

CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET
SACRAMENTO, CA 95814-5512
WWW.ENERGY.CA.GOV



DATE: June 28, 2010

TO: Interested Parties

FROM: Mary Dyas, Compliance Project Manager

**SUBJECT: Russell City Energy Center (01-AFC-7C)
Staff Analysis of Proposed Project Modifications**

On November 18, 2009, the Russell City Energy Company, LLC (RCEC) filed a petition with the California Energy Commission (Energy Commission) to amend the Energy Commission Decision for the Russell City Energy Center. On January 12, 2010, a letter was filed by RCEC eliminating one of the four proposed new laydown areas from the amendment. Staff has reviewed the amendment and prepared an analysis of the proposed changes.

The 600 megawatt project was certified on September 11, 2002, and amended on October 2, 2007. The project plans to begin construction in late summer 2010. The project is located in the City of Hayward, Alameda County.

The proposed modifications are to (1) add three new land parcels as construction worker parking and construction laydown areas. Their use for this purpose will terminate at the end of construction; (2) route the potable water supply and sanitary sewer pipelines to connect with the City lines at Depot Road instead of Enterprise Avenue. This new proposed route will be shorter and entirely within the existing licensed RCEC parcel; and (3) update the Air Quality Conditions of Certification to meet current best available control technology (BACT) standards for a number of pollutants, as established by the federal Prevention of Significant Deterioration (PSD) permit.

Energy Commission staff reviewed the petition and assessed the impacts of this proposal on environmental quality, public health and safety, and proposes revisions as noted in the attached analysis. It is staff's opinion that, with the implementation of the revised conditions in Air Quality and Cultural Resources, the project will remain in compliance with applicable laws, ordinances, regulations, and standards and that the proposed modifications will not result in a significant adverse direct or cumulative impact to the environment (Title 20, California Code of Regulations, Section 1769).

The amendment petition and staff's analysis have been posted on the Energy Commission's webpage at:

http://www.energy.ca.gov/sitingcases/russellcity_amendment/compliance/index.html.

The Energy Commission's Order (if approved) will also be posted on the webpage. Energy Commission staff intends to recommend approval of the petition at the August 11, 2010, Business Meeting of the Energy Commission. If you have comments on this proposed modification, please submit them to me at the address below prior to July 30, 2010.

Mary Dyas, Compliance Project Manager
California Energy Commission
1516 9th Street, MS-2000
Sacramento, CA 95814

Comments and questions may be submitted by fax to (916) 654-3882, or by e-mail to mdyas@energy.state.ca.us.

For further information on how to participate in this proceeding, please contact the Energy Commission Public Adviser's Office, at (916) 654-4489, or toll free in California at (800) 822-6228, or by e-mail at publicadviser@energy.state.ca.us. News media inquiries should be directed to the Energy Commission Media Office at (916) 654-4989, or by e-mail at mediaoffice@energy.state.ca.us.

Enclosure

RUSSELL CITY ENERGY CENTER (01-AFC-7C)

AIR QUALITY

Jacquelyn Leyva and Matthew Layton

INTRODUCTION

On November 18, 2009, Russell City Energy Center, LLC filed a petition with the California Energy Commission (Commission) to amend the Russell City Energy Center project (RCEC); a similar filing was made regarding renewal of the Authority to Construct (ATC) for RCEC with the Bay Area Air Quality Management District (District or BAAQMD) on October 21, 2009. The 600-megawatt (MW) natural gas-fired combined-cycle electric generating facility would be located in the City of Hayward in Alameda County. This project was certified on September 11, 2002, and amended on October 3, 2007, to relocate the facility approximately 1,300 feet northeast of the original location. The project has not begun construction.

The amendment request as it pertains to air quality would amend several air quality conditions in the RCEC Commission license so that they are consistent with the conditions in the federal Prevention of Significant Deterioration (PSD) permit. This Petition for Amendment includes the following components:

- Updating the Conditions of Certification concerning air quality to be consistent with the new lower limits established by the federal Prevention of Significant Deterioration (PSD) permit.
- Routing the potable water supply and sanitary sewer pipelines to connect via a shorter route to Depot Road instead of Enterprise Avenue.
- Adding four new parcels as construction worker parking and construction laydown areas. These sites will be used temporarily for construction worker parking and material laydown during the construction periods and their use for the purpose will terminate at the end of construction.

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

RCEC construction has been delayed while waiting the issuance (and resolution of appeals regarding) the federal PSD permit. This federal U.S. Environmental Protection Agency (EPA) permit was issued by BAAQMD¹ on February 3, 2010. Among other things, the PSD permit demonstrates compliance with the annual and 24-hour NAAQS PM_{2.5} standard, and provides a new Best Available Control Technology (BACT) analysis that requires lower project emission limits.

¹ BAAQMD issues the federal PSD permit “standing in the shoes of EPA,” on behalf of the EPA Administrator, pursuant to a delegation agreement with EPA. (See BAAQMD, 2008b, p. 5.)

The Air District has conducted an analysis of PM_{2.5}² and to the extent that PSD requirements apply to this facility, it complies with these requirements (BAAQMD, 2010d).

The PSD permit will not become final until all appeals to EPA's Environmental Appeals Board are resolved (BAAQMD 2010b). If any appeals are sustained, the permit may be remanded for further analysis or additional conditions.

Unless air districts have adopted PSD provisions into the State Implementation Plan, projects above certain emission thresholds must obtain federal PSD permits from EPA pursuant to the federal Clean Air Act and its implementing regulations, notwithstanding the Commission's licensing process.

A document titled *Additional Statement of Basis draft federal Prevention of Significant Deterioration Permit* was published by BAAQMD in August 2009. The District prepared this Additional Statement of Basis because it had undertaken additional analysis and consideration regarding Russell City after the initial Statement of Basis was issued. This additional analysis and consideration was undertaken for several reasons, including recent changes in federal PSD regulatory requirements, additional factual information that had become available since the initial Statement of Basis was prepared, comments received from members of the public during the initial comment period, and further discussions with the project applicant (BAAQMD 2009c).

The changes proposed in petition to amend, including re-routing the potable water supply and sanitary sewer pipelines and the new proposed worker parking and construction laydown areas, do not change compliance with air quality LORS.

This amendment incorporates all changes to the Conditions of Certification since the previously adopted Energy Commission Decision on October 3, 2007.

SETTING

EPA and the California Air Resources Board (ARB) have both established maximum allowable ambient air quality standards for criteria pollutants to protect public health. **Air Quality Table 1** summarizes the area's attainment status for various applicable current state and federal ambient air quality standards.

² See BAAQMD 2009c at pp. 80-92

**Air Quality Table 1
BAAQMD Attainment Status**

Pollutant	Averaging Time	California Status	Federal Status
Ozone (O ₃)	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 _x)	Annual	N/A	Attainment
	1 Hour	Attainment	N/A
Sulfur Dioxide (SO ₂)	Annual	N/A	Attainment
	24 Hour	Attainment	Attainment
	1 Hour	Attainment	N/A
PM ₁₀	Annual	Non-attainment	Attainment
	24 Hour	Non-attainment	Unclassified
PM _{2.5}	Annual	Non-attainment	Attainment
	24 Hour	N/A	Non-Attainment ^a

Notes:

^a EPA has designated the Bay Area as non-attainment for the 35 µg/m³ PM_{2.5} standard, effective December 2009.

Unclassified means the area is treated as it is attainment for regulatory purposes

N/A= no standard applies or not applicable

ANALYSIS

PROJECT EMISSION PROFILE CHANGES

The Commission's licensing decision includes specific daily and annual criteria pollutant emission limits. The proposed amendment would alter the facility's daily emission limits for certain pollutants to be consistent with the PSD permit requirements. Specifically, with respect to nitrogen dioxide (NO₂), carbon monoxide (CO), and particulate matter less than 10 microns in diameter (PM₁₀), the Conditions of Certification would be modified to be consistent with the more stringent current BACT limitations of the PSD permit.³ For precursor organic compounds (POC), particulate matter less than 2.5 microns in diameter (PM_{2.5}) and sulfur dioxide (SO₂) emissions, existing Conditions of Certification are consistent with current BACT requirements, and remain unchanged. In addition, the emissions associated with the new laydown and construction areas will not

³ EPA has recently promulgated a new ambient air quality standard for NO₂. That standard is applicable to all PSD permits issued after April 12, 2010, but is inapplicable to projects for which PSD permits were issued prior to that date. The PSD permit for RCEC was issued on February 3, 2010.

have any significant adverse environmental impacts on air quality. The use of these sites will be temporary and only during the construction period of the project. Changes to the water supply and sanitary sewer line route to connect with Depot Road also will not affect air emissions. No changes will be needed in plant equipment or method of operation. Therefore, no changes in Conditions of Certification will be required due to these project changes.

GREENHOUSE GAS EMISSIONS

Since the 2007 decision on the application amendment, the Energy Commission has included in its environmental assessment analysis whether greenhouse gas (GHG) emissions are a significant cumulative impact pursuant to the California Environmental Quality Act (CEQA). Such analysis considers the overall effect of adding a new generation facility to the existing electric generating system, and whether such effect has the resulting impact of decreasing or increasing GHG emissions from the existing baseline. This approach is consistent with the CEQA Guidelines. (Cal. Admin. Regs., tit. 14, § 15064.4.)

After considerable deliberation on this issue, the Commission has adopted a “precedent decision” that addresses the impacts of new power plant projects comprehensively. The recent Avenal Energy Project (CEC 2009d) Decision described the role of new natural gas facilities and describes why such facilities do not normally result in a significant cumulative impact with regard to GHG emissions. The Avenal Energy Project decision found that Avenal, a new natural-gas-fired plant certified by the Energy Commission, would:

- (a) Not increase overall system heat rate for natural gas plants, because it is more efficient;
- (b) Not interfere with generation from existing renewable facilities nor with integration of new renewable generation; and
- (c) Reduce system-wide GHG emissions and be consistent with the goals of AB 32.

The facts germane to GHG emissions that are applicable to the Avenal decision parallel those of RCEC. RCEC will have a thermal efficiency of 56.4 percent (BAAQMD 2010a, page 33), which is equivalent to a heat rate of 7,730 British Thermal Unit per kilowatt hour (BTU/kWh) higher heating value (HHV) averaged across all operating scenarios. The system-wide heat rate for California is currently about 9,750 BTU/kWh (CEC 2002a, page 5.3-2), equivalent to a thermal efficiency of about 35 percent. Since the Russell City Energy Center’s heat rate is less than the system wide heat rate, if and when RCEC operates, it will ordinarily displace less efficient, higher GHG-emitting generation, reducing system wide natural gas consumption and GHG emissions from California electricity production. Furthermore, Russell City’s dispatch capability would enable the project to provide system support for intermittent renewable generation resources as the state moves to achieve a goal of obtaining 33 percent of its electrical energy from renewable sources by 2020. Thus, the project would be consistent with the goals of AB 32 and California’s GHG reduction framework. For a more complete

discussion of these issues, see the Avenal Commission Final Decision (December 2009).

ANALYSIS OF SPECIFIC AMENDMENT REQUESTS

Lower the Emission Limit for Nitrogen Dioxide (NO₂), Carbon Monoxide (CO) and Particulate Matter less than 10 microns (PM10) to Reflect Changes to the PSD Permit

The applicant requests a revision of the permit limits for Nitrogen Dioxide (NO₂), Carbon Monoxide (CO) and Particulate Matter less than 10 microns (PM10) to be consistent with the District's federal PSD permit limits and incorporate current BACT requirements.

The proposed modification to Air Quality Condition of Certification **AQ-SC8** will now require an emission limit of 95 pounds per hot startup and 125 pounds per warm startup per event.

The proposed modification to Air Quality Condition of Certification **AQ-SC14** is removed because it is already required under the California Air Resources Board's mandatory reporting requirements under the California Global Warming Solutions Act of 2006 (AB 32) which was implemented in late 2008.

The proposed modification to Air Quality Condition of Certification **AQ-10** will decrease the PM10 emissions limits from 432 pounds per calendar day to 413 pounds per calendar day during the commissioning period, including shutdown and startup emissions.

The proposed modification to Air Quality Condition of Certification **AQ-19(c)** will lower the CO mass emission limits for all operating scenarios, including the duct burner firing mode and is a requirement of the federal PSD Permit. The CO mass emission limits will reduce from 20 pounds per hour to 10 pounds per hour and will decrease from 0.009 to 0.0045 pounds per Million British Thermal Units (MMBtu) when burning natural gas over a rolling 1-hour period rather than a 3-hour period. Similarly, the proposed modification to Air Quality Condition of Certification **AQ-19(d)** will lower the CO project emission concentration for all operating scenarios, including the duct burner firing mode. The CO limits are reduced from 4.0 parts per million by volume (ppmv) to 2.0 ppmv, on a dry basis corrected at 15 percent O₂, averaged over a 1-hour period rather than a 3-hour period.

The proposed modification to Air Quality Condition of Certification **AQ-19(h)** will lower the PM10 mass emission limits from 8.64 pounds per hour to 7.5 pounds per hour which is equivalent to a decrease from 0.0042 to 0.0036 pounds per MMBtu of natural gas use.

The proposed modification to Air Quality Condition of Certification **AQ-20** will reduce hot startup emission limits of NO_x (as NO₂) and CO as seen in **Table 2**, as required by the federal PSD permit. The emission limit will be 95 pounds per hot startup and 125

pounds per warm startup. Similarly, the proposed modification to Air Quality **AQ-20** will also reduce emission limits of CO for cold startup combustion tuning, hot startup and shutdown modes. The CO emission limits will decrease from 5,028 pounds per cold startup to 2,514 pounds per cold startup. The CO emission limits will decrease from 2,514 pounds per hot startup to 891 pounds per startup. Lastly, the CO emission limits will decrease from 902 pounds per shutdown to 100 pounds per shutdown.

AIR QUALITY Table 2 AQ-20 Emission Rates
(modified are in **BOLD**, removed limits are in ~~strikethrough~~.)

Pollutant	Cold Startup Combustion Tuning (lb/startup)	Hot Startup (lb/startup)	Warm Startup (lb/startup)	Shutdown (lb/shutdown)
NOx (as NO ₂)	480	425 95	125	40
CO	5,028 2,514	2,514 891	2,514	902 100
POC (as CH ₄)	83	35.3	79	16

The proposed modification to Air Quality Conditions of Certification **AQ-22(a), (c), & (e)** will make changes to NOx (as NO₂), CO, and PM10, respectively, all on a per day basis. **AQ-22(a)** reduces total combined emissions of the facility for NOx (as NO₂) from 1,553 pounds per day to 1,453 pounds per day. **AQ-22(c)** reduces total combined emissions of the facility for CO from a maximum of 10,774 pounds per day to a maximum of 7,360 pounds of CO per day. **AQ-22(e)** reduces the total combined emissions of the facility for PM10 from 626 pounds per day to 413 pounds per day.

The proposed modification to Air Quality Conditions of Certification **AQ-23(a), (b), & (d)** will make changes to NOx (as NO₂), CO, and PM10, respectively, on a tons per year basis, as required by the new PSD permit. **AQ-23(a)** reduces NOx (as NO₂) emissions from 134.6 tons per year to 127 tons per year of NOx (as NO₂). **AQ-23(b)** reduces CO emissions from 389.3 tons per year to 330 tons of CO per year. **AQ-23(d)** reduces PM10 emissions from 86.8 tons per year to 71.8 tons of PM10 per year.

The proposed modification to the Air Quality Conditions of Certification **AQ-26 (f) and (h)** will eliminate references to a rolling 3-hour rolling average.

The proposed modification to Air Quality Condition of Certification **AQ-44** reflects the lowered limit of total dissolved solids (TDS) measured at the base of the cooling towers from 8,000 parts per million by weight (ppmw) to 6,200 ppmw (expressed in milligrams per liter (mg/l)).

These revisions reflect the updated BACT limits and PSD requirements. They will not only decrease emission rates for various criteria pollutants; they will also decrease the facility's impact on ambient air quality.

Staff recommends accepting these revisions because the proposed modifications to the air quality Conditions of Certification are consistent with the current federal PSD permit to achieve the goal of meeting BACT requirements for the criteria pollutants as seen in **Air Quality Table 3** below. The revised BACT requirements are more stringent than those in the Energy Commission license as amended. The proposed modifications do not negatively impact air quality and will result in a beneficial change by adopting emission limits lower than the limits in the 2007 Commission Amendment Decision. Thus, the impact on air quality, if any, will be positive, and the proposed amendments do not result in any significant environmental impact.

Air Quality Table 3

Pollutant	BACT
NO _x	2.0 ppmvd* @ 15% O ₂ , 1-hour average SCR
CO	2 ppmvd* @ 15% O ₂ , 1-hour average Oxidation catalyst
POC	1.0 ppmvd* @ 15% O ₂ , 1-hour average Best combustion practices, Oxidation catalyst
SO ₂	Natural gas fuel with sulfur content <1.0 gr/100 scf
PM ₁₀	7.5 lb/hr Best combustion practices, natural gas fuel with sulfur content <1.0 gr/100 scf

* parts per million volume dry (ppmvd)

CONCLUSIONS AND RECOMMENDATIONS

- The amended project is expected to comply with applicable District rules and regulations, including federal PSD rules and regulations.
- The amended project would result in decreased emissions and air quality impacts and will be consistent with current federal PSD Permit and BACT requirements.
- Adoption of the proposed amendments regarding air quality will not result in any significant impact to the environment; moreover, any impact from lower pollutant emission limitations will in fact be positive.

AMENDED AND PROPOSED CONDITIONS OF CERTIFICATION

Below is a list of the revised Air Quality Conditions of Certification, which were originally contained in the Decision (CEC 2002b), and a brief discussion of the proposed changes. These changes to the conditions parallel the requirements in the federal PSD permit. Strikeout is used to indicate deleted language and **underline and bold** is used for new language.

Summary of revised Conditions of Certification:

- Revise Condition of Certification **AQ-SC8** to reflect a lower emission of NOx for a turbine hot startup.
- Delete **AQ-SC14** – reporting of GHG emission is now required under ARB’s mandatory greenhouse gas reporting requirements.
- Lower the PM10 limit in **AQ-10**.
- Lower the CO emissions limits in **AQ-19(c) & (d)**.
- Lower the PM10 emission limit in **AQ-19(h)**.
- Lower the NOx emission limit for hot startup in **AQ-20**.
- Lower the CO emissions limits for cold startup/combustion tuning, hot startup, and shutdown in **AQ-20**.
- Lower the NOx, CO, and PM10 emissions limits in **AQ-22(a), (c), & (e)**, respectively.
- Lower the NOx, CO, & PM10 emissions limits in **AQ-23(a), (b), & (d)**, respectively.
- Revise Condition of Certification **AQ-26 (f) and (h)** to eliminate references of rolling 3-hour period.
- Revise Conditions of Certification **AQ-44** to reflect the lowered limit of total dissolved solids (TDS) measured at the base of the cooling towers.

The revised Conditions of Certification and their verification requirements are as follows:

AQ-SC8 Turbine hot/warm startup NOx emissions shall not exceed 95 /125 pounds per startup event, respectively.

Verification: As part of the quarterly and annual compliance reports as required by **AQ-19**, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

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 CO2 and CH4 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 CO2 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 ₂	EPA Method 3A
CH ₄	EPA Method 18 (POC measured as CH ₄)

~~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 CO2, CH4 and N2O emissions using the appropriate fuel-based carbon content coefficient (for CO2) and the appropriate fuel-based emission factors (for CH4 and N2O).~~

~~The project owner shall convert the N₂O and CH₄ emissions into CO₂ equivalent emissions using the current IPCC Global Warming Potentials (GWP). The project owner shall maintain a record of all SF₆ that is used for replenishing on-site high voltage electrical equipment. At the end of each reporting period, the project owner shall total the mass of SF₆ used and convert that to a CO₂ equivalent emission using the IPCC GWP for SF₆. 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 CO₂ equivalent emission using the IPCC GWP.~~

~~On an annual basis, the project owner shall report the CO₂ and CO₂ equivalent emissions from the described emissions of CO₂, N₂O, CH₄, SF₆, PFCs, and HFCs.~~

~~**Verification:** The project annual GHG emissions shall be reported, as a CO₂ 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.~~

AIR DISTRICT CONDITIONS OF CERTIFICATION

Definitions:

Clock Hour:	Any continuous 60-minute beginning on the hour.
Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours.
Year:	Any consecutive twelve-month period of time
Heat Input:	heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf.
Rolling 3-hour period:	Any consecutive three hour period, not including startup or shutdown periods.
Firing Hours:	Period of time during which fuel is flowing to a unit, measured in minutes.
MM Btu:	Million British thermal units
Gas Turbine Warm and Hot Startup Mode:	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 AQ-20 19(b) and 20 19(d) .

Gas Turbine Cold Startup Mode:	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 initiated until the gas turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of Conditions of Certification AQ-20 19(b) and 20 19(d) .
Gas Turbine Shutdown Mode:	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 AQ-20 19(b) and 20 19(d) until termination of fuel flow to the gas turbine.
Gas Turbine Combustor Tuning Mode:	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 NOx and CO emissions. The SCR and oxidation catalyst are not operating during the tuning operation.
Gas Turbine Cold Startup:	A gas turbine startup that occurs more than 48 hours after a gas turbine shutdown.
Gas Turbine Hot Startup:	A gas turbine startup that occurs within 8 hours of a gas turbine shutdown.
Gas Turbine Warm Startup:	A gas turbine startup that occurs between 8 hours and 48 hours of a gas turbine shutdown.
Specified PAHs:	The polycyclic aromatic hydrocarbons listed below shall be considered to be Specified PAHs for these permit conditions. Any emissions limits for Specified PAHs refer to the sum of the emissions for all six of the following compounds: <ul style="list-style-type: none"> Benzo[a]anthracene Benzo[b]fluoranthene Benzo[k]fluoranthene Benzo[a]pyrene Dibenzo[a,h]anthracene Indeno[1,2,3-cd]pyrene
Corrected Concentration:	The concentration of any pollutant (generally NOx, CO, or NH3) corrected to a standard stack gas oxygen concentration. For emissions 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 percent O2 by volume on a dry basis.
Commissioning Activities:	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 turbine, heat recovery steam generators, steam turbine, and associated electrical delivery systems during the commissioning period.

Commissioning Period: The period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when a gas turbine is first fired, whichever occurs first. The period shall terminate when the plants has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange.

Precursor Organic Compounds (POCs): Any compounds of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

CPM: California Energy Commission Compliance Program Manager

RCEC: Russell City Energy Center

AQ-10 Conditions for Commissioning Period

The project owner 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 startup and shutdown of the gas turbines (S-1 & S-3).

NOx (as NO ₂)	4,805 pounds per calendar day	400 pounds per hour
CO	20,000 pounds per calendar day	5,000 pounds per hour
POC (as CH ₄)	495 pounds per calendar day	--
PM10	432 413 pounds per calendar day	--
SO ₂	298 pounds per calendar day	--

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

AQ-19

The project owner 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 startup, combustor tuning operation or shutdown. (BACT, PSD, and Regulation 2, Rule 5)

(a) Nitrogen oxide mass emissions (calculated as NO₂) 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 NO₂) 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 percent O₂, averaged over any 1-hour period. (BACT for NO_x)

(c) Carbon monoxide mass emissions at P-1 and P-2 each shall not exceed ~~20~~ **10** pounds per hour or ~~0.009~~ **0.0045** lb/MM BTU of natural gas fired, averaged over any ~~rolling 3-1~~ hour period. (PSD for CO)

(d) The carbon monoxide emission concentration at P-1 and P-2 each shall not exceed ~~4.0~~ **2.0** ppmv, on a dry basis, corrected to 15 percent O₂, averaged over any ~~rolling 3-1~~ hour period. (BACT for CO)

(e) Ammonia (NH₃) emission concentrations at P-1 and P-2 each shall not exceed 5 ppmv, on a dry basis, corrected to 15 percent O₂, 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 CH₄) 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 (SO₂) mass emissions at P-1 & P-2 each shall not exceed 6.21 pounds per hour or 0.0028 lb/MM BTU of natural gas fired. (BACT)

(h) Particulate matter (PM₁₀) mass emissions at P-1 & P-2 each shall not exceed ~~8.64~~ **7.5** pounds per hour or ~~0.0042~~ **0.0036** lb PM₁₀ MM BTU of natural gas fired. ~~when the HRSG duct burners are not in operation.~~

~~Particulate matter (PM10) 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_x 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_x, CO, PM10, POC and SO_x (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 project owner shall ensure that the regulated air pollutant mass emission rates from each of the gas turbines (S-1 & S-3) during a startup does not exceed the limits established below. The project owner shall not operate both of the Gas Turbines (S-1 & S-3) in Startup Mode at the same time⁴. (PSD, CEC Conditions of Certification)

Pollutant	Cold Startup Combustion Tuning (lb/startup)	Hot Startup (lb/startup)	Warm Startup (lb/startup)	Shutdown (lb/shutdown)
NOx (as NO ₂)	480	425 95	125	40
CO	5,028 2,514	2,514 891	2,514	902 100
POC (as CH ₄)	83	35.3	79	16

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 project owner 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 startups, combustor tuning, and shutdowns to exceed the following limits during any calendar day:

- (a) ~~4,553~~ **1,453** pounds of NOx (as NO₂) per day. (Cumulative Emissions)
- (b) 1,225 pounds of NOx per day during ozone season from June 1 to September 30. (CEC Condition of Certification)
- (c) ~~40,774~~ **7,360** pounds of CO per day (PSD)
- (d) 295 pounds of POC (as CH₄) per day (Cumulative Emissions)
- (e) ~~626~~ **413** pounds of PM10 per day (PSD)
- (f) 292 pounds of SO₂ 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**.

⁴Included in the PSD permit, however was not included as part of the applicant's change requests.

AQ-23 The project owner 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 startups, combustor tuning, and shutdowns to exceed the following limits during any consecutive twelve-month period:

- (a) ~~434.6~~ **127** tons of NO_x (as NO₂) per year (Offsets, PSD)
- (b) ~~389.3~~ **330** tons of CO per year (Cumulative Increase, PSD)
- (c) 28.5 tons of POC (as CH₄) per year (Offsets)
- (d) ~~86.8~~ **71.8** tons of PM₁₀ per year (Cumulative Increase, PSD)
- (e) 12.2 tons of SO₂ 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-26 The project owner 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 startup, 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 (O₂) concentration, Nitrogen Oxides (NO_x) 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 project owner 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 project owner shall calculate and record the total firing hours, the average hourly fuel flow rates, and pollutant emission concentrations.

The project owner 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_x concentration, NO_x mass emission rate (as NO₂), 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 project owner 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 project owner 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_x mass emission rate (as NO₂), CO mass emission rate, and corrected NO_x and CO emission concentrations for every clock hour ~~and for every rolling 3-hour period.~~

(i) on an hourly basis, the cumulative total NO_x mass emissions (as NO₂) 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_x emission concentration, NO_x mass emission rate (as NO₂), 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_x mass emissions (as NO₂) 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.

Permit Conditions for Cooling Towers

AQ-44 The project owner shall properly install and maintain the S-5 cooling tower to minimize drift losses. The project owner shall equip the cooling tower with high-efficiency mist eliminators with a maximum guaranteed drift rate of 0.0005 percent. 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 **6,200** ppmw (mg/l). The project owner 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.

ACRONYMS

<u>AAQS</u>	<u>Ambient Air Quality Standard</u>
<u>AB</u>	<u>Assembly Bill</u>
<u>AFC</u>	<u>Application for Certification</u>
<u>AQMD</u>	<u>Air Quality Management District</u>
<u>ARB</u>	<u>California Air Resources Board</u>
<u>ATC</u>	<u>Authority to Construct</u>
<u>BAAQMD</u>	<u>Bay Area Air Quality Management District</u>
<u>BACT</u>	<u>Best Available Control Technology</u>
<u>CEC</u>	<u>California Energy Commission (or Energy Commission)</u>
<u>CFR</u>	<u>Code of Federal Regulations</u>
<u>CO</u>	<u>Carbon Monoxide</u>
<u>CO₂</u>	<u>Carbon Dioxide</u>
<u>CPM</u>	<u>(CEC) Compliance Project Manager</u>
<u>GHG</u>	<u>Greenhouse Gas</u>
<u>lbs</u>	<u>Pounds</u>
<u>LORS</u>	<u>Laws, Ordinances, Regulations and Standards</u>
<u>mg/L</u>	<u>Milligram per liter</u>
<u>MW</u>	<u>Megawatt (1,000,000 Watts)</u>
<u>NAAQS</u>	<u>National Ambient Air Quality Standard</u>
<u>NO</u>	<u>Nitric Oxide</u>
<u>NO₂</u>	<u>Nitrogen Dioxide</u>
<u>NO_x</u>	<u>Oxides of Nitrogen</u>
<u>NSPS</u>	<u>New Source Performance Standard</u>
<u>NSR</u>	<u>New Source Review</u>
<u>O₂</u>	<u>Oxygen</u>
<u>O₃</u>	<u>Ozone</u>
<u>PM</u>	<u>Particulate Matter</u>
<u>PM₁₀</u>	<u>Particulate Matter less than 10 microns in diameter</u>
<u>PM_{2.5}</u>	<u>Particulate Matter less than 2.5 microns in diameter</u>
<u>ppm</u>	<u>Parts Per Million</u>
<u>ppmv</u>	<u>Parts Per Million by Volume</u>
<u>PSD</u>	<u>Prevention of Significant Deterioration</u>
<u>PTO</u>	<u>Permit to Operate</u>
<u>RCEC</u>	<u>Russell City Energy Center (project)</u>
<u>RCEC LLC.</u>	<u>Russell City Energy Center, LLC (applicants)</u>
<u>SO₂</u>	<u>Sulfur Dioxide</u>
<u>SO_x</u>	<u>Oxides of Sulfur</u>
<u>TDS</u>	<u>total dissolved solids</u>
<u>µg/m³</u>	<u>microgram per cubic meter</u>
<u>U.S.EPA</u>	<u>United States Environmental Protection Agency</u>
<u>VOC</u>	<u>Volatile Organic Compounds</u>

REFERENCES

- BAAQMD 2010a – Bay Area Air Quality Management District. Draft **“Prevention of Significant Deterioration” Permit, Russell City Energy Center**. Received **February 5, 2010**
- BAAQMD 2008b – Bay Area Air Quality Management District. Statement of Basis for Draft Amended Federal **“Prevention of Significant Deterioration” Permit, Russell City Energy Center**. December 8, 2008
- BAAQMD 2009c – Bay Area Air Quality Management District. Additional Statement of Basis Draft Federal **“Prevention of Significant Deterioration” Permit, Russell City Energy Center**. August 3, 2009
- BAAQMD 2010d – Bay Area Quality Management District. **Responses to Public Comments Federal “Prevention of Significant Deterioration” Permit**. Dated February 2010.
http://www.baaqmd.gov/~media/Files/Engineering/Public%20Notices/2010/15487/PSD%20Permit/B3161_nsr_15487_res-com_020410.ashx
- CEC 2002a - California Energy Commission, Final Staff Assessment of the Russell City Energy Center Power Plant Project (01-AFC-07). June 10, 2002.
- CEC 2001b - California Energy Commission, Commission Final Decision of the Russell City Energy Center Power Plant Project (01-AFC-07). July 31, 2002.
- CEC 2007c - California Energy Commission, [Commission's Final Decision on Amendment](#) of the Russell City Energy Center Power Plant Project (01-AFC-07C). October 2007. RCEC 2009 – Russell City Energy Company, LLC. Petition to Amend Air Quality Conditions in the Russell City Energy Center Power Plant Project Final Decision. Received 11/17/2009.
- CEC 2009d – California Energy Commission, Final Commission Decision of the Avenal Energy facility (08-AFC-1), CEC-800-2009-006-CMF, December 2009.
- EPA Guidance, 2010e – Environmental Protection Agency, Memorandum: Applicability of the Federal Prevention of Significant Deterioration Permit Requirements to New and Revised National Ambient Air Quality Standards, April 1, 2010.

**RUSSELL CITY ENERGY CENTER (01-AFC-7C)
CULTURAL RESOURCES
Dorothy Torres**

INTRODUCTION

Petition to Amend Number 2 (Petition), submitted by Russell City Energy Center proposed to add four new parcels to serve as construction worker parking and construction laydown areas. On January 12, 2010, the project owner sent a letter asking that the City of Hayward Finger Parcel be removed from consideration as a laydown, or parking area. This analysis will address the remaining three parcels proposed for this amendment.

The Petition also proposed a change in the permitted route of the potable water supply and sanitary sewer pipelines to connect with Depot Road lines rather than Enterprise Avenue. The change in the route of the pipelines would shorten the routes and stay within the permitted boundaries of the project. Since the proposed new routes to Depot Road are within the boundaries of the permitted project that was previously assessed for cultural resources, this change does not affect cultural resources conditions of certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS) COMPLIANCE

Staff has reviewed the petition for potential environmental effects and consistency with applicable LORS. Based on this review, staff determined that there are no new or changed LORS that would be applicable to the proposed project.

ANALYSIS

The three proposed construction and laydown areas would be located on the Tompkins, Zanette, and Chess parcels. The parcels were surveyed by a cultural resources consultant to the project owner on October 23, 2009. The newly proposed Tompkins, Zanette, and Chess parcels all had a considerable amount of debris, gravel, concrete, or asphalt covering their surfaces, resulting in poor visibility during the survey. In addition, the towers for the Eastshore-Grant Transmission Line (site P-01-002269), are situated near the southeast corner and northeast corner of the parcel. The transmission line would be avoided by the project, and impacts to the setting of the Eastshore-Grant Transmission Line would not be affected because the project is proposed in an area where there is already considerable industrial development.

No known cultural resources would be affected by the proposed project amendments. There is a potential to discover subsurface archaeological sites or artifacts because the seashore was a likely location for prehistoric and historic habitation, and subsistence activities. Condition of Certification **CUL-7** requires monitoring during removal of debris, or ground clearing for areas of the original project and the three newly proposed parcels where visibility was limited during surveys. If the cultural resources conditions of

certification are properly implemented, any impacts to newly discovered cultural resources would be reduced to a less than significant level.

CUMULATIVE IMPACTS

A cumulative impact refers to a proposed project's incremental effect together with that of 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). Reconductoring of the existing transmission line from the Eastshore Substation to the Dumbarton Substation is proposed to facilitate movement of additional electricity supply. Proponents for the Eastshore to Dumbarton reconductoring, and other future projects in the Amendment No. 2 area can mitigate impacts to as yet undiscovered subsurface archaeological deposits to less than significant by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the California Register of Historical Resources or National Register of Historic Places). Staff's proposed Conditions of Certification would ensure that the proposed project's incremental effect is not cumulatively considerable.

CONCLUSIONS AND RECOMMENDATIONS

Amendment 2 would not affect any previously identified cultural resources. Due to poor ground surface visibility, an attempt to survey the ground surface of newly proposed construction/laydown areas did not yield conclusive results regarding the presence of cultural resources. To ensure identification, evaluation, and appropriate mitigation of newly discovered resources, staff has added the three parcels proposed by this amendment to **CUL-7**. The proposed project changes will not impact known cultural resources. Implementation of the previously adopted cultural resources Conditions of Certification **CUL-1** through **CUL-7** would serve to mitigate any impacts to newly discovered significant cultural resources.

PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

CUL-7 Prior to any form of debris removal, ground clearing, or grading at the Aladdin Parcel, Tomkins Parcel, Zanette Parcel, Chess Parcel, Transmission Line Route Alternative 2, and portions of Alternative 1 subject to ground disturbance, the CPM shall be informed via e-mail or other method acceptable to the CPM, that debris removal, ground clearing, or grading is about to occur. The project owner shall ensure that the CRS, alternate CRS, or CRM(s) monitors full time (one person monitoring each large piece of machinery) during the removal of old vehicles, storage containers, gravel, debris, and overburden and during grading at the Aladdin Parcel, Tomkins Parcel, Zanette Parcel, Chess Parcel, at Transmission Line Route Alternative 1 locations where ground disturbance is likely, and along Transmission Line

Route Alternative 2. If there is a discovery during the removal process, then the Cultural Resources conditions of certification shall apply.

After removal of the various kinds of debris obscuring the ground surface, the CRS shall examine cleared ground as it is revealed, or conduct or oversee an archaeological pedestrian survey of the project site and linear locations not previously surveyed. If there is a discovery during the examination or survey, then the Cultural Resources conditions of certification shall apply. After completion of each examination or pedestrian archaeological survey, and prior to any grading or ground disturbance, a letter report from the CRS identifying monitoring and survey personnel and detailing the examination or survey methods, procedures, and results shall be provided to the CPM for review and approval.

Verification: One week prior to any form of debris removal, ground clearing or grading at the Aladdin Parcel, Tomkins Parcel, Zanette Parcel, Chess Parcel, Alternative 2 transmission line route, and Alternative 1 Transmission Line Route where there may be ground disturbance, the project owner shall inform the CPM via e-mail, or another method acceptable to the CPM, that the debris removal, ground clearing, or grading will begin within one week and that the CRS, alternate CRS or CRM(s) are available to monitor. No later than one week after completion of each cleared earth examination or survey, and prior to any additional grading or ground disturbance, a letter report identifying survey personnel and detailing the methods, procedures, location, and results of the examinations or surveys shall be provided to the CPM for review and approval.