) a summary of all actions taken to maintain compliance with this condition;
- (2) copies of any complaints filed with the District in relation to project construction; and
- (3) any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

**AQ-SC5 Diesel-Fueled Engine Control:** The AQCMM shall submit to the CPM in the MCR, a construction mitigation report that demonstrates compliance with the following mitigation measures for the purposes of controlling diesel construction-related emissions. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

- a) All diesel-fueled engines used in the construction of the facility shall be fueled only with ultra-low sulfur diesel, which contains no more than 15 ppm sulfur.
- b) All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.
- c) All construction diesel engines, which have a rating of 100 hp or more, shall meet, at a minimum, the Tier 2 California Emission Standards for Off-Road Compression-Ignition Engines as specified in California Code of Regulations, Title 13, section 2423(b)(1) unless certified by the on-site AQCMM that such engine is not available for a particular item of equipment. In the event a Tier 2 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a Tier 1 engine. In the event a Tier 1 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a catalyzed diesel particulate filter (soot filter), unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is "not practical" if, among other reasons:
- (1) There is no available soot filter that has been certified by either the California Air Resources Board (ARB) or U.S. Environmental Protection Agency (EPA) for the engine in question; or
  - (2) The construction equipment is intended to be on-site for ten (10) days or less.
  - (3) The CPM may grant relief from this requirement if the AQCMM can demonstrate that they have made a good faith effort to comply with this requirement and that compliance is not possible.
- d) The use of a soot filter may be terminated immediately if one of the following conditions exists, provided that the CPM is informed within ten (10) working days of the termination:
- (1) The use of the soot filter is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or reduced power output due to an excessive increase in backpressure.
  - (2) The soot filter is causing or is reasonably expected to cause significant engine damage.
  - (3) The soot filter is causing or is reasonably expected to cause a significant risk to workers or the public.
  - (4) Any other seriously detrimental cause which has the approval of the CPM prior to the termination being implemented.
- e) All heavy earthmoving equipment and heavy duty construction related trucks with engines meeting the requirements of (c) above shall be properly

maintained and the engines tuned to the engine manufacturer's specifications.

- f) All diesel heavy construction equipment shall not remain running at idle for more than five minutes, to the extent practical.

**Verification:** The project owner shall include in the MCR:

- (1) a summary of all actions taken to maintain compliance with this condition,
- (2) copies of all diesel fuel purchase records,
- (3) a list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained, and
- (4) any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

**AQ-SC6** The project owner shall provide the CPM copies of all District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) for the facility.

The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. EPA, and any revised permit issued by the District or U.S. EPA, for the project.

**Verification:** The project owner shall submit any ATC, PTO, and any proposed air permit modification to the CPM within five working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

**AQ-SC7** The facility's emissions shall not exceed 1,225 lbs of NO<sub>x</sub> per day and 157 lbs of POC during the June 1 to September 30 periods. In addition, NO<sub>x</sub> emissions in excess of 848 lbs per calendar day shall be mitigated through the surrender of emission reduction credits (ERCs). The amount of credits to be surrendered shall be the difference between 848 lbs per day and the actual daily emissions.

**Verification:** The project owner shall submit to the District and the CPM the quarterly and annual compliance reports as required by AQ-19. Violations of this condition shall require the project owner to apply to the CPM for an immediate amendment to the project.

**AQ-SC8** Turbine hot/warm start-up NO<sub>x</sub> emissions shall not exceed 125 pounds per start-up event.

**Verification:** As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit

condition. Violations of this condition shall require the project owner to apply to the CPM for an immediate amendment to the project.

**AQ-SC9** The project owner shall not operate both gas turbines (S-1 and S-3) simultaneously in start-up mode.

**Verification:** As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition. Violations of this condition shall require the project owner to apply to the CPM for an immediate amendment to the project.

**AQ-SC10** In lieu of complying with AQ-SC7, AQ-SC8, and AQ-SC9, the project's combustion turbine/HRSG units shall be designed and built with equipment and control systems to minimize start-up times and emissions. These could include the Fast-Start technology with an integrated control system and a once-through Benson boiler design, appropriate system configuration and equipment to facilitate operating chemistry during starting sequences, and an auxiliary boiler.

**Verification:** Ninety (90) days prior to start of construction, the project owner shall submit to the CPM, for approval, the type of turbine/HRSG design(s) and manufacturer's information that start-up time of the turbine/HRSG can be reduce to no more than 2 hours.

**AQ-SC11** The project owner shall surrender 12.2 tons per year of SO<sub>x</sub> or SO<sub>x</sub>-equivalent emission reduction credits (ERCs) from certificate 989, 28.5 tons per year of POC ERCs, and 154.8 tons per year of NO<sub>x</sub>, or an equivalent combination of NO<sub>x</sub> and POC ERCs from certificates 815 and 855, prior to start of construction of the project.

**Verification:** The project owner shall submit to the CPM a copy of all ERCs to be surrendered to the District at least 30 days prior to start construction.

**AQ-SC12** A fireplace retrofit/woodstove replacement program shall be made available to all Hayward residents on a first-come, first-serve basis to finance a voluntary woodstove replacement/fireplace retrofit. The program shall provide a minimum of 43.4 tons of PM<sub>10</sub> ERCs per year. Each resident participating in the retrofit/replacement program would agree to replace their existing woodstove or fireplace with a natural gas-fired unit, or to permanently close the fireplace or woodstove chimney and apply the rebate toward the improvement or replacement of their homes' existing central heating and air conditioning unit. Quarterly status reports on the program meeting the following milestones shall be submitted to the CPM,

- a. achieving 6.5 tons per year of PM<sub>10</sub> six (6) months after start of construction.
- b. achieving 13.0 tons per year of PM<sub>10</sub> nine (9) months after start of construction.
- c. achieving 21.7 tons per year of PM<sub>10</sub> twelve (12) months after start of construction.

- d. achieving 34.7 tons per year of PM10 eighteen (18) months after start of construction.
- e. achieving 43.4 tons per year of PM10 twenty four (24) months after start of construction.

**Verification:** At least ninety (90) days from start of construction, the project owner shall submit to the CPM a plan detailing the fireplace/woodstove replacement program for approval. The plan shall include, at the minimum, the description of the program, the amount of rebate, the person (or agency) who oversees the program implementation, the responsible person who reports to the CPM on the progress of the program implementation, the target milestones, and procedures to be followed if the target milestones have not been met. The project owner shall submit documentation to show compliance with this condition in the quarterly and annual reports as required in AQ-20.

**AQ-SC13** In lieu of compliance with AQ-SC12, or if complete compliance with AQ-SC12 cannot be achieved by the milestones, the project owner shall provide the unmet portion of the 86.8 TPY of PM10 required, either as PM10 or SOx ERCs, acquired in the areas surrounding Oakland, Hayward, Fremont, San Jose and San Francisco areas to provide an annual equivalent of 86.8 TPY of PM10 or PM10 equivalent at the SOx for PM10 interpollutant trading ratio of 5.3 to 1.

**Verification:** The project owner shall submit to the CPM a list of PM10 and/or SOx ERCs to be surrendered to the District at least 60 days prior to initial startup.

**AQ-SC14** Until the California Global Warming Solutions Act of 2006 (AB32) is implemented, the project owner shall either participate in a climate action registry approved by the CPM, or report on an annual basis to the CPM the quantity of greenhouse gases (GHG) emitted as a direct result of facility electricity production.

The project owner shall maintain a record of fuels types and carbon content used on-site for the purpose of power production. These fuels shall include but are not limited to each fuel type burned: (1) in combustion turbines, (2) HRSGs (if applicable) or auxiliary boiler (if applicable), (3) internal combustion engines, (4) flares, and/or (5) for the purpose of startup, shutdown, operation or emission controls.

The project owner may perform annual source tests of CO<sub>2</sub> and CH<sub>4</sub> emissions from the exhaust stacks while firing the facility's primary fuel, using the following test methods or other test methods as approved by the CPM. The project owner shall produce fuel-based emission factors in units of lbs CO<sub>2</sub> equivalent per mmBtu of fuel burned from the annual source tests. If a secondary fuel is approved for the facility, the project owner may also perform these source tests while firing the secondary fuel.

Pollutant	Test Method
CO <sub>2</sub>	EPA Method 3A
CH <sub>4</sub>	EPA Method 18 (POC measured as CH <sub>4</sub> )



As an alternative to performing annual source tests, the project owner may use the Intergovernmental Panel on Climate Change (IPCC) Methodologies for Estimating Greenhouse Gas Emissions (MEGGE). If MEGGE is chosen, the project owner shall calculate the CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions using the appropriate fuel-based carbon content coefficient (for CO<sub>2</sub>) and the appropriate fuel-based emission factors (for CH<sub>4</sub> and N<sub>2</sub>O).

The project owner shall convert the N<sub>2</sub>O and CH<sub>4</sub> emissions into CO<sub>2</sub> equivalent emissions using the current IPCC Global Warming Potentials (GWP). The project owner shall maintain a record of all SF<sub>6</sub> that is used for replenishing on-site transformers. At the end of each reporting period, the project owner shall total the mass of SF<sub>6</sub> used and convert that to a CO<sub>2</sub> equivalent emission using the IPCC GWP for SF<sub>6</sub>. The project owner shall maintain a record of all PFCs and HFCs that are used for replenishing on-site refrigeration and chillers directly related to electricity production. At the end of each reporting period, the project owner shall total the mass of PFCs and HFCs used and not recycled and convert that to a CO<sub>2</sub> equivalent emission using the IPCC GWP.

On an annual basis, the project owner shall report the CO<sub>2</sub> and CO<sub>2</sub> equivalent emissions from the described emissions of CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>, SF<sub>6</sub>, PFCs, and HFCs.

**Verification:** The project annual GHG emissions shall be reported, as a CO<sub>2</sub> equivalent, by the project owner to a climate action registry approved by the CPM, or to the CPM as part of the fourth Quarterly or the annual Air Quality Report, until such time that GHG reporting requirements are adopted and in force for the project as part of the California Global Warming Solutions Act of 2006.

## DISTRICT CONDITIONS OF CERTIFICATIONS

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### Permit Conditions

#### (A) Definitions:

<u>Clock Hour:</u>	<u>Any continuous 60-minute period beginning on the hour</u>
<u>Calendar Day:</u>	<u>Any continuous 24-hour period beginning at 12:00 AM or 0000 hours</u>
<u>Year:</u>	<u>Any consecutive twelve-month period of time</u>
<u>Heat Input:</u>	<u>All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf</u>
<u>Rolling 3-hour period:</u>	<u>Any consecutive three-hour period, not including start-up or shutdown periods</u>
<u>Firing Hours:</u>	<u>Period of time during which fuel is flowing to a unit, measured in minutes</u>
<u>MM BTU:</u>	<u>million British thermal units</u>
<u>Gas Turbine Warm and Hot Start-up Mode:</u>	<u>The lesser of the first 180 minutes of continuous fuel flow to the gas turbine after fuel flow is initiated or the period of time from gas turbine fuel flow initiation until the gas turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of Conditions of Certification <b>AQ-20(b) and 20(d)</b></u>
<u>Gas Turbine Cold Start-up Mode:</u>	<u>The lesser of the first 360 minutes of continuous fuel flow to the gas turbine after fuel flow is initiated or the period of time from gas turbine fuel flow initiation until the gas turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of Conditions of Certification <b>AQ-20(b) and 20(d)</b></u>
<u>Gas Turbine Shutdown Mode:</u>	<u>The lesser of the 30 minute period immediately prior to the termination of fuel flow to the gas turbine or the period of time from non-compliance with any requirement listed in Conditions of Certification <b>AQ 20(b) through 20(d)</b> until termination of fuel flow to the gas turbine</u>
<u>Gas Turbine Combustor: Tuning Mode</u>	<u>The period of time, not to exceed 360 minutes, in which testing, adjustment, tuning, and calibration operations are performed, as recommended by the gas turbine manufacturer, to insure safe and reliable steady-state operation, and to minimize NO<sub>x</sub> and CO emissions. The SCR and oxidation catalyst are not operating during the tuning operation.</u>
<u>Gas Turbine Cold Start-up:</u>	<u>A gas turbine start-up that occurs more than 72 hours after a gas turbine shutdown</u>

<u>Gas Turbine Hot Start-up:</u>	<u>A gas turbine start-up that occurs within 8 hours of a gas turbine shutdown</u>
<u>Gas Turbine Warm Start-up:</u>	<u>A gas turbine start-up that occurs between 8 hours and 72 hours of a gas turbine shutdown</u>
<u>Specified PAHs:</u>	<u>The polycyclic aromatic hydrocarbons listed below shall be considered to be Specified PAHs for these permit conditions. Any emission limits for Specified PAHs refer to the sum of the emissions for all six of the following compounds</u> <u>Benzo[a]anthracene</u> <u>Benzo[b]fluoranthene</u> <u>Benzo[k]fluoranthene</u> <u>Benzo[a]pyrene</u> <u>Dibenzo[a,h]anthracene</u> <u>Indeno[1,2,3-cd]pyrene</u>
<u>Corrected Concentration:</u>	<u>The concentration of any pollutant (generally NO<sub>x</sub>, CO, or NH<sub>3</sub>) corrected to a standard stack gas oxygen concentration. For emission points P-1 (combined exhaust of S-1 gas turbine and S-3 HRSG duct burners), P-2 (combined exhaust of S-2 gas turbine and S-4 HRSG duct burners), the standard stack gas oxygen concentration is 15% O<sub>2</sub> by volume on a dry basis</u>
<u>Commissioning Activities:</u>	<u>All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the RCEC construction contractor to insure safe and reliable steady state operation of the gas turbines, heat recovery steam generators, steam turbine, and associated electrical delivery systems during the commissioning period</u>
<u>Commissioning Period:</u>	<u>The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when a gas turbine is first fired, whichever occurs first. The period shall terminate when the plant has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange.</u>
<u>Precursor Organic Compounds (POCs):</u>	<u>Any compound of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate</u>
<u>CPM:</u>	<u>California Energy Commission Compliance Program Manager</u>
<u>RCEC:</u>	<u>Russell City Energy Center</u>

**(B) Applicability:**

Conditions of Certification AQ-1 through AQ-11 shall only apply during the commissioning period as defined above. Unless otherwise indicated, Conditions of

Certification AQ-12 through AQ-49 shall apply after the commissioning period has ended.

**The RCEC will consist of the following permitted equipment:**

**S-1 Combustion Turbine Generator (CTG) #1, Westinghouse 501F, 2,038.6 MMBtu/hr maximum rated capacity, natural gas fired only; abated by A-1 Selective Catalytic Reduction System (SCR) and A-2 Oxidation Catalyst**

**S-2 Heat Recovery Steam Generator (HRSG) #1, with Duct Burner Supplemental Firing System, 200 MMBtu/hr maximum rated capacity; Abated by A-1 Selective Catalytic Reduction (SCR) System and A-2 Oxidation Catalyst**

**S-3 Combustion Turbine Generator (CTG) #2, Westinghouse 501F, 2,038.6 MMBtu/hr maximum rated capacity, natural gas fired only; abated by A-3 Selective Catalytic Reduction System (SCR) and A-4 Oxidation Catalyst**

**S-4 Heat Recovery Steam Generator (HRSG) #2, with Duct Burner Supplemental Firing System, 200 MMBtu/hr maximum rated capacity; Abated by A-3 Selective Catalytic Reduction (SCR) System and A-4 Oxidation Catalyst**

**S-5 Cooling Tower, 9-Cell, 141,352 gallons per minute, with efficiency drift eliminators, make and model to be determined.**

**S-6 Fire Pump Diesel Engine, Clarke JW6H-UF40, 300 hp, 2.02 MMBtu/hr rated heat input.**

**CONDITIONS FOR THE COMMISSIONING PERIOD**

**AQ-1. The owner/operator of the RCEC shall minimize emissions of carbon monoxide and nitrogen oxides from S-1 & S-3 gas turbines and S-2 & S-4 Heat Recovery Steam Generators (HRSGs) to the maximum extent possible during the commissioning period.**

**Verification: The project owner shall submit a Monthly Compliance Report (MCR) to the CPM specifying how this condition is being complied with.**

**AQ-2. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall tune the S-1 & S-3 gas turbines combustors and S-2 & S-4 HRSGs duct burners to minimize the emissions of carbon monoxide and nitrogen oxides.**

**Verification: The project owner shall submit a MCR to the CPM specifying how this condition is being complied with.**

**AQ-3. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, owner/operator shall install, adjust, and operate the A-2 & A-4 Oxidation Catalysts and A-1 & A-3 SCR Systems, to minimize the emissions of carbon monoxide and nitrogen oxides from S-1 & S-3 gas turbines and S-2 & S-4 HRSGs.**

**Verification:** The project owner shall submit a MCR to the CPM specifying how this condition is being complied with.

**AQ-4.** The owner/operator of the RCEC shall submit a plan to the District Engineering Division and the CPM at least four weeks prior to first firing of S-1 & S-3 gas turbines describing the procedures to be followed during the commissioning of the gas turbines, HRSGs, and steam turbines. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the Dry-Low-NO<sub>x</sub> combustors, the installation and operation of the required emission control systems, the installation, calibration, and testing of the CO and NO<sub>x</sub> continuous emission monitors, and any activities requiring the firing of the gas turbines (S-1 & S-3) and HRSGs (S-2 & S-4) without abatement by their respective oxidation catalysts and/or SCR Systems. The owner/operator shall not fire any of the gas turbines (S-1 or S-3) sooner than 28 days after the District receives the commissioning plan.

**Verification:** The project owner shall submit a MCR to the CPM specifying how this condition is being complied with.

**AQ-5.** During the commissioning period, the owner/operator of the RCEC shall demonstrate compliance with AQ-8, AQ-9, AQ-10 and AQ-11, through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:

firing hours

fuel flow rates

stack gas nitrogen oxide emission concentrations,

stack gas carbon monoxide emission concentrations

stack gas oxygen concentrations.

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the gas turbines (S-1 & S-3), HRSGs (S-2 & S-4). The owner/operator shall use District-approved methods to calculate heat input rates, nitrogen dioxide mass emission rates, carbon monoxide mass emission rates, and NO<sub>x</sub> and CO emission concentrations, summarized for each clock hour and each calendar day. The owner/operator shall retain records on site for at least five (5) years from the date of entry and make such records available to District personnel upon request.

**Verification:** The project owner shall submit a MCR report to the CPM specifying how this condition is being complied with.

**AQ-6.** The owner/operator shall install, calibrate, and operate the District-approved continuous monitors specified in AQ-5 prior to first firing of the gas turbines (S-1 & S-3) and HRSGs (S-2 & S-4). After first firing of the turbines, the owner/operator shall adjust the detection range of these continuous emission monitors as necessary to accurately measure the resulting range of CO and NO<sub>x</sub> emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.

**Verification:** The project owner shall submit a MCR to the CPM specifying how this condition is being complied with. In addition, the project owner shall provide evidence of the District's approval of the emission monitoring system to the CPM prior to first firing of the gas turbines.

**AQ-7.** The owner/operator shall not fire the S-1 gas turbine and S-2 HRSG without abatement of nitrogen oxide emissions by A-1 SCR System and/or abatement of carbon monoxide emissions by A-2 Oxidation Catalyst for more than 300 hours during the commissioning period. Such operation of S-1 gas turbine and S-2 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system and/or oxidation catalyst in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Engineering and Enforcement Divisions and the unused balance of the 300 firing hours without abatement shall expire.

**Verification:** The project owner shall submit a MCR to the CPM specifying how this condition is being complied with.

**AQ-8.** The owner/operator shall not fire the S-3 gas turbine and S-4 HRSG without abatement of nitrogen oxide emissions by A-3 SCR System and/or abatement of carbon monoxide emissions by A-4 Oxidation Catalyst for more than 300 hours during the commissioning period. Such operation of S-3 gas turbine and S-4 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system and/or oxidation catalyst in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Engineering and Enforcement Divisions and the unused balance of the 300 firing hours without abatement shall expire.

**Verification:** The project owner shall submit a MCR to the CPM specifying how this condition is being complied with.

**AQ-9.** The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM10, and sulfur dioxide that are emitted by the gas turbines (S-1 & S-3), HRSGs (S-2 & S-4) and S-6 Fire Pump Diesel Engine during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in **AQ-23**.

**Verification:** The project owner shall submit a MCR to the CPM specifying how this condition is being complied with.

**AQ-10.** The owner/operator shall not operate the gas turbines (S-1 & S-3) and HRSGs (S-2 & S-4) in a manner such that the combined pollutant emissions from these sources will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the gas turbines (S-1 & S-3).

<u>NO<sub>x</sub> (as NO<sub>2</sub>)</u>	<u>4,805 pounds per calendar day</u>	<u>400 pounds per hour</u>
<u>CO</u>	<u>20,000 pounds per calendar day</u>	<u>5,000 pounds per hour</u>
<u>POC (as CH<sub>4</sub>)</u>	<u>495 pounds per calendar day</u>	
<u>PM10</u>	<u>432 pounds per calendar day</u>	
<u>SO<sub>2</sub></u>	<u>298 pounds per calendar day</u>	

**Verification:** The project owner shall submit a MCR to the CPM specifying how this condition is being complied with.

**AQ-11.** No less than 45 days prior to the end of the Commissioning Period, the owner/operator shall conduct District and Energy Commission approved source tests using certified continuous emission monitors to determine compliance with the emission limitations specified in AQ-19. The source tests shall determine NO<sub>x</sub>, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods and shall include at least one cold start, one warm start, and one hot start. Twenty (20) working days before the execution of the source tests, the owner/operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The District and the CPM will notify the owner/operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The owner/operator shall incorporate the District and CPM comments into the test plan. The owner/operator shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. The owner/operator shall submit the source test results to the District and the CPM within 60 days of the source testing date.

**Verification:** No later than 30 working days before the commencement of the source tests, the project owner shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The District and the CPM will notify the project owner of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The project owner shall incorporate the District and CPM comments into the test plan. The project owner shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within 60 days of the source testing date.

#### **Conditions for the Gas Turbines (S-1 & S-3) and the HRSGs (S-2 & S-4)**

**AQ-12.** The owner/operator shall fire the gas turbines (S-1 & S-3) and HRSG duct burners (S-2 & S-4) exclusively on PUC-regulated natural gas with a maximum sulfur content of 1 grain per 100 standard cubic feet. To demonstrate compliance with this limit, the operator of S-1 through S-4 shall sample and analyze the gas from each supply source at least monthly to determine the sulfur content of the gas. PG&E monthly sulfur data may be used provided that such data can be demonstrated to be representative of the gas delivered to the RCEC. In the event that the average sulfur content exceeds 0.25 grain per 100 standard cubic feet, a reduced annual heat input rate may be utilized to calculate the maximum projected annual emissions. The reduced annual heat input rate shall be subject to District review and approval. (BACT for SO<sub>2</sub> and PM10)

**Verification:** The project owner shall complete, on a monthly basis, a laboratory analysis showing the sulfur content of natural gas being burned at the facility. The sulfur analysis reports shall be incorporated into the quarterly compliance reports.

**AQ-13.** The owner/operator shall not operate the units such that the combined heat input rate to each power train consisting of a gas turbine and its associated HRSG (S-1 & S-2 and S-3 & S-4) exceeds 2,238.6 MM BTU (HHV) per hour. (PSD for NO<sub>x</sub>)

**Verification:** As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

**AQ-14.** The owner/operator shall not operate the units such that the combined heat input rate to each power train consisting of a gas turbine and its associated HRSG (S-1 & S-2 and S-3 & S-4) exceeds 53,726 MM BTU (HHV) per day. (PSD for PM10)

**Verification:** As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

**AQ-15.** The owner/operator shall not operate the units such that the combined cumulative heat input rate for the gas turbines (S-1 & S-3) and the HRSGs (S-2 & S-4) exceeds 35,708,858 MM BTU (HHV) per year. (Offsets)

**Verification:** As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

**AQ-16.** The owner/operator shall not fire the HRSG duct burners (S-2 & S-4) unless its associated gas turbine (S-1 & S-3, respectively) is in operation. (BACT for NO<sub>x</sub>)

**Verification:** As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

**AQ-17.** The owner/operator shall ensure that the S-1 gas turbine and S-2 HRSG are abated by the properly operated and properly maintained A-1 SCR system and A-2 oxidation catalyst system whenever fuel is combusted at those sources and the A-1 SCR catalyst bed has reached minimum operating temperature. (BACT for NO<sub>x</sub>, POC and CO)

**Verification:** As part of the quarterly and annual compliance reports, the project owner shall provide information on any major problem in the operation of the oxidizing catalyst and SCR Systems for the gas turbines and HRSGs. The information shall include, at a minimum, the date and description of the problem and the steps taken to resolve the problem.

**AQ-18.** The owner/operator shall ensure that the S-3 gas turbine and S-4 HRSG are abated by the properly operated and properly maintained A-3 SCR System and A-4 oxidation catalyst system whenever fuel is combusted at those sources and the A-3 SCR catalyst bed has reached minimum operating temperature. (BACT for NO<sub>x</sub>, POC and CO)



**Verification:** As part of the quarterly and annual compliance reports, the project owner shall provide information on any major problem in the operation of the oxidizing catalyst and SCR Systems for the gas turbines and HRSGs. The information shall include, at a minimum, the date and description of the problem and the steps taken to resolve the problem.

**AQ-19.** The owner/operator shall ensure that the gas turbines (S-1 & S-3) and HRSGs (S-2 & S-4) comply with requirements (a) through (h) under all operating scenarios, including duct burner firing mode. Requirements (a) through (h) do not apply during a gas turbine start-up, combustor tuning operation or shutdown. (BACT, PSD, and Regulation 2, Rule 5)

- (a) Nitrogen oxide mass emissions (calculated as NO<sub>2</sub>) at P-1 (the combined exhaust point for S-1 gas turbine and S-2 HRSG after abatement by A-1 SCR System) shall not exceed 16.5 pounds per hour or 0.00735 lb/MM BTU (HHV) of natural gas fired. Nitrogen oxide mass emissions (calculated as NO<sub>2</sub>) at P-2 (the combined exhaust point for S-3 gas turbine and S-4 HRSG after abatement by A-3 SCR System) shall not exceed 16.5 pounds per hour or 0.00735 lb/MM BTU (HHV) of natural gas fired
- (b) The nitrogen oxide emission concentration at emission points P-1 and P-2 each shall not exceed 2.0 ppmv, on a dry basis, corrected to 15% O<sub>2</sub>, averaged over any 1-hour period. (BACT for NO<sub>x</sub>)
- (c) Carbon monoxide mass emissions at P-1 and P-2 each shall not exceed 20 pounds per hour or 0.009 lb/MM BTU of natural gas fired, averaged over any rolling 3-hour period. (PSD for CO)
- (d) The carbon monoxide emission concentration at P-1 and P-2 each shall not exceed 4.0 ppmv, on a dry basis, corrected to 15% O<sub>2</sub>, averaged over any rolling 3-hour period. (BACT for CO)
- (e) Ammonia (NH<sub>3</sub>) emission concentrations at P-1 and P-2 each shall not exceed 5 ppmv, on a dry basis, corrected to 15% O<sub>2</sub>, averaged over any rolling 3-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia injection rate to A-2 and A-4 SCR Systems. The correlation between the gas turbine and HRSG heat input rates, A-2 and A-4 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-1 and P-2 shall be determined in accordance with permit condition 30. (Regulation 2-5)
- (f) Precursor organic compound (POC) mass emissions (as CH<sub>4</sub>) at P-1 and P-2 each shall not exceed 2.86 pounds per hour or 0.00128 lb/MM BTU of natural gas fired. (BACT)
- (g) Sulfur dioxide (SO<sub>2</sub>) mass emissions at P-1 & P-2 each shall not exceed 1.55 pounds per hour or 0.0007 lb/MM BTU of natural gas fired. (BACT)
- (h) Particulate matter (PM<sub>10</sub>) mass emissions at P-1 & P-2 each shall not exceed 8.64 pounds per hour or 0.0042 lb PM<sub>10</sub>/MM BTU of natural gas fired when the HRSG duct burners are not in operation. Particulate matter (PM<sub>10</sub>) mass emissions at P-1 & P-2 each shall not exceed 11.64 pounds per hour or

0.0052 lb PM10/MM BTU of natural gas fired when the HRSG duct burners are in operation. (BACT)

**Verification:** The project owner shall submit to the District and CPM, quarterly reports for the proceeding calendar quarter within 30 days from the end of the quarter. The report for the fourth quarter can be an annual compliance summary for the preceding year. The quarterly and annual compliance summary reports shall contain the following information:

- (a) Operating parameters of emission control equipment, including but not limited to ammonia injection rate, NO<sub>x</sub> emission rate and ammonia slip.
- (b) Total plant operation time (hours), number of startups, hours in cold startup, hours in warm startup, hours in hot startup, and hours in shutdown.
- (c) Date and time of the beginning and end of each startup and shutdown period.
- (d) Average plant operation schedule (hours per day, days per week, weeks per year).
- (e) All continuous emissions data reduced and reported in accordance with the District approved CEMS protocol.
- (f) Maximum hourly, maximum daily, total quarterly, and total calendar year emissions of NO<sub>x</sub>, CO, PM10, POC and SO<sub>x</sub> (including calculation protocol).
- (g) Fuel sulfur content (monthly laboratory analyses, monthly natural gas sulfur content reports from the natural gas supplier(s), or the results of a custom fuel monitoring schedule approved by the District.
- (h) A log of all excess emissions, including the information regarding malfunctions/breakdowns.
- (i) Any permanent changes made in the plant process or production, which would affect air pollutant emissions, and indicate when changes were made.
- (j) Any maintenance to any air pollutant control system (recorded on an as-performed basis).

In addition, this information shall be maintained on site for a minimum of five (5) years and shall be provided to District personnel on request.

**AQ-20.** The owner/operator shall ensure that the regulated air pollutant mass emission rates from each of the gas turbines (S-1 & S-3) during a start-up does not exceed the limits established below. (PSD)

<u>Pollutant</u>	<u>Cold Start-Up Combustor Tuning</u>	<u>Hot Start-Up</u>	<u>Warm Start-Up</u>	<u>Shutdown</u>
	<u>lb/start-up</u>	<u>lb/start-up</u>	<u>lb/start-up</u>	<u>lb/shutdown</u>
<u>NO<sub>x</sub> (as NO<sub>2</sub>)</u>	<u>480.0</u>	<u>125</u>	<u>125</u>	<u>40</u>
<u>CO</u>	<u>5,028</u>	<u>2514</u>	<u>2514</u>	<u>902</u>
<u>POC (as CH<sub>4</sub>)</u>	<u>83</u>	<u>35.3</u>	<u>79</u>	<u>16</u>

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19.**

**AQ-21.** The owner/operator shall not perform combustor tuning on gas turbines more than once every rolling 365 day period for each S-1 and S-3. The owner/operator shall notify the District no later than 7 days prior to combustor tuning activity. (Offsets, Cumulative Emissions)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19.**

**AQ-22.** The owner/operator shall not allow total combined emissions from the gas turbines and HRSGs (S-1, S-2, S-3 & S-4), S-5 Cooling Tower, and S-6 Fire Pump Diesel Engine, including emissions generated during gas turbine start-ups, combustor tuning, and shutdowns to exceed the following limits during any calendar day:

- (a) 1,553 pounds of NO<sub>x</sub> (as NO<sub>2</sub>) per day (Cumulative Emissions)
- (b) 1,225 pounds of NO<sub>x</sub> per day during ozone season from June 1 to September 30. (CEC Condition of Certification)
- (c) 10,774 pounds of CO per day (PSD)
- (d) 295 pounds of POC (as CH<sub>4</sub>) per day (Cumulative Emissions)
- (e) 626 pounds of PM10 per day (PSD)
- (f) 74 pounds of SO<sub>2</sub> per day (BACT)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19.**

**AQ-23.** The owner/operator shall not allow cumulative combined emissions from the gas turbines and HRSGs (S-1, S-2, S-3 & S-4), S-5 Cooling Tower, and S-6 Fire Pump Diesel Engine, including emissions generated during gas turbine start-ups, combustor tuning, and shutdowns to exceed the following limits during any consecutive twelve-month period:

- (a) 134.6 tons of NO<sub>x</sub> (as NO<sub>2</sub>) per year (Offsets, PSD)
- (b) 389.3 tons of CO per year (Cumulative Increase, PSD)
- (c) 28.5 tons of POC (as CH<sub>4</sub>) per year (Offsets)
- (d) 86.8 tons of PM10 per year (Cumulative Increase, PSD)
- (e) 12.2 tons of SO<sub>2</sub> per year (Cumulative Increase, PSD)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19.**

**AQ-24.** The owner/operator shall not allow sulfuric acid emissions (SAM) from stacks P-1 and P-2 combined to exceed 7 tons in any consecutive 12 month period. (Basis: PSD)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19.**

**AQ-25.** The owner/operator shall not allow the maximum projected annual toxic air contaminant emissions (per AQ-28) from the gas turbines and HRSGs (S-1, S-2, S-3 & S-4) combined to exceed the following limits:

<u>formaldehyde</u>	<u>10,912 pounds per year</u>
<u>benzene</u>	<u>226 pounds per year</u>
<u>Specified polycyclic aromatic hydrocarbons (PAHs)</u>	<u>1.8 pounds per year</u>

unless the following requirement is satisfied:

The owner/operator shall perform a health risk assessment to determine the total facility risk using the emission rates determined by source testing and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. The owner/operator shall submit the risk analysis to the District and the CPM within 60 days of the source test date. The owner/operator may request that the District and the CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will not result in a significant cancer risk, the District and the CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. (Regulation 2, Rule 5)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by AQ-19.

**AQ-26.** The owner/operator shall demonstrate compliance with AQ-13 through AQ-16, AQ-19(a) through (d), AQ-20, AQ-22(a) and (b), AQ-23(a) and (b) by using properly operated and maintained continuous monitors (during all hours of operation including gas turbine start-up, combustor tuning, and shutdown periods) for all of the following parameters:

- (a) Firing Hours and Fuel Flow Rates for each of the following sources: S-1 & S-3 combined, S-2 & S-4 combined.
- (b) Oxygen (O<sub>2</sub>) concentration, Nitrogen Oxides (NO<sub>x</sub>) concentration, and Carbon Monoxide (CO) concentration at exhaust points P-1 and P-2.
- (c) Ammonia injection rate at A-1 and A-3 SCR Systems

The owner/operator shall record all of the above parameters every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each calendar day, the owner/operator shall calculate and record the total firing hours, the average hourly fuel flow rates, and pollutant emission concentrations.

The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

- (d) Heat Input Rate for each of the following sources: S-1 & S-3 combined, S-2 & S-4 combined.
- (e) Corrected NO<sub>x</sub> concentration, NO<sub>x</sub> mass emission rate (as NO<sub>2</sub>), corrected CO concentration, and CO mass emission rate at each of the following exhaust points: P-1 and P-2.

For each source, source grouping, or exhaust point, the owner/operator shall record the parameters specified in AQ-26(d) and (e) at least once every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

- (f) total heat input rate for every clock hour and the average hourly heat input rate for every rolling 3-hour period.
- (g) on an hourly basis, the cumulative total heat input rate for each calendar day for the following: each gas turbine and associated HRSG combined and all four sources (S-1, S-2, S-3 and S-4) combined.
- (h) the average NO<sub>x</sub> mass emission rate (as NO<sub>2</sub>), CO mass emission rate, and corrected NO<sub>x</sub> and CO emission concentrations for every clock hour and for every rolling 3-hour period.
- (i) on an hourly basis, the cumulative total NO<sub>x</sub> mass emissions (as NO<sub>2</sub>) and the cumulative total CO mass emissions, for each calendar day for the following: each gas turbine and associated HRSG combined and all four sources (S-1, S-2, S-3 and S-4) combined.
- (j) For each calendar day, the average hourly heat input rates, corrected NO<sub>x</sub> emission concentration, NO<sub>x</sub> mass emission rate (as NO<sub>2</sub>), corrected CO emission concentration, and CO mass emission rate for each gas turbine and associated HRSG combined and the auxiliary boiler.
- (k) on a daily basis, the cumulative total NO<sub>x</sub> mass emissions (as NO<sub>2</sub>) and cumulative total CO mass emissions, for the previous consecutive twelve month period for all four sources (S-1, S-2, S-3 and S-4) combined.

(1-520.1, 9-9-501, BACT, Offsets, NSPS, PSD, Cumulative Increase)

**Verification:** At least 30 days before first fire, the project owner shall submit to the CPM a plan on how the measurements and recordings required by this condition will be performed.

**AQ-27.** To demonstrate compliance with conditions AQ-19(f) thru (h), AQ-22(c) thru (e), and AQ-23(c) thru (e), the owner/operator shall calculate and record on a daily basis, the Precursor Organic Compound (POC) mass emissions, Fine Particulate Matter (PM<sub>10</sub>) mass emissions (including condensable particulate matter), and Sulfur Dioxide (SO<sub>2</sub>) mass emissions from each power train. The owner/operator shall use the actual heat input rates measured pursuant to AQ-26, actual gas turbine start-up times, actual gas turbine shutdown times, and CEC and District-approved emission factors developed pursuant to source testing under AQ-30 to calculate these emissions. The owner/operator shall present the calculated emissions in the following format:

- (a) For each calendar day, POC, PM<sub>10</sub>, and SO<sub>2</sub> emissions, summarized for each power train (gas turbine and its respective HRSG combined) and all four sources (S-1, S-2, S-3 & S-4) combined
- (b) on a daily basis, the cumulative total POC, PM<sub>10</sub>, and SO<sub>2</sub> mass emissions, for each year for all eight sources (S-1, S-2, S-3 & S-4) combined  
(Offsets, PSD, Cumulative Increase)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19**.

**AQ-28.** To demonstrate compliance with AQ-25, the owner/operator shall calculate and record on an annual basis the maximum projected annual emissions of: Formaldehyde, Benzene, and Specified PAH's. The owner/operator shall calculate the maximum projected annual emissions using the maximum annual heat input rate of 35,708,858 MM BTU/year and the highest emission factor (pounds of pollutant per MM BTU of heat input) determined by any source test of the S-1 and S-3 gas turbines and/or S-2 and S-4 HRSGs. If the highest emission factor for a given pollutant occurs during minimum-load turbine operation, a reduced annual heat input rate may be utilized to calculate the maximum projected annual emissions to reflect the reduced heat input rates during gas turbine start-up and minimum-load operation. The reduced annual heat input rate shall be subject to District review and approval. (Regulation 2, Rule 5)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQ-19**.

**AQ-29.** Within 90 days of start-up of the RCEC, the owner/operator shall conduct a District-approved source test on exhaust point P-1 or P-2 to determine the corrected ammonia (NH<sub>3</sub>) emission concentration to determine compliance with AQ-19(e). The source test shall determine the correlation between the heat input rates of the gas turbine and associated HRSG, A-2 or A-4 SCR System ammonia injection rate, and the corresponding NH<sub>3</sub> emission concentration at emission point P-1 or P-2. The source test shall be conducted over the expected operating range of the turbine and HRSG (including, but not limited to, minimum and full load modes) to establish the range of ammonia injection rates necessary to achieve NO<sub>x</sub> emission reductions while maintaining ammonia slip levels. The owner/operator shall repeat the source testing on an annual basis thereafter. Ongoing compliance with AQ-20(e) shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. The owner/operator shall submit the source test results to the District and the CPM within 60 days of conducting the tests. (Regulation 2, Rule 5)

**Verification:** The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-30.** Within 90 days of start-up of the RCEC and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-1 and P-2 while each gas turbine and associated Heat Recovery Steam Generator are operating at maximum load to determine compliance with AQ-19(a),(b),(c),(d),(f),(g), and (h) and while each gas turbine and associated Heat Recovery Steam Generator are operating at minimum load to determine compliance with AQ-19(c) and (d), and to verify the accuracy of the continuous

emission monitors required in AQ-26. The owner/operator shall test for (as a minimum): water content; stack gas flow rate; oxygen concentration; precursor organic compound concentration and mass emissions; nitrogen oxide concentration and mass emissions (as NO<sub>2</sub>); carbon monoxide concentration and mass emissions; sulfur dioxide concentration and mass emissions; methane; ethane; and, particulate matter (PM<sub>10</sub>) emissions, including condensable particulate matter. The owner/operator shall submit the source test results to the District and the CPM within 60 days of conducting the tests. (BACT, offsets)

**Verification:** The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-31.** The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section and the CPM prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section and the CPM in writing of the source test protocols and projected test dates at least 7 days prior to the testing date(s). As indicated above, the owner/operator shall measure the contribution of condensable PM (back half) to the total PM<sub>10</sub> emissions. However, the owner/operator may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. The owner/operator shall submit the source test results to the District and the CPM within 60 days of conducting the tests. (BACT)

**Verification:** Approval of the source test procedures, as required in AQ-31, and the source test reports shall be deemed as verification for this condition. The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-32.** Within 90 days of start-up of the RCEC and on a biennial basis (once every two years) thereafter, the owner/operator shall conduct a District-approved source test on exhaust point P-1 or P-2 while the gas turbine and associated Heat Recovery Steam Generator are operating at maximum allowable operating rates to demonstrate compliance with AQ-25. The owner/operator shall also test the gas turbine while it is operating at minimum load. If three consecutive biennial source tests demonstrate that the annual emission rates calculated pursuant to AQ-25 for any of the compounds listed below are less than the BAAQMD trigger levels, pursuant to Regulation 2, Rule 5, shown, then the owner/operator may discontinue future testing for that pollutant:

Benzene ≤ 6.4 pounds/year and 2.9 pounds/hour  
Formaldehyde < 30 pounds/year and 0.21 pounds/hour  
Specified PAHs ≤ 0.011 pounds/year  
(Regulation 2, Rule 5)

**Verification:** The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-33.** The owner/operator shall calculate the SAM emission rate using the total heat input for the sources and the highest results of any source testing conducted pursuant to AQ-30. If this SAM mass emission limit of AQ-24 is exceeded, the owner/operator must utilize air dispersion modeling to determine the impact (in  $\mu\text{g}/\text{m}^3$ ) of the sulfuric acid mist emissions pursuant to Regulation 2-2-306. (PSD)

**Verification:** The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-34.** Within 90 days of start-up of the RCEC and on a semi-annual basis (twice per year) thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-1 and P-2 while each gas turbine and HRSG duct burner is operating at maximum heat input rates to demonstrate compliance with the SAM emission rates specified in AQ-24. The owner/operator shall test for (as a minimum)  $\text{SO}_2$ ,  $\text{SO}_3$ , and  $\text{H}_2\text{SO}_4$ . After acquiring one year of source test data on these sources, the owner/operator may petition the District to reduce the test frequency to an annual basis if test result variability is sufficiently low as determined by the District. The owner/operator shall submit the source test results to the District and the CPM within 60 days of conducting the tests. (PSD)

**Verification:** The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-35.** The owner/operator of the RCEC shall submit all reports (including, but not limited to monthly CEM reports, monitor breakdown reports, emission excess reports, equipment breakdown reports, etc.) as required by District Rules or Regulations and in accordance with all procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies & Procedures Manual. (Regulation 2-6-502)

**Verification:** The project owner shall submit to the District and CPM the reports as required by procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies & Procedures Manual.

**AQ-36.** The owner/operator of the RCEC shall maintain all records and reports on site for a minimum of 5 years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, natural gas sulfur content analysis results, emission calculation records, records of plant upsets and



related incidents. The owner/operator shall make all records and reports available to District and the CPM staff upon request. (Regulation 2-6-501)

**Verification:** During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA or CEC staff.

**AQ-37.** The owner/operator of the RCEC shall notify the District and the CPM of any violations of these permit conditions. Notification shall be submitted in a timely manner, in accordance with all applicable District Rules, Regulations, and the Manual of Procedures. Notwithstanding the notification and reporting requirements given in any District Rule, Regulation, or the Manual of Procedures, the owner/operator shall submit written notification (facsimile is acceptable) to the Enforcement Division within 96 hours of the violation of any permit condition. (Regulation 2-1-403)

**Verification:** Submittal of these notifications as required by this condition is the verification of these permit conditions. In addition, as part of the quarterly and annual compliance reports of AQ-19, the project owner shall include information on the dates when these violations occurred and when the project owner notified the District and the CPM.

**AQ-38.** The owner/operator shall ensure that the stack height of emission points P-1 and P-2 is each at least 145 feet above grade level at the stack base. (PSD, Regulation 2-5)

**Verification:** At least 120 days prior to construction of the turbine stacks, the project owner shall provide the District and CPM an "approved for construction" drawing showing the appropriate stack height and location of sampling ports and platforms. The project owner shall make the site available to the District, EPA and CEC staff for inspection.

**AQ-39.** The owner/operator of RCEC shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall comply with the District Manual of Procedures, Volume IV, Source Test Policy and Procedures, and shall be subject to BAAQMD review and approval. (Regulation 1-501)

**Verification:** At least 120 days prior to construction of the turbine stacks, the project owner shall provide the District and CPM an "approved for construction" drawing showing the appropriate stack height and location of sampling ports and platforms. The project owner shall make the site available to the District, EPA and CEC staff for inspection.

**AQ-40.** Within 180 days of the issuance of the Authority to Construct for the RCEC, the owner/operator shall contact the BAAQMD Technical Services Division regarding requirements for the continuous emission monitors, sampling ports, platforms, and source tests required by AQ-29, 30, 32, 34, and 43. The owner/operator shall conduct all source testing and monitoring in accordance with the District approved procedures. (Regulation 1-501)

**Verification:** Compliance with this condition is the verification of this permit condition.

**AQ-41.** Pursuant to BAAQMD Regulation 2, Rule 6, section 404.1, the owner/operator of the RCEC shall submit an application to the BAAQMD for a major facility review permit within 12 months of completing construction as demonstrated by the first firing of any gas turbine or HRSG duct burner. (Regulation 2-6-404.1)

**Verification:** The project owner shall submit to the CPM copies of the Federal (Title IV) Acid Rain and (Title V) Operating Permit within 30 days after they are issued by the District.

**AQ-42.** Pursuant to 40 CFR Part 72.30(b)(2)(ii) of the Federal Acid Rain Program, the owner/operator of the Russell City Energy Center shall submit an application for a Title IV operating permit to the BAAQMD at least 24 months before operation of any of the gas turbines (S-1, S-3, S-5, or S-7) or HRSGs (S-2, S-4, S-6, or S-8). (Regulation 2, Rule 7)

**Verification:** The project owner shall submit to the CPM copies of the Federal (Title IV) Acid Rain and (Title V) Operating Permit within 30 days after they are issued by the District.

**AQ-43.** The owner/operator shall ensure that the Russell City Energy Center complies with the continuous emission monitoring requirements of 40 CFR Part 75. (Regulation 2, Rule 7)

**Verification:** At least 60 days prior to the installation of the CEMS, the project owner shall seek approval from the District for an emission monitoring plan.

#### **Permit Conditions for Cooling Towers**

**AQ-44.** The owner/operator shall properly install and maintain the S-5 cooling tower to minimize drift losses. The owner/operator shall equip the cooling towers with high-efficiency mist eliminators with a maximum guaranteed drift rate of 0.0005%. The maximum total dissolved solids (TDS) measured at the base of the cooling towers or at the point of return to the wastewater facility shall not be higher than 8,000 ppmw (mg/l). The owner/operator shall sample and test the cooling tower water at least once per day to verify compliance with this TDS limit. (PSD)

**Verification:** At least 120 days prior to construction of the cooling tower, the project owner shall provide the District and CPM an "approved for construction" drawing and specifications for the cooling tower and the high-efficiency mist eliminator.

**AQ-45.** The owner/operator shall perform a visual inspection of the cooling tower drift eliminators at least once per calendar year, and repair or replace any drift eliminator components which are broken or missing. Prior to the initial operation of the Russell City Energy Center, the owner/operator shall have the cooling tower vendor's field representative inspect the cooling tower drift eliminators and certify that the installation was performed in a satisfactory manner. Within 60 days of the initial operation of the cooling tower, the owner/operator shall perform an initial performance source test to determine the PM10 emission rate from the cooling tower to verify compliance with the

vendor-guaranteed drift rate specified in AQ-44. The CPM may require the owner/operator to perform source tests to verify continued compliance with the vendor-guaranteed drift rate specified in AQ-44. (PSD)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by AQ-19.

#### **Permit Conditions for S-6 Fire Pump Diesel Engine**

**AQ-46.** The owner/operator shall not operate S-6 Fire Pump Diesel Engine more than 50 hours per year for reliability-related activities. ("Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3), offsets)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by AQ-19.

**AQ-47.** The owner/operator shall operate S-6 Fire Pump Diesel Engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, State or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating hours while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited. ("Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection 9e)(2)(A)(3) or (e)(2)(B)(3))

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by AQ-19.

**AQ-48.** The owner/operator shall operate S-6 Fire Pump Diesel Engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained. ("Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(G)(1), cumulative increase)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by AQ-19.

**AQ-49.** Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 60 months from the date of entry. Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.

- a. Hours of operation for reliability-related activities (maintenance and testing).
- b. Hours of operation for emission testing to show compliance with emission limits.
- c. Hours of operation (emergency).
- d. For each emergency, the nature of the emergency condition.
- e. Fuel usage for each engine(s).

(Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(l), cumulative increase)

**Verification:** During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA or CEC staff.

### **CONSTRUCTION CONDITIONS OF CERTIFICATION**

~~**AQ-C1** The project owner/operator shall submit the resume(s) of their selected Construction Mitigation Manager(s) (CMM) to the Energy Commission Compliance project Manager (CPM) for approval. The owner/operator shall be responsible for funding the costs of the CMM however the CMM shall report to the CPM. The CMM shall preferably have a minimum of 8 years experience as follows, however the CPM shall consider all resumes submitted regardless of experience:~~

- ~~• 5 years construction experience as a subcontractor or general contractor.~~
- ~~• An engineering degree or an additional 5 years construction experience.~~
- ~~• 1 year construction project management experience.~~
- ~~• 2 years air quality assessment experience.~~

~~The project owner/operator shall make available a dedicated office for the CMM. The CMM shall be responsible for implementing all mitigation measures related to construction equipment combustion emissions, as outlined in Conditions of Certification AQ-C4. A CMM shall be on-site or available to be on-site at any time, until deemed no longer necessary by the CPM. The CMM shall be granted access to all areas of the main and related linear facility construction sites. The CMM shall have the authority to appeal to the CPM to have the CPM stop construction on either the main or the related linear facility construction sites as warranted by specific mitigation measures. The CMM may not be terminated prior to the cessation of all construction activities unless approval is granted by the CPM.~~

~~**Verification:** The project owner/operator shall submit the CMM resume(s) to the CPM for approval at least sixty (60) days prior to site mobilization.~~

~~**AQ-C2** The CMM shall submit to the CPM for approval, a Monthly Construction Compliance Report (MCCR). The MCCR will, at a minimum, summarize all compliance actions taken germane to Conditions of Certification AQ-C3 and AQ-C4. The MCCR shall include, at a minimum, the following elements:~~

#### ~~**Fugitive Dust Mitigation Monthly Report (see Condition of Certification AQ-C3)**~~

- ~~• Identification of specific mitigation measure performed, the location performed, date performed and date enforced or verified as remaining effective.~~
- ~~• Identification of any transgressions or circumventions of mitigation measure and the actions taken to correct the situation.~~

- Identification of any observation by the CMM of dust plumes beyond the property boundary of the main construction site or beyond an acceptable distance from the linear construction site and what actions (if any) were taken to abate the plume.
- A summary report of all ambient air monitoring data.

**Diesel Construction Equipment Mitigation Monthly Report  
(see Condition of Certification AQ-C4)**

- Identification of any changes, as approved by the CPM, to the Diesel Construction Equipment Mitigation Plan from the initial report or the last monthly report including any new contractors and their diesel construction equipment.
- A Copy of all receipt or other documentation indicating type and amount of fuel purchased, from whom, where delivered and on what date for the main and related linear construction sites.
- Identification and verification of all diesel engines required to meet EPA or CARB 1996 off-road diesel equipment emission standards.
- The suitability of the use of a catalyzed diesel particulate filter for a specific piece of construction equipment is to be determined by a qualified mechanic or engineer who must submit a report through the CMM to the CPM for approval. The identification of any suitability report being initiated, pursued or the completed report should be included the monthly report (in the month that it was completed) as should the verification of any subsequent installation of a catalyzed diesel particulate filter.
- Identification of any observation by the CMM of dark plumes emanating from diesel fire construction equipment beyond the property boundary of the main construction site or beyond an acceptable distance from the linear construction site and what actions (if any) were taken to abate the plume or future expected plumes.

**Verification:** The CMM shall submit to the CPM for approval, the Monthly Construction Compliance Report (MCCR) for each month by the 15th (or the following Monday if the 15th is a Saturday or Sunday) of the following month while construction is occurring at the main or related linear construction sites.

**AQ-C3** The project owner/operator shall prepare and submit to the CPM for approval a Fugitive Dust Mitigation Plan (FDMP) that specifically identifies all fugitive dust mitigation measures that will be employed for the construction of the facility and administered on site. The construction mitigation measures that shall be addressed in the FDMP include, but are not limited to, the following:

- Identification of the employee parking area(s) and surface composition of those parking area(s)
- The frequency of watering of unpaved roads and all disturbed areas
- Application of chemical dust suppressants
- Gravel in high traffic areas

- ~~Paved access aprons~~
- ~~Sandbags to prevent run-off~~
- ~~Posted speed limit signs~~
- ~~Wheel washing areas prior to large trucks leaving the project site~~
- ~~Methods that will be used to clean tracked-out mud and dirt from the project site onto public roads~~
- ~~For any transportation of borrowed fill material
 
  1. ~~Vehicle covers~~
  2. ~~Wetting of the transported material~~
  3. ~~Appropriate freeboard~~~~
- ~~Methods for the stabilization of storage piles and disturbed areas~~
- ~~Windbreaks at appropriate locations~~
- ~~Additional mitigation measures to be implemented at the direction of the CMM in the event that the standard measures fail to completely control dust from any activity and/or source~~
- ~~The suspension of all earth moving activities under windy Conditions~~
- ~~On site monitoring devices~~

~~In monitoring the effectiveness of all mitigation measures included in the FDMP, the CMM shall take into account the following, at a minimum:~~

- a) ~~On-site spot checks of soil moisture content at locations where soil disturbance, movement, and/or storage is occurring;~~
- b) ~~Visual observations of all construction activities; and~~
- c) ~~Review the results of Los Esteros Critical Energy Facility Air Monitoring Demonstration project, (LECEF)~~
- d) ~~At least 45 days prior to site mobilization, the applicant shall meet with staff, CMM and CPM for LECEF, and the CPM for RCEC to determine the effectiveness of the PM10 site monitoring for LECEF, and whether a similar Construction Monitoring Demonstration Program should be required during construction of the RCEC. The results of this meeting will be reported in the Fugitive Dust Mitigation Plan.~~

~~The CMM shall implement the following procedures for additional mitigation measures if the CMM determines that the existing mitigation measures are not resulting in adequate mitigation:~~

1. ~~The CMM shall direct more aggressive application of the existing mitigation methods within fifteen (15) minutes of making such a determination.~~
2. ~~The CMM shall direct implementation of additional methods of dust suppression if step #1 specified above fails to result in adequate mitigation within thirty (30) minutes of the original determination.~~

3. The CMM shall have the authority to appeal to the CPM to have the CPM direct a temporary shutdown of the source of the emissions if step #2 specified above fails to result in adequate mitigation within one (1) hour of the original determination. If the CPM grants the request for shutdown, the activity shall not restart until the CPM authorizes restarting of the activity.

**Verification:** ~~At least thirty (30) days prior to site mobilization, the project owner/operator shall provide the CPM with a copy of the Fugitive Dust Mitigation Plan (FDMP) for approval. Site mobilization shall not commence until the project owner/operator receives approval of the FDMP from the CPM. If the results of the LECEF Demonstration project are not available in time for their consideration in the initial FDMP, Staff and the project owner/operator will meet and confer regarding the applicability of the LECEF Demonstration project to the RCEC project after such results are made available to Staff and the project owner/operator. If Staff and project owner/operator are in agreement, the FDMP may be amended to reflect such agreement. If the Staff and Applicant are not in agreement after informal dispute resolution process are exhausted, then the Staff and the project owner shall each file a petition with the Energy Commission to resolve any differences between the parties regarding the applicability of the LECEF Demonstration project to the RCEC project.~~

**AQ-C4** ~~The project owner/operator shall prepare and submit to the CPM for approval a Diesel Construction Equipment Mitigation Plan (DCEMP) that will specifically identify diesel engine mitigation measures that will be employed during the construction phase of the main and related linear construction sites. The project owner/operator will be responsible for implementing and maintaining all measure identified in the DCEMP. The DCEMP shall include the following:~~

1. ~~A list of all diesel fueled, off road, stationary or portable construction related equipment to be used either on the main or the related linear construction sites. This list will initially be estimated and then subsequently be updated as specific contractors become identified. Prior to a contractor gaining access to the main or related linear construction sites, the project owner/operator will submit to the CPM for approval, an update of this list including all of the new contractor's diesel construction equipment.~~
2. ~~Each piece of construction equipment listed under item #1 of this Condition must demonstrate compliance according to the following mitigation requirements, except as noted in items #3, #4 and #5 of this Condition:~~

<b>Engine Size (BHP)</b>	<b>1996 CARB or EPA Certified Engine</b>	<b>Required Mitigation</b>
< 100	NA	ULSD
> or = 100	Yes	ULSD
> or = 100	No	<b>ULSD AND CDPF, IF SUITABLE AS DETERMINED BY THE CPM</b>

- ~~3. If the construction equipment is intended to be on site for ten (10) days or less, then none of the mitigation measures identified in item #2 of this Condition are required.~~
- ~~4. The CPM may grant relief from the mitigation measures listed in item #2 of this Condition for a specific piece of equipment if the project owner/operator can demonstrate that they have made a good faith effort to comply with the mitigation measures and that compliance is not possible.~~
- ~~5. Any implemented mitigation measure in item #2 of this Condition may be terminated immediately if one of the following Conditions exists, however the CPM must be informed within ten (10) working days of the termination:~~
  - ~~5.1 The measure is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or reduced power output due to an excessive increase in back pressure.~~
  - ~~5.2 The measure is causing or is reasonably expected to cause significant engine damage.~~
  - ~~5.3 The measure is causing or is reasonably expected to cause a significant risk to workers or the public.~~
  - ~~5.4 Any other seriously detrimental cause that has approval by the CPM prior to the termination being implemented.~~
- ~~6. All contractors must agree to limit diesel engine idle time on all diesel-powered equipment to no more than ten (10) minutes, to the extent practical.~~

**Verification:** ~~The project owner/operator shall submit the initial Diesel Construction Equipment Mitigation Plan (DCEMP) to the CPM for approval at least thirty (30) days prior to site mobilization. The project owner/operator will update the initial DCEMP as necessary, no less than ten (10) days prior to a specific contractor gaining access to either the main or related linear construction sites. The project owner/operator will notify the CPM of any emergency termination within ten (10) working days of the termination.~~

### **~~Operations Conditions of Certification~~**

*~~All definitions presented in the Bay Area Air Quality Management District's Final Determination of Compliance for the Russell City Energy Center apply to the following Conditions of Certification.~~*

### **~~Process Equipment~~**

- ~~S-1 Combustion Turbine Generator (CTG) #1, Westinghouse 501F, 1979.4 MMBtu/hr maximum rated capacity, natural gas fired only; Abated by A-1 Selective Catalytic Reduction (SCR) System.~~
- ~~S-2 Heat Recovery Steam Generator (HRSG) #1, with Duct Burner Supplemental Firing System, 200 MMBtu/hr maximum rated capacity; Abated by A-1 Selective Catalytic Reduction (SCR) System.~~



~~S-3—Combustion Turbine Generator (CTG) #2, Westinghouse 501F, 1979.4 MMBtu/hr maximum rated capacity, natural gas fired only; Abated by A-2 Selective Catalytic Reduction (SCR) System.~~

~~S-4—Heat Recovery Steam Generator (HRSG) #2, with Duct Burner Supplemental Firing System, 200 MMBtu/hr maximum rated capacity; Abated by A-2 Selective Catalytic Reduction (SCR) System.~~

~~S-5—Cooling Tower, Ten Cells, 135,000 gallons per minute~~

~~S-6—Emergency Generator, with Caterpillar G3512-90-LE natural gas fired engine, 660 kW, 6.44 MMBtu/hr input~~

~~S-7—Diesel Engine, Cummins 6CTA8.3-F3, 400 hp, 2.11 MMBtu/hr input~~

~~AQ-1 The owner/operator of the RCEC shall minimize emissions of carbon monoxide and nitrogen oxides from S-1 and S-3 Gas Turbines and S-2 and S-4 Heat Recovery Steam Generators (HRSGs) to the maximum extent possible during the commissioning period. Conditions AQ-1 through AQ-12 shall only apply during the commissioning period as defined in the District FDOC. Unless otherwise indicated, Conditions AQ-13 through AQ-56 shall apply after the commissioning period has ended.~~

~~**Verification:**—The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by Condition AQ-5 and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by Condition AQ-11.~~

~~AQ-2 At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall tune the S-1 & S-3 Gas Turbine combustors and S-2 & S-4 Heat Recovery Steam Generator duct burners to minimize the emissions of carbon monoxide and nitrogen oxides.~~

~~**Verification:**—The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by Condition AQ-5 and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by Condition AQ-11.~~

~~AQ-3 At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall install, adjust, and operate the SCR systems to minimize the emissions of carbon monoxide and nitrogen oxides from S-1 & S-3 Gas Turbines and S-2 & S-4 Heat Recovery Steam Generators.~~

~~**Verification:**—The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by Condition AQ-5 and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by Condition AQ-11.~~

~~AQ-4 Coincident with the as-designed operation of A-1 & A-2 SCR Systems, pursuant to Conditions AQ-3, AQ-10, AQ-11, and AQ-12, the Gas Turbines (S-1 & S-3) and the HRSGs (S-2 & S-4) the owner/operator shall operate the facility in a manner such that comply with the NO<sub>x</sub> and CO emission limitations specified in Conditions AQ-20(a) through AQ-20(d).~~

~~**Verification:** The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by Condition AQ-5 and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by Condition AQ-11.~~

~~AQ-5 The owner/operator of the RCEC shall submit a plan to the District Permit Services Division and the CPM describing the procedures to be followed during the commissioning of the gas turbines and HRSGs. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the Dry Low-NO<sub>x</sub> combustors, the installation and operation of the SCR systems and oxidation catalysts, the installation, calibration, and testing of the CO and NO<sub>x</sub> continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-1 & S-3) and HRSGs (S-2 & S-4) without abatement by their respective SCR System. Neither Gas Turbine (S-1 or S-3) shall be fired sooner than 28 days after the District receives the commissioning plan.~~

~~**Verification:** The project owner/operator shall submit a Commissioning Plan to the District Permit Services Division and the CPM for approval at least four (4) weeks prior to first fire of S-1, S-2, S-3 and S-4.~~

~~AQ-6 During the commissioning period, the owner/operator of the RCEC shall demonstrate compliance with Conditions AQ-8 through AQ-11 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:~~

- ~~a. Firing hours for each gas turbine (S-1 and S-3) and each HRSG (S-2 and S-4)~~
- ~~b. Fuel flow rates to each train~~
- ~~c. Stack gas nitrogen oxide emission concentrations at P-1 and P-2~~
- ~~d. Stack gas carbon monoxide emission concentrations P-1 and P-2~~
- ~~e. Stack gas carbon dioxide concentrations P-1 and P-2~~

~~The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the Gas Turbines (S-1 & S-3) and HRSGs (S-2 & S-4). The owner/operator shall use District-approved methods to calculate heat input rates, NO<sub>x</sub> mass emission rates, carbon monoxide mass emission rates, and NO<sub>x</sub> and CO emission concentrations, summarized for each clock hour and each calendar day. All records shall be retained on site for at least 5 years from the date of entry and made available to District personnel upon request.~~

~~**Verification:** The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by Condition AQ-5~~

and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by Condition AQ-11.

~~AQ-7 The owner/operator shall install, calibrate, and make operational District-approved continuous emission monitors specified in Condition 6 prior to first firing of the Gas Turbines (S-1 & S-3) and Heat Recovery Steam Generators (S-2 & S-4). After first firing of the turbines and auxiliary boilers, the detection range of these continuous emission monitors as necessary to accurately measure the resulting range of CO and NOx emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.~~

~~**Verification:** The project owner/operator shall notify the District and CPM of the date of expected first fire at least thirty (30) days prior to first fire and shall make the project site available for inspection if desired by either the District or CPM. The project owner/operator shall propose a schedule of compliance with this Condition of Certification in the Commissioning Plan required by Condition AQ-5 and document continuing compliance with this Condition of Certification in each Monthly Emissions Report required by Condition AQ-11.~~

~~AQ-8 The owner/operator shall not operate the facility such that the total number of firing hours of S-1 Gas Turbine and S-2 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-1 SCR System shall not exceed 300 hours during the commissioning period. Such operation of S-1 Gas Turbine and S-2 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 300 firing hours without abatement shall expire.~~

~~**Verification:** The project owner/operator shall submit documentation of compliance with this Condition of Certification in the Monthly Emissions Report required by Condition AQ-11.~~

~~AQ-9 The total number of firing hours of S-3 Gas Turbine and S-4 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-2 SCR System shall not exceed 300 hours during the commissioning period. Such operation of S-3 Gas Turbine and S-4 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 300 firing hours without abatement shall expire.~~

~~**Verification:** The project owner/operator shall submit documentation of compliance with this Condition of Certification in the Monthly Emissions Report required by Condition AQ-11.~~

~~AQ-10 The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM10, and sulfur dioxide that are emitted by the Gas~~

~~Turbines (S-1 & S-3) and Heat Recovery Steam Generators (S-2 & S-4) during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in Condition AQ-25.~~

~~**Verification:** The project owner/operator shall submit documentation of compliance with this Condition of Certification in the Monthly Emissions Report required by Condition AQ-11.~~

~~**AQ-11** Combined pollutant mass emissions from the Gas Turbines (S-1 & S-3) and Heat Recovery Steam Generators (S-2 & S-4) shall not exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the Gas Turbines (S-1 & S-3).~~

<del>NO<sub>x</sub> (as NO<sub>2</sub>)</del>	<del>7,880 pounds per calendar day</del>	<del>400 pounds per hour</del>
<del>CO</del>	<del>17,716 pounds per calendar day</del>	<del>584 pounds per hour</del>
<del>POC (as CH<sub>4</sub>)</del>	<del>230 pounds per calendar day</del>	
<del>PM<sub>10</sub></del>	<del>456 pounds per calendar day</del>	
<del>SO<sub>2</sub></del>	<del>77 pounds per calendar day</del>	

~~**Verification:** During the Commissioning Period, as defined in the district FDOC, the project owner/operator shall submit to the CPM for approval, a Monthly Emissions Report that includes, but is not limited to, fuel use, turbine operation, post combustion control operation, ammonia use and CEM readings on an hourly and daily basis. The Monthly Emissions Report for each month must be submitted by the 15th (or the following Monday if the 15th is a Saturday or Sunday) of the following month.~~

~~**AQ-12** Prior to the end of the Commissioning Period, the Owner/Operator shall conduct a District and Energy Commission approved source test using external continuous emission monitors to determine compliance with Condition AQ-20. The source test shall determine NO<sub>x</sub>, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods.~~

~~**Verification:** No later than twenty (20) working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this Condition. The District and the CPM will notify the Owner/Operator of any necessary modifications to the plan within twenty (20) working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within thirty (30) days of the source testing date.~~

**~~Conditions for the Gas Turbines (S-1 & S-3) and the Heat Recovery Steam Generators (HRSGs; S-2 & S-4)~~**

~~AQ-13 The owner/operator shall fire the Gas Turbines (S-1 and S-3) and HRSG Duct Burners (S-2 and S-4) exclusively on natural gas. (BACT for SO<sub>2</sub> and PM<sub>10</sub>)~~

~~**Verification:** The project owner/operator shall make the project site available for inspection at any time by representatives of the District, ARB, USEPA and Energy Commission.~~

~~AQ-14 The owner/operator shall not exceed 2,179.4 MM Btu per hour, averaged over any rolling 3-hour period from the combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-1 & S-2 and S-3 & S-4). (PSD<sup>15</sup> for NO<sub>x</sub>)~~

~~**Verification:** A detailed report of fuel use and equipment operation shall be included in the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~AQ-15 The owner/operator shall not exceed 52,306 MM Btu per calendar day from the combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-1 & S-2 and S-3 & S-4). (PSD for PM<sub>10</sub>)~~

~~**Verification:** A detailed report of fuel use and equipment operation shall be included in the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~AQ-16 The owner/operator shall not exceed 34,679,108 MM Btu per year from the combined cumulative heat input rate for the Gas Turbines (S-1 & S-3) and the HRSGs (S-2 & S-4). (Offsets)~~

~~**Verification:** A detailed report of fuel use and equipment operation shall be included in each January 30 Quarterly Air Quality Report as required by the verification of Condition AQ-36.~~

~~AQ-17 The owner/operator shall not fire HRSG duct burners (S-2 and S-4) unless its associated Gas Turbine (S-1 and S-3, respectively) is in operation. (BACT for NO<sub>x</sub>)~~

~~**Verification:** The project owner/operator shall submit documentation of compliance with this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~AQ-18 The owner/operator shall properly operate and properly maintain A-1 Selective Catalytic Reduction (SCR) System except as provided in Condition AQ-8, whenever fuel is combusted at S-1 Gas Turbine and/or S-2 HRSG and A-1 catalyst bed has reached minimum operating temperature. (BACT for NO<sub>x</sub>)~~

~~**Verification:** The project owner/operator shall make the project site available for inspection at any time by representatives of the District, ARB, USEPA and Energy Commission.~~

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<sup>15</sup> PSD is the prevention of significant deterioration.

~~AQ-19 The owner/operator shall properly operate and properly maintain A-2 Selective Catalytic Reduction (SCR) System except as provided in Condition AQ-9, whenever fuel is combusted at S-2 Gas Turbine and/or S-4 HRSG and A-2 catalyst bed has reached minimum operating temperature. (BACT for NOx)~~

~~**Verification:** The project owner/operator shall make the project site available for inspection at any time by representatives of the District, ARB, USEPA and Energy Commission.~~

~~AQ-20 The owner/operator of Gas Turbines (S-1 & S-3) and HRSGs (S-2 & S-4) shall comply with requirements (a) through (h) under all operating scenarios, including duct burner firing mode and steam injection power augmentation mode. Requirements (a) through (h) do not apply during a gas turbine start up or shutdown. (BACT, PSD, and Toxic Risk Management Policy)~~

~~(a) Nitrogen oxide mass emissions (calculated in accordance with District approved methods as NO<sub>2</sub>) at P-1 (the combined exhaust point for the S-1 Gas Turbine and the S-2 HRSG after abatement by A-1 SCR System) shall not exceed 19.5 pounds per hour or 0.0090 lb/MM Btu (HHV) of natural gas fired. Nitrogen oxide mass emissions (calculated in accordance with District approved methods as NO<sub>2</sub>) at P-2 (the combined exhaust point for the S-2 Gas Turbine and the S-4 HRSG after abatement by A-2 SCR System) shall not exceed 19.5 pounds per hour or 0.0090 lb./MM Btu (HHV) of natural gas fired. (PSD for NO<sub>x</sub>)~~

~~(b) The nitrogen oxide emission concentration at emission points P-1 and P-2 each shall not exceed 2.5 ppmv, on a dry basis, corrected to 15% O<sub>2</sub>, averaged over any 1-hour period. (BACT for NO<sub>x</sub>)~~

~~(c) Carbon monoxide mass emissions at P-1 and P-2 each shall not exceed 0.0087 lb./MM Btu (HHV) of natural gas fired or 28.3 pounds per hour, averaged over any rolling 3-hour period. (PSD for CO)~~

~~(d) The carbon monoxide emission concentration at P-1 and P-2 each shall not exceed 4 ppmv, on a dry basis, corrected to 15% O<sub>2</sub>, averaged over any rolling 3-hour period. (BACT for CO)~~

~~(e) Ammonia (NH<sub>3</sub>) emission concentrations at P-1 and P-2 each shall not exceed 5 ppmv, on a dry basis, corrected to 15% O<sub>2</sub>, averaged over any rolling 3-hour period. The continuous recording of the ammonia injection rate to A-1 and A-2 SCR Systems shall verify this ammonia emission concentration. The correlation between the gas turbine and HRSG heat input rates, A-1 and A-2 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-1 and P-2 shall be determined in accordance with permit Condition AQ-31. (TRMP for NH<sub>3</sub>)~~

~~(f) Precursor organic compound (POC) mass emissions (as CH<sub>4</sub>) at P-1 and P-2 each shall not exceed 2.72 pounds per hour or 0.00125 lb/MM Btu of natural gas fired. (BACT)~~

~~(g) Sulfur dioxide (SO<sub>2</sub>) mass emissions at P-1 and P-2 each shall not exceed 1.51 pounds per hour or 0.0007 lb/MM Btu of natural gas fired. Sulfur content of the natural gas shall not exceed 0.25 grains/100 scf. (BACT)~~

~~(h) Particulate matter (PM<sub>10</sub>) mass emissions at P-1 and P-2 each shall not exceed 9 pounds per hour or 0.00455 lb/MM Btu of natural gas fired when the HRSG duct burners are not in operation. Particulate matter (PM<sub>10</sub>) mass emissions at P-1 and P-2 each shall not exceed 12 pounds per hour or 0.00551 lb./MM Btu of natural gas fired when the HRSG duct burners are in operation. (BACT)~~

~~**Verification:** The project owner/operator shall submit documentation of compliance with all emission limits specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~**AQ-21** The owner/operator shall operate the facility such that the regulated air pollutant mass emission rates from each of the Gas Turbines (S-1 and S-3) during a start-up or a shutdown does not exceed the following limits: (PSD)~~

	<del>Cold Start-Up (lb/start-up)</del>	<del>Hot Start-Up (lb/start-up)</del>	<del>Shutdown (lb/shutdown)</del>
<del>Oxides of Nitrogen (as-NO<sub>2</sub>)</del>	<del>240</del>	<del>80</del>	<del>18</del>
<del>Carbon Monoxide (CO)</del>	<del>2,514</del>	<del>902</del>	<del>43.8</del>
<del>Precursor Organic Compounds (as-CH<sub>4</sub>)</del>	<del>48</del>	<del>16</del>	<del>5</del>

~~**Verification:** The project owner/operator shall submit documentation of compliance with the emission limits in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~**AQ-22** The owner/operator shall not operate in start-up mode for both Gas Turbines (S-1 and S-3) simultaneously. (PSD)~~

~~**Verification:** The project owner/operator shall submit documentation of all start-up events as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~**AQ-23** The owner/operator shall design and construct the heat recovery steam generators (S-2 & S-4) and associated ducting such that an oxidation catalyst can be readily installed and properly operated if deemed necessary by the APCO or CPM to insure compliance with the CO and/or POC emission rate limitations of Conditions AQ-20(c), AQ-20(d) and AQ-20(f). (BACT)~~

~~**Verification:** Prior to the first firing of natural gas in either turbine the owner/operator shall provide as built drawings or other suitable proof of compliance with this Condition of Certification to the District and the CPM.~~

~~**AQ-24** The owner/operator shall not exceed the total combined emissions from the Gas Turbines and HRSGs (S-1, S-2, S-3, and S-4), including emissions generated during Gas Turbine start-ups and shutdowns for the following limits during any calendar day:~~

- (a) 1,364 pounds of NO<sub>x</sub> (as NO<sub>2</sub>) per day (CEQA)
- (b) ~~7,882 POUNDS OF CO PER DAY~~ (PSD)
- (c) 230 pounds of POC (as CH<sub>4</sub>) per day (CEQA)
- (d) 456 pounds of PM<sub>10</sub> per day (PSD)
- (e) 78 pounds of SO<sub>2</sub> per day (BACT)

**Verification:** The project owner/operator shall submit documentation of compliance with all emission limits specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition ~~AQ-36~~.

~~AQ-25~~ The owner/operator shall not exceed the cumulative combined emissions from the Gas Turbines and HRSGs (S-1, S-2, S-3, and S-4), Cooling Tower (S-5), Emergency Generator (S-6) and Fire Pump Engine (S-7), including emissions generated during gas turbine start-ups and shutdowns for the following limits during any consecutive twelve month period:

- (a) 134.6 tons of NO<sub>x</sub> (as NO<sub>2</sub>) per year (Offsets, PSD)
- (b) 584.2 tons of CO per year (Cumulative Increase, PSD)
- (c) 27.8 tons of POC (as CH<sub>4</sub>) per year (Offsets)
- (d) 86.4 tons of PM<sub>10</sub> per year (Cumulative Increase, PSD)
- (e) 12.2 tons of SO<sub>2</sub> per year (Cumulative Increase)

**Verification:** The project owner/operator shall submit documentation of compliance with all emission limits specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition ~~AQ-36~~.

~~AQ-26~~ The owner/operator shall not exceed 7 tons in any consecutive four quarters of sulfuric acid emissions (SAM) from P-1 and P-2. (Basis: PSD)

**Verification:** The project owner/operator shall submit documentation of compliance with all emission limits specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition ~~AQ-36~~.

~~AQ-27~~ The owner/operator shall not exceed the maximum projected annual toxic air contaminant emissions (per Condition ~~AQ-29~~) from the Gas Turbines and HRSGs combined (S-1, S-2, S-3, and S-4) for the following limits:

- ~~3,726~~ Pounds of formaldehyde per year
- ~~2,324~~ Pounds of acetaldehyde per year
- ~~218~~ Pounds of acrolein per year
- ~~461~~ Pounds of benzene per year
- ~~22.4~~ Pounds of specified polycyclic aromatic hydrocarbons (PAHs) per year unless the following requirement is satisfied:

The owner/operator shall perform a health risk assessment using the emission rates determined by source test and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. The owner/operator may request that the District and the CPM revise the carcinogenic compound emission limits specified above. If the



owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will result in a cancer risk of not more than 1.0 in one million, the District and the CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. [Toxic Risk Management Policy (TRMP).]

**Verification:** If prepared, the health risk analysis shall be submitted to the District and the CPM within sixty (60) days of the source test date. Otherwise, the project owner/operator shall submit documentation of compliance with all emission limits specified in this Condition of Certification as part of the January 30 Quarterly Air Quality Report each year required by the verification of Condition **AQ-36**.

**AQ-28** The owner/operator shall demonstrate compliance with Conditions **AQ-14** through **AQ-17**, **AQ-20(a)** through **AQ-20(d)**, **AQ-21**, **AQ-24(a)**, **AQ-24(b)**, **AQ-25(a)**, and **AQ-25(b)** by using properly operated and maintained continuous monitors (during all hours of operation including equipment Start-up and Shutdown periods) for all of the following parameters:

- (a) Firing Hours and Fuel Flow Rates for each of the following sources: S-1 & S-3 combined and S-2 & S-4 combined.
- (b) Carbon Dioxide (CO<sub>2</sub>) or Oxygen (O<sub>2</sub>) concentrations, Nitrogen Oxides (NO<sub>x</sub>) concentrations, and Carbon Monoxide (CO) concentrations at each of the following exhaust points: P-1 and P-2.
- (c) Ammonia injection rate at A-1 and A-2 SCR Systems
- (d) Steam injection rate at S-1 & S-3 Gas Turbine Combustors

The owner/operator shall record all of the above parameters every fifteen (15) minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each calendar day, the owner/operator shall calculate and record the total firing hours, the average hourly fuel flow rates, and average hourly pollutant emission concentrations.

The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

- (e) Heat Input Rate for each of the following sources: S-1 & S-3 combined and S-2 & S-4 combined.
- (f) Corrected NO<sub>x</sub> concentrations, NO<sub>x</sub> mass emissions (as NO<sub>2</sub>), corrected CO concentrations, and CO mass emissions at each of the following exhaust points: P-1 and P-2. Applicable to emission points P-1 and P-2, the owner/operator shall record the parameters specified in Conditions **AQ-28(e)** and **AQ-28(f)** at least once every fifteen (15) minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:
- (g) Total Heat Input Rate for every clock hour and the average hourly Heat Input Rate for every rolling 3-hour period.
- (h) On an hourly basis, the cumulative total Heat Input Rate for each calendar day for the following: each Gas Turbine and associated HRSG combined

and all four sources (S-1, S-2, S-3, and S-4) combined.

- (i) ~~The average NOx mass emissions (as NO<sub>2</sub>), CO mass emissions, and corrected NOx and CO emission concentrations for every clock hour and for every rolling 3-hour period.~~
- (j) ~~On an hourly basis, the cumulative total NOx mass emissions (as NO<sub>2</sub>) and the cumulative total CO mass emissions, for each calendar day for the following: each Gas Turbine and associated HRSG combined, and all four sources (S-1, S-2, S-3, and S-4) combined.~~
- (k) ~~For each calendar day, the average hourly Heat Input Rates, Corrected NOx emission concentrations, NOx mass emissions (as NO<sub>2</sub>), corrected CO emission concentrations, and CO mass emissions for each Gas Turbine and associated HRSG combined.~~
- (l) ~~On a daily basis, the cumulative total NOx mass emissions (as NO<sub>2</sub>) and cumulative total CO mass emissions, for the previous consecutive twelve-month period for all four sources (S-1, S-2, S-3, and S-4) combined.~~

(1-520.1, 9-9-501, BACT, Offsets, NSPS, PSD, Cumulative Increase)

**Verification:** ~~The project owner/operator shall submit documentation of each of the parameters specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

**AQ-29** ~~To demonstrate compliance with Conditions AQ-20(f), AQ-20(g), AQ-20(h), AQ-24(c) through AQ-24(e), AQ-25(c) through AQ-25(e), and AQ-26, the owner/operator shall calculate and record on a daily basis, the Precursor Organic Compound (POC) mass emissions, Fine Particulate Matter (PM<sub>10</sub>) mass emissions (including condensable particulate matter), Sulfur Dioxide (SO<sub>2</sub>) mass emissions, and sulfuric acid mist (SAM) mass emissions from each power train. The owner/operator shall use the actual Heat Input Rates calculated pursuant to Condition AQ-28, actual Gas Turbine Start-up Times, actual Gas Turbine Shutdown Times, and Energy Commission and District-approved emission factors to calculate these emissions. The calculated emissions shall be presented as follows:~~

- (a) ~~For each calendar day, POC, PM<sub>10</sub>, SO<sub>2</sub>, and SAM emissions shall be summarized for: each power train (Gas Turbine and its respective HRSG combined) and all four sources (S-1, S-2, S-3, and S-4) combined and~~
- (b) ~~On a daily basis, the 365-day rolling average cumulative total POC, PM<sub>10</sub>, SO<sub>2</sub>, and SAM mass emissions, for all four sources (S-1, S-2, S-3, and S-4) combined.~~

(Offsets, PSD, Cumulative Increase)

**Verification:** ~~The project owner/operator shall submit documentation of each of the parameters specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~**AQ-30** To demonstrate compliance with Condition **AQ-27**, the owner/operator shall calculate and maintain records on an annual basis of the maximum projected annual emissions of Acetaldehyde, Acrolein, Formaldehyde, Benzene, and Specified PAHs. Maximum projected annual emissions shall be calculated using the maximum Heat Input Rate of 34,670,088 MM Btu/year and the highest emission factor (pounds of pollutant per MM Btu of Heat Input) determined by any source test of the S-1 & S-3 Gas Turbines and/or S-2 & S-4 Heat Recovery Steam Generators. (TRMP)~~

~~**Verification:** The project owner/operator shall submit documentation of each of the parameters specified in this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition **AQ-36**.~~

~~**AQ-31** After start up of the RCEC, the owner/operator shall conduct a District approved source test on exhaust point P-1 or P-2 to determine the corrected ammonia ( $\text{NH}_3$ ) emission concentration to determine compliance with Condition **AQ-20(e)**. The source test shall determine the correlation between the heat input rates of the gas turbine and associated HRSG, A-1 or A-2 SCR System ammonia injection rate, and the corresponding  $\text{NH}_3$  emission concentration at emission point P-1 or P-2. The source test shall be conducted over the expected operating range of the turbine and HRSG (including, but not limited to minimum, 70%, 85%, and 100% load) to establish the range of ammonia injection rates necessary to achieve  $\text{NO}_x$  emission reductions while maintaining ammonia slip levels. Continuing compliance with Condition **AQ-20(e)** shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. (TRMP)~~

~~**Verification:** Initial source testing shall be completed within sixty (60) days of start-up. No later than twenty (20) working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this Condition. The District and the CPM will notify the Owner/Operator of any necessary modifications to the plan within twenty (20) working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within sixty (60) days of the source testing date.~~

~~**AQ-32** After start up of the RCEC and on an annual basis thereafter the owner/operator shall conduct a District approved source test on exhaust points P-1 and P-2 while each Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum load (including steam injection power augmentation mode) to determine compliance with Conditions **AQ-20(a)**, **(b)**, **(c)**, **(d)**, **(f)**, **(g)**, and **(h)**, while each Gas Turbine and associated Heat Recovery Steam Generator are operating at minimum load to determine compliance with Conditions **AQ-20(c)** and **(d)**, and to verify the accuracy of the continuous emission monitors required in Condition **AQ-27**. The owner/operator shall test for (as a minimum): water content, stack gas flow rate, oxygen concentration, precursor organic compound concentration and mass emissions, nitrogen oxide~~

concentration and mass emissions (as NO<sub>2</sub>), carbon monoxide concentration and mass emissions, sulfur dioxide concentration and mass emissions, methane, ethane, and particulate matter (PM<sub>10</sub>) emissions including condensable particulate matter. (BACT, offsets)

~~**Verification:** Initial source testing shall be completed within sixty (60) days of start-up. No later than twenty (20) working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this Condition. The District and the CPM will notify the Owner/Operator of any necessary modifications to the plan within twenty (20) working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within sixty (60) days of the source testing date.~~

~~**AQ-33** After start up of the RCEC and on a quarterly basis thereafter, the owner/operator shall conduct a District approved source test on exhaust points P-1 and P-2 while each Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum load (including steam injection power augmentation mode) to demonstrate compliance with the SAM levels in Condition AQ-26. The owner/operator shall test for (as a minimum) SO<sub>2</sub>, SO<sub>3</sub>, SAM and ammonium sulfates. After acquiring one year of source test data on these units, the owner/operator may petition the District to switch to annual source testing if test variability is low. (Basis: PSD Avoidance, SAM Periodic Monitoring)~~

~~**Verification:** Initial source testing shall be completed within sixty (60) days of start-up. No later than twenty (20) working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this Condition. The District and the CPM will notify the Owner/Operator of any necessary modifications to the plan within twenty (20) working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within sixty (60) days of the source testing date.~~

~~**AQ-34** After start up of the RCEC and on an biennial basis (once every two years) thereafter, the owner/operator shall conduct a District approved source test on exhaust point P-1 or P-2 while the Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum allowable operating rates to demonstrate compliance with Condition AQ-27. If three consecutive biennial source tests demonstrate that the annual emission rates calculated pursuant to Condition AQ-30 for any of the compounds listed below are less than the BAAQMD Toxic Risk Management Policy (TRMP) trigger levels shown, then the owner/operator may discontinue future testing for that pollutant:~~

Acetaldehyde	≤	72 pounds/year
Acrolein	≤	3.9 pounds/year

Benzene	≤	26.8 pounds/year
Formaldehyde	<	132 pounds/year
Specified PAHs	≤	0.18 pounds/year

**Verification:** ~~Initial source testing shall be completed within sixty (60) days of start-up. No later than twenty (20) working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this Condition. The District and the CPM will notify the Owner/Operator of any necessary modifications to the plan within twenty (20) working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within sixty (60) days of the source testing date.~~

**AQ 35** ~~The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section and the CPM prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section and the CPM in writing of the source test protocols and projected test dates at least seven (7) days prior to the testing date(s). As indicated above, the Owner/Operator shall measure the contribution of condensable PM (back half) to the total PM<sub>10</sub> emissions. However, the Owner/Operator may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. Source test results shall be submitted to the District and the CPM within sixty (60) days of conducting the tests. (BACT)~~

**Verification:** ~~The project owner/operator shall submit documentation of the procedures and results of each source test conducted as part of the Quarterly Air Quality Report required by the verification of Condition AQ 36.~~

**AQ 36** ~~The owner/operator of the RCEC shall submit all reports (including, but not limited to monthly CEM reports, monitor breakdown reports, emission excess reports, equipment breakdown reports, etc.) as required by District Rules or Regulations and in accordance with all procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies & Procedures Manual. (Regulation 2-6-502)~~

**Verification:** ~~The project owner/operator shall submit a Quarterly Air Quality Report (QAQR) for the preceding calendar quarter by January 30, April 30, July 30 and October 30 of each year. Each QAQR shall include, but not be limited to, a compliance matrix, a summary of operations activities, and a summary of all reports covered by this Condition. The January 30 report for each year shall include an annual summary of the four Quarterly Air Quality Reports covering the preceding calendar year. The reports shall be submitted to the California Energy Commission Compliance project Manager (CPM).~~

~~AQ-42~~ Prior to the issuance of the BAAQMD Authority to Construct for the RCEC, the owner/operator shall provide to the District valid emission reduction credit banking certificates in the amount of 154.8 tons/year of Nitrogen Oxides and 27.8 tons/year of Precursor Organic Compounds or equivalent as defined by District Regulations 2-2-302.1 and 2-2-302.2. (Offsets)

~~Verification:~~ The project owner/operator must submit all ERC documentation to the District and the CPM prior to the issuance of the BAAQMD Authority to Construct.

~~AQ-43~~ Pursuant to BAAQMD Regulation 2, Rule 6, section 404.1, the owner/operator of the RCEC shall submit an application to the BAAQMD for a major facility review permit within 12 months of the issuance of the PSD Permit. (Regulation 2-6-404.1)

~~Verification:~~ The owner/operator shall notify the CPM within ten (10) working days of any application for, issuance of, and/or modification to any permit pertaining to air quality.

~~AQ-44~~ Pursuant to 40 CFR Part 72.30(b)(2)(ii) of the Federal Acid Rain Program, the owner/operator of the RCEC shall not operate either of the gas turbines until either: 1) a Title IV Operating Permit has been issued; 2) 24 months after a Title IV Operating Permit Application has been submitted, whichever is earlier. (Regulation 2, Rule 7)

~~Verification:~~ The owner/operator shall notify the CPM within ten (10) working days of any application for, issuance of, and/or modification to any permit pertaining to air quality.

~~AQ-45~~ The owner/operate of the RCEC shall comply with the continuous emission monitoring requirements of 40 CFR Part 75. (Regulation 2, Rule 7)

~~Verification:~~ The project owner/operator shall submit documentation of compliance with this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.

~~AQ-46~~ The owner/operator shall take monthly samples of the natural gas at the RCEC facility. The samples shall be analyzed for sulfur content using District-approved laboratory methods or the owner/operator shall obtain certified analytical results from the gas supplier. The sulfur content test results shall retain records on site for a minimum of five years from the test date and shall be utilized to satisfy the requirements of 40 CFR Part 60, subpart GG. (cumulative increase)

~~Verification:~~ The project owner/operator shall submit documentation of compliance with this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.

~~AQ-47~~ The owner/operator shall install and maintain the high-efficiency mist eliminators with a maximum guaranteed drift rate of at least 0.0005 percent such that S-5 Cooling Tower minimizes the drift losses. The maximum total dissolved solids (TDS) measured at the base of the cooling towers or at the point of return to the

wastewater facility shall not be higher than 2,000 ppmw (mg/l). The owner/operator shall sample the water at least once per day. (PSD)

**Verification:** The project owner/operator shall submit documentation of compliance with this Condition of Certification, including a summary of all data collected in relation to this Condition, as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.

**AQ-48** The owner/operator shall perform a visual inspection of the cooling tower drift eliminators at least once per calendar year, and repair or replace any drift eliminator components that are broken or missing. Prior to the initial operation of the Russell City Energy Center, the owner/operator shall have the cooling tower vendor's field representative inspect the cooling tower drift eliminators and certify that the installation was performed in a satisfactory manner. Within sixty (60) days of the initial operation of the cooling tower, the owner/operator shall perform an initial performance source test to determine the PM<sub>10</sub> emission rate from the cooling tower to verify compliance with the vendor guaranteed drift rate specified in Condition AQ-47. The CPM may, in years five (5) and fifteen (15) of cooling tower operation, require the owner/operator to perform source tests to verify continued compliance with the vendor guaranteed drift rate specified in Condition AQ-47. (PSD)

**Verification:** The project owner/operator shall submit documentation of compliance with this Condition of Certification, including color photographs, as part of the January Quarterly Air Quality Report required by the verification of Condition AQ-36.

**AQ-49** The owner/operator shall fire the S-6 Emergency Generator exclusively on natural gas. (Toxics, Cumulative Increase)

**Verification:** The project owner/operator shall include documentation of natural gas fuel use of the S-6 Emergency Generator as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.

**AQ-50** The owner/operator shall operate the S-6 Emergency Generator for no more than 100 hours per year for the purpose of reliability testing or in anticipation of imminent emergency Conditions. Emergency Conditions are: (1) Failure of a regular power supply, or (2) involuntary curtailment of a power supply (where the utility that provides regular power has been instructed by the ISO to shed firm load, or where the utility has actually shed firm load). (Cumulative Increase)

**Verification:** The project owner/operator shall submit documentation of compliance with this Condition of Certification as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.

**AQ-51** The owner/operator equip the S-6 Emergency Generator with a non-resettable totalizing counter that records hours of operation. (BACT)

**Verification:** The project owner/operator shall make the project site available for inspection at any time by representatives of the District, ARB, USEPA and Energy Commission.

~~AQ-52 The owner/operator shall maintain the following monthly records in a District-approved log for at least 5 years and shall be made available to the District upon request: (BACT)~~

- ~~a. Total number of hours of operation for S-6 Emergency Generator~~
- ~~b. Fuel usage at S-6 Emergency Generator~~

~~**Verification:** The project owner/operator shall submit documentation of S-6 Emergency Generator hours of operation and fuel use as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~AQ-53 The owner/operator shall fire the S-7 Fire Pump Engine exclusively on diesel fuel having a sulfur content no greater than 0.05 percent by weight. (Toxics, Cumulative Increase)~~

~~**Verification:** The project owner/operator shall submit documentation S-7 Fire Pump Engine diesel fuel use and sulfur content certification as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~AQ-54 The owner/operator shall operate the S-7 Fire Pump Engine for no more than 30 hours per year for the purpose of reliability testing and non-emergency operation. (Toxics)~~

~~**Verification:** The project owner/operator shall submit documentation S-7 Fire Pump Engine hours of operation as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~AQ-55 The owner/operator shall equip the S-7 Fire Pump Engine with a non-resettable totalizing counter that records hours of operation. (BACT)~~

~~**Verification:** The project owner/operator shall make the project site available for inspection at any time by representatives of the District, ARB, USEPA and Energy Commission.~~

~~AQ-56 The owner/operator shall maintain the following monthly records in a District-approved log for at least five (5) years and shall make such records readily available for District inspection upon request: (BACT)~~

- ~~a. Total number of hours of operation for S-7 Fire Pump Engine~~
- ~~b. Fuel usage at S-7 Fire Pump Engine~~

~~**Verification:** The project owner/operator shall submit documentation of S-7 Fire Pump Engine hours of operation and fuel use as part of the Quarterly Air Quality Report required by the verification of Condition AQ-36.~~

~~AQ-57 The project owner/operator shall submit a copy of any proposed modifications to the Authority to Construct and/or Permit to Operate issued by the district, and shall provide a written description of any other air quality related permit modification to the CPM for review and approval.~~



~~If the CPM concurs with the process undertaken by, and the decision of, the local air district or other agency concerning any permit modifications, no Energy Commission action (amendment) will be required.~~

~~**Verification:** The project owner/operator shall submit a copy of any request to modify the local air district permits within five (5) days of filing the requested modification to the CPM. The project owner/operator shall provide a written description of any other proposed modification within ten (10) days to the CPM.~~

~~**AQ-58** The project owner/operator shall fully implement the PM<sub>10</sub> Mitigation Plan in cooperation with the Bay Area Air Quality Management District as outlined in the Amended PM<sub>10</sub> Mitigation Plan prepared by the Applicant and docketed on April 5<sup>th</sup>, 2001. All retrofits and replacements shall be completed within twenty-four (24) months of commencement of first turbine roll.~~

~~**Verification:** The project owner/operator shall submit a PM<sub>10</sub> Mitigation Progress Report as a part of each Quarterly Air Quality Report required by the verification of Condition AQ-36. Once all required emissions efforts have been completed, the Applicant shall submit a Final PM<sub>10</sub> Mitigation Report within sixty (60) days. The report shall provide detailed documentation of the entire mitigation effort including, but not limited to, funds spent and the exact number of fireplaces and wood stoves retrofit/replaced.~~

## REFERENCES

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- AD 2006a – AD/G. Darwin (tn: 38535).** Cover letter and CD for Modeling file for the Russell City Energy Center. 11/21/2006. Rec'd 12/04/2006.
- BAAQMD 2007 - Bay Area Air Quality Management District.** Notice Inviting Written Public Comment. 04/02/2007.
- CEC 2001a – Calpine Corp./Hildebrand (tn: 20373).** Application for Certification.
- CEC 2002a – California Energy Commission (tn: 26086).** Final Staff Assessment.
- CEC 2002b –California Energy Commission/Commissioners (tn:26635).** Commission Decision for Russell City - POS.
- CEC 2006a – California Energy Commission/J.Z. Scott (tn: 38766).** Russell City Energy Center Amendment Data Requests. 12/22/2006. Rec'd 12/22/2006.
- CH2MHILL 2007a – CH2MHILL/D.M. Davy (tn: 38948).** project owner's Responses to Staff Data Requests 1-52. Cover letter docketed, transmittal letter, and attached POS. 01/17/2007. Rec'd 01/17/2007.
- RC 2006a – Russell City/M. Hartfield (tn: 38410).** Petition for Amendment NO. 1, Russell City Energy Center.
- AD 2007a – AD/G. Darwin.** SOx/PM10 Offset Ratio Analysis. E-mail dated 5/4/2007.

## AIR QUALITY APPENDIX 1

### STAFF ESTIMATES OF THE RUSSELL CITY ENERGY CENTER EMISSIONS

#### Information provided by the project owner

1. Turbine's start up and shut down emissions (Appendix 3.1A, Table 3.1A-5):

Per turbine, per event	Cold Start	Warm Start	Hot Start	Shut Down
NOx (pounds)	480	240	240	80
VOC (pounds)	96	48	48	16
CO (pounds)	5,028	2,514	2,514	902
Duration (hour)	6	3	3	0.5

2. Turbine's normal operation (Table 3.1-3, Appendix 3.1A, Table 3.1A-4):

	Exhaust Gas Concentration (ppm)	Hourly per turbine lbs/hr	Daily both turbines lbs/day	Annual ton/yr
NOx	2.0	16.17 (ea.)	1,542.2	134.52
VOC	1.0	2.82	293.6	27.78
CO	4.0	19.69	10,764.8	584.18
SOx		6.2	297.6	12.2
PM10/PM2.5		9	432	74.68

3. Facility operating schedule would be 24 hours/day, 7 days/week, and 8,364 hours/year per turbine (RCEC 2007, pp. 3-5).

4. Facility estimated start up and shut down events would be one cold and on hot starts, two shut downs for each turbine per day. The maximum number of start up and shut down event would be about 104 cold and 520 hot starts and 614 shut downs a year (RCEC, 2007a, Table DR4-1).

5. ERCs provided

Company	Location	Cert.#	NOx (TPY)	VOC(TPY)	PM10(TPY)
PG&E	San Francisco	855	53.11		
Pacific Ref.	Hercules	815	49.864	28.5	
			51.825 (VOC for NOx)		
Total			154.8	28.5	

## Staff Estimates

### 1. Facility's operational profile

According to the project owner, each turbine can go through one cold, one hot, two shut down events, and the rest are normal operation. Thus for every 24 hour period, each turbine can experience 9 hours of start up (6 hours for cold and 3 hours for hot) and 1 hour of shut down (0.5 hour each). The normal hours of operation would be 14 hours.

On the annual basis, each turbine can go through 52 cold, 260 hot start-ups and 312 shutdown. Thus each year, the start up and shut down hours for each turbine are:

$$= 52(6\text{hr}) + 260(3\text{hr}) + 312(0.5\text{hr}) = 1,248 \text{ hours}$$

This leaves approximate 7,116 hours [(8,364 hours - 1,248 hours)] of normal steady state operation.

### 2. Facility's potential emissions

On a daily basis

$$\text{NOx} = 2 \text{ turbines } [1 \text{ cold}(480) + 1 \text{ hot}(240) + 2 \text{ SD}(80) + 14 \text{ hr}(16.17)] \\ = 2,213 \text{ lbs/day}$$

$$\text{VOC} = 2 [1(96) + 1(48) + 2(16) + 14(2.82)] = 431 \text{ lbs/day}$$

$$\text{CO} = 2 [1(5,028) + 1(2,514) + 2(902) + 14(19.69)] = 19,603 \text{ lbs/day}$$

$$\text{PM}_{10} = 24\text{hrs}[2(9 \text{ lbs/hr}) + 2.83^a \text{ lbs/hr}] = 500 \text{ lbs/day}$$

$$\text{SOx} = 24\text{hrs}[(4.38\text{EE}6 \text{ scf } (1\text{gr}^b / 100\text{scf}) / 7000\text{gr/lbs}) (64/32)] = 300 \text{ lbs/day}$$

#### Notes:

- Cooling tower PM<sub>10</sub> emissions.
- Staff estimates the facility's potential daily SO<sub>x</sub> emissions using the maximum 1 grain/100 scf sulfur content natural gas, and assumed full conversion of sulfur to sulfur dioxide.

On an annual basis

$$\text{NOx} = 2 \text{ turbines } [52\text{cold}(480) + 260\text{hot}(240) + 312\text{SD}(80) + 7116\text{hrs}(16.17)] \\ = 454,771 \text{ lbs/yr or } 227.4 \text{ TPY}$$

$$\text{VOC} = 2[52(96) + 260(48) + 312(16) + 7116(2.82)] = 85,062 \text{ lbs or } 42.5 \text{ TPY}$$

$$\text{CO} = 2[52(5,208) + 260(2,514) + 312(902) + 7116(19.69)] = 2,691,988 \text{ lbs} \\ \text{or } 1,346 \text{ TPY}$$

$$\text{PM}_{10}/\text{PM}_{2.5} = 8364\text{hrs}[2(9) + 2.83] = 174,222 \text{ lbs or } 87.1 \text{ TPY}$$

$$\text{SOx} = 8364\text{hrs}[4.38\text{EE}6(0.25\text{gr}/100)/7000](64/32) = 26,167 \text{ lbs or } 13.08 \text{ TPY}$$

### 3. Facility probable maximum daily emissions

Staff believes that the facility's estimated potential emissions (see above) would rarely happen in practice. For both gas turbines to undergo a sequence of a cold start-up, a shutdown, a hot re-start, operate for a few hours, then shut down again would require the facility to have breakdown immediately after restarting from an extended outage for maintenance. Staff explored the most probable daily emissions of ozone precursor emissions at the facility.

According to data from the project owner and operational data collected from other facilities currently in operation, staff found the following scenario to be the most probable operational profile for the RCEC facility. The facility would have a hot start in the morning, operate normally for about 14 hours and then shut down overnight. If this is the case, the facility's ozone precursors emissions would be calculated as:

$$\begin{aligned} \text{NOx} &= 2 \text{ turbines } [1 \text{ hot}(240) + 1 \text{ SD}(80) + 14 \text{ hr}(16.17)] \\ &= 1,093 \text{ lbs/day} \end{aligned}$$

$$\text{VOC} = 2 [1(48) + 1(16) + 14(2.82)] = 207 \text{ lbs/day}$$

### 4. What if the facility were built with GE Rapid Start process (see Victorville 2 Hybrid (07-AFC-1)?

The Victorville 2 Hybrid Power project is proposed to be built with GE turbines employing Rapid Start process. The start-up and shutdown NOx emissions guaranteed for the combustion turbines are 96 lbs per cold start-up, 40 lbs per hot start-up and 57 lbs per shutdown. Using these data, the RCEC worst case turbine/HRSG emissions would be:

$$\begin{aligned} \text{NOx} &= 2 \text{ turbines } [1 \text{ cold}(96) + 1 \text{ hot}(40) + 2 \text{ SD}(57) + 14 \text{ hr}(16.17)] \\ &= 950 \text{ lbs/day} \end{aligned}$$

### 5. What if the facility were built with Siemens-Westinghouse Benson Once Through Boiler (see City of Vernon (06-AFC-1)?

The City of Vernon Power project is proposed to be built with Siemens-Westinghouse 501FD turbines employing the Benson Once-through boiler. The start-up and shutdown emissions guarantee for the combustion turbines NOx emissions are 21.6 lbs per cold start-up, 28 lbs per hot start-up and 22 lbs per shutdown. Using these data, the RCEC worst case turbine/HRSG emissions would be:

$$\begin{aligned} \text{NOx} &= 2 \text{ turbines } [1 \text{ cold}(21.6) + 1 \text{ hot}(28) + 2 \text{ SD}(22) + 14 \text{ hr}(16.17)] \\ &= 640 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{VOC} &= 2 \text{ turbines } [1 \text{ cold}(20.5) + 1 \text{ hot}(32) + 2 \text{ SD}(10) + 14 \text{ hr}(2.82)] \\ &= 223 \text{ lbs/day} \end{aligned}$$

#### Most probable case

$$\begin{aligned} \text{NOx} &= 2 \text{ turbines } [1 \text{ hot}(32) + 1 \text{ SD}(10) + 14 \text{ hr}(2.82)] \\ &= 163 \text{ lbs/day} \end{aligned}$$

## AIR QUALITY APPENDIX 2

### STAFF ESTIMATES OF SOX TO PM10 TRADING RATIO

The project owner has provided staff with an analysis to support their proposed interpollutant trading ratio of 3 lbs of SOx to mitigate each new pound of PM10 emissions from the RCEC facility (AD-2007a). In this analysis, the project owner used a combination of measured and interpolated ambient concentration data of PM10 and its sulfates components in Fremont to derive an estimated interpollutant trading ratio ranging from of 6.37 to 8.11 SOx for every pound of PM10.

Believing that the ratio range derived for Fremont data was too high, the project owner attempted to determine a ratio that is representative for the whole surrounding area including Concord, Livermore and San Jose. Again using a combination of measured and interpolated ambient concentration data, the project owner derived an estimated ratio of 3.08 lbs of SOx for every new pound of PM10.

Staff does not believe that the analysis submitted by the project owner is accurate in representing the ambient conditions in the region because many of the ambient data used in the analysis are not measured data but interpolated data. Therefore, staff searched for additional measured data and attempt to replicate the project owner analysis to find a representative trading ratio of SOx for PM10. The staff method of analysis is identical to that submitted by the project owner (see AD-2007a), but the PM10 sulfate data points are based on actual ambient concentrations measured at Concord, San Pablo and San Francisco air monitoring stations. Staff calculations of the SOx for PM10 interpollutant trading ratio using actual measured data are show below in AIR QUALITY Appendix 2 Table 1.

**AIR QUALITY Appendix 2 Table 1**  
**SO<sub>2</sub>:PM10 Emissions Trade-Off Ratios Using Data Measured on 12-7-06**

Site	Total SO <sub>x</sub> ug/m <sup>3</sup> as SO <sub>2</sub>	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> ug/m <sup>3</sup>	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> 2H <sub>2</sub> O ug/m <sup>3</sup>	Range of Computed Trade-Off Ratios	Best Estimate
San Pablo	12.094	1.38	1.75	6.91:1 to 8.76:1	7.84:1
San Francisco	18.543	2.99	3.67	5.05:1 to 6.40:1	5.73:1
Concord	3.526	1.38	1.75	2.01:1 to 2.56:1	2.29:1
<b>Area Average</b>				<b>4.66:1 to 5.91:1</b>	<b>5.30:1</b>

Source: project owner's SOx to PM10 analysis (AD-2007a)

Staff's analysis shows that if the actual measured data were used, then the range of interpollutant trading ratios of SOx for PM10 is 4.66:1 to 5.91:1, which yields an average interpollutant trading ratio of 5.30:1.