DOCKET
07-AFC-3
DATE JUN 30 2010
RECD. JUN 30 2010

Shana Lazerow
COMMUNITIES FOR A BETTER ENVIRONMENT
1440 Broadway, Suite 701
Oakland, California 94612
T: (510) 302-0430 x 18
F: (510) 302-0438
slazerow@cbecal.org

STATE OF CALIFORNIA
ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of: Application for Certification for the CPV SENTINEL ENERGY PROJECT	**Docket No. 07-AFC-03** UPDATED EXPERT DECLARATION OF JULIA MAY REGARDING EMISSION REDUCTION CREDITS DOCUMENTATION OFFERED BY SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

1. I am a Senior Scientist at Communities for a Better Environment (CBE). I am authorized to give the following testimony concerning documentation offered by the South Coast Air Quality Management District (AQMD) purporting to document reductions in emissions. The facts set forth herein are based on my personal knowledge, unless indicated as being based on information and belief. The opinions set forth herein are based on my experience and upon my review of the documents presented. Should additional relevant or pertinent information become available, I reserve the right to supplement the discussion and findings in this report. If called upon, I could and would testify truthfully to these matters.

INTRODUCTION

2. The following supplements my Expert Declaration of June 15, 2010. Please refer to that document for the basis, background, analysis, footnotes, citations and attachments, further discussed and supplemented below.

3. One finding of my updated report (among other issues identified below), is that:
    a. When updated PM emissions factors for controlled facilities identified by the AQMD and AP42 were applied to sandblasting, cement, and aggregate processing facilities,

b. When a specific PM10 BACT level as identified in the proposed Contra Costa Generating Station in Oakley, California power plant was applied to power plants, and

c. When additional reductions in credits identified in my previous declaration are tallied,

then about 47,000 or more lbs/year in PM10 credits disappeared out of the updated AQMD figure of almost 138,000 lbs/year. This is my conclusion after an evaluation of these particular problems for about a dozen facilities out of the greater than four dozen facilities used for the generation of credits. Scrutiny of those other facilities for the same problems is likely to further reduce credits, if the same principles are met – such as only using credits at emissions levels met by current control standards and BACT, and removing credits where there are data gaps in existing records for those credits.

UPDATED EVALUATION

Discounting credits from sandblasting, cement and aggregate processing

4. Activities that generated large numbers of credits in the AQMD updated list included sandblasting, cement, and aggregate processing plants. Credits for these facilities were calculated by the AQMD using AER data on throughput and emissions factors. These emissions factors were frequently much larger than updated emissions factors listed for the same activities when pollution controls are applied as identified in AP42 and AQMD documents. If updated emission factors were applied, the emissions and credits would be much lower, as shown in the following calculations and summarized in Table 4. Although the updated Emissions Factors (EFs) are much lower than the factors used in the AQMD AER for these outdated facilities, they do not likely represent BACT (since, for example, the AP42 documents forming the basis of these EFs were published in the 1990s).

5. I did not attempt to identify current BACT levels for each of these operations from the large number of similar facilities in existence in the U.S. However, using the AP42 and AQMD EFs for controlled facilities identified below still results in greatly reduced emissions and resultant credits generated.

6. Statewide Sandblasting – This facility, with a permit dated 1981 in the AQMD Offset Verification sheet, provided 3,748 PM10 from two abrasive blasting sources. One unit had an Emission Factor (EF) of 33.5 lbs PM/ton throughput, and another had 16.5 lbs/ton.[1] The types of sandblasting are not specified in the Offset Calculation sheet, but metal sandblasting is a very common type. The AP42 metal sandblasting EFs (published 1997[2]) list “Abrasive blasting of unspecified metal parts, controlled with a fabric filter” at 0.69 lbs total PM /1000 lbs abrasive.

---

[1] Attached to my previous declaration as JMay Attachment 11 Statewide Sandblasting AQMD Offset Calcs.pdf

[2] Attached as Updated JMay attachmt 01 AP42 Abrasive Blasting c13s02-6

Since a ton is 2000 lbs, this EF is equivalent to 1.38 lbs PM / ton throughput. Replacing the high EFs used in the AQMD AER sheets with 1.38 lbs PM/ton instead of 33.5 or 16.5, results in a total of emissions for each unit of 178 lbs PM10 for the two units (still using the AQMD assumption that PM10 is 50% of PM emissions).[3]

7. **Gateway Sandblasting,** with a permit in the Offset Verification sheet dated 1989, used an EF for sandblasting of 40 lbs PM/ton (Offset Verification AER form), even higher than the EFs used above for Statewide Sandblasting, resulting in 2,386 lbs/year of credits from the sandblasting portion of the operations (not including an additional smaller amount from a portable IC engine). Applying the AP42 metal sandblasting EF of 1.38 lbs PM / ton cited above to the abrasive blasting source results in an EF 29 times lower (= 40/1.38), still using the AQMD assumption that PM10 is half the total PM emissions, or 82 lbs. PM10 per year. Also note from my previous declaration that the inspection for this facility failed to verify shutdown.

8. **Elsinore Ready-Mix** (the earliest permit in the Offset Verification sheet was dated 1987[4]). This facility generated 1,290 lbs/year of PM10 credits from Concrete Batch Equipment, using an EF listed at **10 lbs/ton throughput**, from the Offset Verification sheet AER form for Concrete and Asphalt batch processing activities. Instead of using the historically applied emissions factors for this facility, there are updated EFs available on the AQMD website. These provide a current guidance document (June 2007)[5] with a much lower set of PM emissions factors for asphalt, cement, concrete, and aggregate activities, for the purpose of calculating AER emissions including concrete batch operations.

9. Batching is a process of measuring and mixing ingredients for a concrete batch.[6] Since the Offset Verification sheet separately lists emissions for handling operations of Sand and Concrete, the Concrete and Asphalt batch processing emissions which generate the credits likely excludes these activities, but the specific activities originally included in batching at Elsinore are not identified in the Offset Verification sheet. As a result, I identified all the activities listed for concrete batching operations in the SCAQMD 2007 guidance, and used the highest EF in recalculating credits, since throughput for each separate concrete batch activity is not provided in the Elsinore Offset Verification sheets. This will likely overestimate the number of operations and emissions when the activities are controlled, but even so, controlled emissions results are much lower than claimed as credits as a result of this company's shutdown.

---

[3] 182 +42 + 8 tpy throughput for each unit x 1.38 lbs/ton (2005-2006), averaged with 200 +83 tpy throughput for each unit x 1.38 lbs/ton. Average is divided by two (still using AQMD assumption that PM10 = 1/2 PM total) = 178 lbs PM10 for two units. Throughput numbers are as entered in Offset Verification form, AER forms, 3rd and 4th pages.

[4] Attached to previous declaration as JMay Attachment 12 Elinsore Ready Mix AQMD Offset Calcs.pdf

[5] *Particulate Matter (PM) Emission Factors For Processes/Equipmenit at Asphalt, Cement, Concrete, and Aggregate Product Plants*, June 2007, http://www.aqmd.gov/webappl/Help/AER/0607_Aggregate_Guidance_R1156_1157.pdf , attached as Updated JMay attachmt 02 AQMD_Aggregate_Guidance_R1156_1157

[6] *"Batching is the process of weighing or volumetrically measuring and introducing into a mixer the ingredients for a batch of concrete."* http://www.tpub.com/content/engine/14080/css/14080_159.htm

10. The AQMD guidance lists for controlled operations for Concrete Batching -- Conveyor/Loading of Sand and Aggregate (respectively **0.00011 and 0.00035 lbs/ton**), Weight Hopper/Surge Bin (**0.00026 lbs/ton**), Silos – Cement (**0.00099 lbs/ton**), Silos - Cement supplements (fly ash) (**0.0089 lbs/ton**), and Concrete Truck Mix Loading (**0.0568 lbs/ton**), or Central Mix Loading (**0.0173 lbs/ton**). Applying even the highest of these (0.0568 lbs/ton), to the entire throughput amounts per year for concrete batch operations listed in the AER, means that emissions are reduced by a factor of about 176 times lower compared to using the AER EF of 10 lbs/ton. Applying this generous formula would generate credits of 7.3 lbs/year of PM10 credits (= 1290 lbs/year / 176).

11. These calculations not only show that current emissions factors for such operations are greatly lower than those historically used, it also shows that the specific operations involved in the credits generation are documented in an extremely general manner. It leaves us with questions – how much PM10 emission in the total came from introduction of aggregate? Cement? Supplemental materials? How much of the total PM10 came from actual measuring and mixing of the concrete batch, and how much came from associated activities (conveying these materials to and from the mixing process)? Was the batching done in Central Mixing equipment, or at individual trucks? These activities are apportioned different emissions levels according to the AQMD guidance document, but in the historical document, only one lump emission factor is provided for the whole batching operation. Furthermore, the AQMD guidance document states that the EFs used include certain assumptions about factors such as moisture content for materials and wind speed, which affect emissions. The Offset Verification identifies neither these conditions, nor the percentage of different components making up the concrete batch. Given all this, it is not possible with the historical information provided to accurately verify the emissions associated with this facility. It is, however, easy to see that according to the AQMD guidance document, modern facilities should meet a greatly lower level of emissions than were credited from shutdown of Elsinore Ready-Mix.

12. **Chandler Aggregates** was permitted in 1996 according to the Offset Verification sheet.[7] Credits were generated for an Aggregate Processing System in the amount of 2907 lbs/yr, using an EF from the AQMD AER of **11.8727 lbs /1000 tons**. The attached permit in the Offset Verification sheet lists various crushing, conveying, and screening activities (7th page). The AQMD *Particulate Matter (PM) Emission Factors For Processes/Equipment at Asphalt, Cement, Concrete, and Aggregate Product Plants"* provides a variety of EFs for controlled operations for aggregate processing including conveyors (0.00012 lbs/ton = **0.12 lbs/1000 tons**), crushing and screening (varying from 0.0031 to 0.0083 lbs/ton, or **3.1 to 8.3 lbs/1000 tons**). The amount of emissions coming from each specific activity is not identified, so it is not possible from the information provided to identify which controlled EF would apply. The highest of these is 8.3 lbs/1000 tons, which if applied to all activities would still result in 30% lower credits

---

[7] Attached to previous declaration as JMay Attachment 13 Chandler Aggregates AQMD Offset Calc.pdf

than those generated for Chandler, or 2,035 lbs/year total credits. The lowest of these EFs (0.12) is 99 times lower and if applied to all activities would result in total credits of 29 lbs/yr.

13. **Matthews International**, permitted 1992, is identified for sand handling / foundry sand reclamation, with a baghouse for control. The emissions factor in the AER provided is only in the form of lbs/hours of operation per year, not volume, so there is not enough information provided to compare emissions factors in lbs/ton in order to update emissions to more recently achievable controlled levels. Hours of operation does not provide an assessment of actual throughput of materials for this process. This facility received almost 7,500 lbs/year in credits, and more detailed information needs to be provided in order to confirm these credits. It is very unlikely this operation met BACT levels, based on the age of the operations.

14. Using updated emissions factors is necessary if new facilities (such as the CPV Sentinel power plant which will use the credits), are to be permitted according to today's standards, rather than being allowed to use inflated credits generated from outdated, gross polluters, as is the case for most of the facilities I reviewed. In my experience, such gross polluters are likely to have been required (or should have been required in recent years during air quality planning processes), to retrofit their facilities to meet current standards for attaining Clean Air Act, state, and local air pollution standards. If these facilities had not been shut down, they should have been subject to regulations that would reduce their emissions, especially in a region like the South Coast Air Basin, where the AQMD is struggling to find sufficient reductions for its SIP (State Implementation Plan) and other plans, to meet health standards. The South Coast District is required to find all feasible reductions to meet health standards. If these facilities had remained open, it would have been feasible to update them to greatly reduce emissions, as shown by the cited AQMD emissions factors and AP42 documents identifying much lower controlled emissions levels for such facilities. As I stated in my previous declaration and below, these controlled emissions factors come mainly from AP42 from emissions factors developed in the 1980s and 1990s, so these levels are far from BACT, yet if the facilities met even these levels of control, most of the emissions would be gone, and not available to generate credits.

15. Table 4 below summarizes the results of the recalculations above.

Table 4 – Discounting PM10 credits with AP42 and AQMD Emission Factors

	AER EF (lbs/ton) & Credits generated in AQMD list (lbs/year)	Recalculated Credits using Updated EFs (lbs/ton)	Reduction in credits (lbs/yr)
Statewide Sandblasting, "various locations in AQMD"	EFs: 33.5 & 16.5 lbs/ton Credits: **3748 lbs/yr** (2 units)	EF 1.38 lbs/ton Credits: 2 units, **178 lbs/yr**	**3,570**
Gateway Sandblasting	EF: 40 lbs/ton Credits: **2,387** lb/yr (sandblasting part)	EF 1.38 lbs/ton Credits: **82 lbs/yr**	**2,305**
Elsinore Ready-Mix Co. Inc., Lake Elsinore	EF: 10 lbs/ton Credits: **1290** lbs/yr	EF range up to 0.0568 lbs/ton Credits: **7.3lbs/yr**	**1283**
Chandler Aggregates, Corona	EF: 11.8727 lbs/1000 tons Credits: **2907 lbs/yr**	EF: 0.12 to 8.3 lbs/ 1000 tons Credits: **29 to 2,035 lbs/year**	**872 to 2878**

Discounting Power Plant credits which don't meet current BACT standards

16. **The Application to the CEC[8] for the Contra Costa Generating Station in Oakley, California proposes PM10 emissions levels much lower than the default PM10 emissions factor the AQMD used to generate credits.** At least this level or lower should be considered a current BACT level for PM10.

17. Page 5.1-6 of that document provides the following chart, identifying less than 0.00357 lbs/MMBtu for Combustion Turbines, and 0.0045 lbs/MMBtu for an auxiliary boiler. Since these are natural gas-fired (which provides about 1020 Btu's per cubic foot of gas), this is equivalent to 3.6 lbs/mmcf and 4.6 lbs/mmcf respectively, far lower than the AQMD default for PM10 (7.6 lbs/mmcf).

---

[8] *Contra Costa Generating Station - Application For Certification - Docket # 09-AFC-4*, Air Quality section attached as Updated JMay attachmt 03 Oakley Applic 5.1_Air Quality, and available at: http://www.energy.ca.gov/sitingcases/oakley/documents/applicant/afc/Volume%201/CCGS_5.1_Air%20Quality.pdf , entire document available at CEC website: http://www.energy.ca.gov/sitingcases/oakley/documents/applicant/afc/

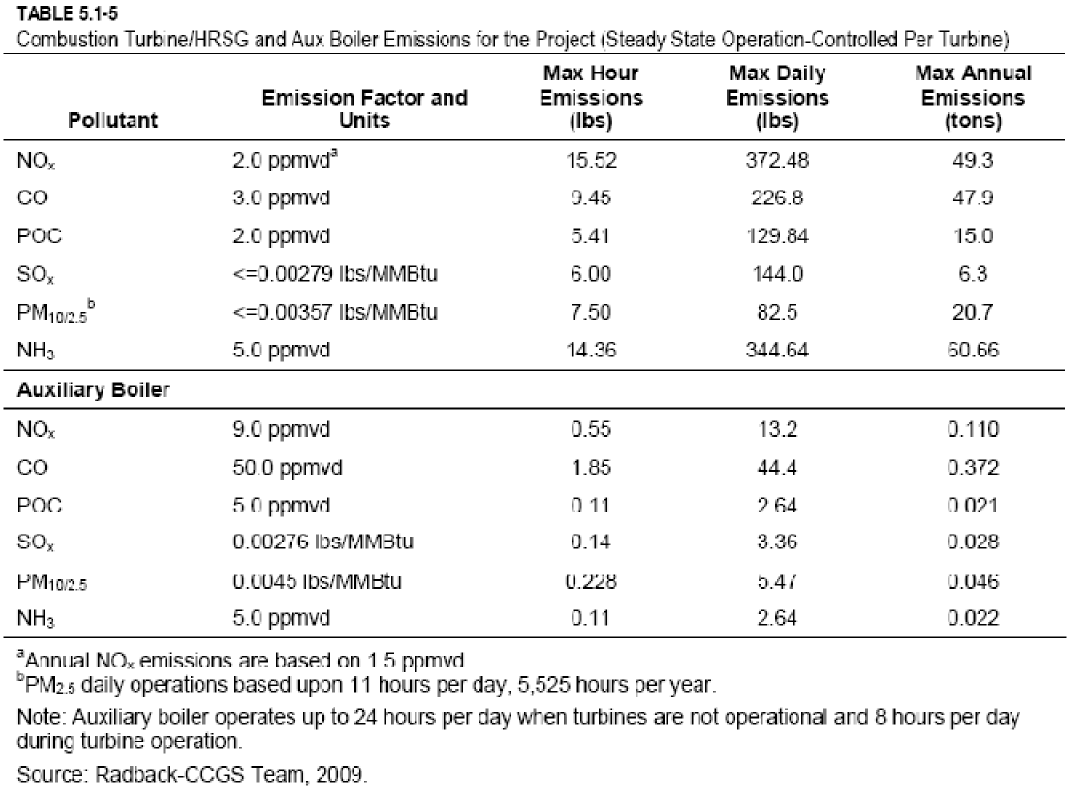

TABLE 5.1-5

Combustion Turbine/HRSG and Aux Boiler Emissions for the Project (Steady State Operation-Controlled Per Turbine)

Pollutant	**Emission Factor and Units**	**Max Hour Emissions (lbs)**	**Max Daily Emissions (lbs)**	**Max Annual Emissions (tons)**
NO_x	2.0 ppmvd[a]	15.52	372.48	49.3
CO	3.0 ppmvd	9.45	226.8	47.9
POC	2.0 ppmvd	5.41	129.84	15.0
SO_x	<=0.00279 lbs/MMBtu	6.00	144.0	6.3
$PM_{10/2.5}$[b]	<=0.00357 lbs/MMBtu	7.50	82.5	20.7
NH_3	5.0 ppmvd	14.36	344.64	60.66
Auxiliary Boiler				
NO_x	9.0 ppmvd	0.55	13.2	0.110
CO	50.0 ppmvd	1.85	44.4	0.372
POC	5.0 ppmvd	0.11	2.64	0.021
SO_x	0.00276 lbs/MMBtu	0.14	3.36	0.028
$PM_{10/2.5}$	0.0045 lbs/MMBtu	0.228	5.47	0.046
NH_3	5.0 ppmvd	0.11	2.64	0.022

[a] Annual NO_x emissions are based on 1.5 ppmvd

[b] $PM_{2.5}$ daily operations based upon 11 hours per day, 5,525 hours per year.

Note: Auxiliary boiler operates up to 24 hours per day when turbines are not operational and 8 hours per day during turbine operation.

Source: Radback-CCGS Team, 2009.

18. The following power plants generated large amounts of credits in the AQMD updated list based on using the higher default value from the AQMD guidance (7.6 lbs/mmcf), unless otherwise identified below. If these emissions are recalculated to meet the levels identified at the Oakley facility, far lower credits would have been generated, as discussed below.

19. **RRI Energy Etiwanda (formerly Reliant):** The major part of the credits from this plant came from two Utility Boilers (1&2), with 16,558 and 21,183 lbs PM10/year, with significant additional credits from shutdown of four turbines. Total credits were over 41,000 lbs/year. The AQMD AER form had only the total emissions for all boilers' PM emissions, so the District allotted the emissions for the two boilers based on percentage of Heat Input used by each boiler as shown in EPA's acid rain data. The total emissions for the boilers were calculated in the AER according to the default AQMD PM10 Emission Factor (EF) for boiler combustion of natural gas – 7.6 lbs/mmcf PM10. When the boilers are recalculated at 4.5 lbs/mmscf, and turbines at 3.6 lbs/mmcf, emissions total about 24,000 lbs/yr.

20. **Mountainview Generating LLC** generated almost 7,200 lbs/yr in PM10 credits based on two boilers. If recalculated using the Oakley boiler factor, they total about 4,200 lbs/year. Note that this facility had other problems with accuracy (boilers were re-rated at much higher levels after decades of use, based on data stating that heat input measurement equipment was wrong), as explained in my previous declaration.

21. **O'Brien Cogeneration used** a slightly lower EF (7.5) for shutdown of a natural gas turbine, instead of the default factor of 7.6, according to the third page of the Offset Verification form, generating over 11,600 credits.[9] When recalculated using the Oakley factor for turbines, credits drop to about 5,600 lbs/year, over 6,000 lbs/year lower.

22. The following table summarizes the reduction in power plant credits if shutdown plants met current BACT standards as identified in the Oakley application.

---

[9] Attached as Updated JMay attachmt 04 OBrien California Cogen Offset calcs

Table 5 - Power Plant sources of PM10 credits (lbs/yr)

	Credits listed in Updated AQMD letter (5/12/10)	**Modified Credits if Power Plants met Oakley BACT standard**	**Reduction in credits**
Emissions Factors used (lbs/mmcf)	**7.6** **Except as otherwise indicated**	**3.6 for turbines,** **4.5 for boilers**	
RRI Energy Etiwanda Boiler 1 Nat Gas	16,558	9,804	6,754
Boiler 2 Nat Gas	21,183	12,543	8,640
Turbine Nat gas/oil (EF 6.93)	896	465	431
“ (EF 6.93)	896	465	431
“ (EF 6.93)	896	465	431
“ (EF 6.93)	896	465	431
RRI Energy Etiwanda total:	41,325	24,044	17,117
Mountainview Generating Station - Boiler 1	4,170	2,469	1,701
- Boiler 2	3026	1,792	1,234
Mountainview Generating total	7,196	4,261	2935
O'Brien Calif Cogen – turbine (EF 7.5)	11,644	5,589	6,055
Totals	**60,165**	**34,058**	**26,107**

Summary Table

23. Supplementing Table 3 from my previous declaration to include specific reductions from the calculations above, results in the following Table 6. The additional reductions result from applying BACT standards to the power plants, and reducing the cement, sandblasting, and aggregate and sources according to the factors identified in the AQMD emissions factors sheet and AP42.

Table 6 -- Multiple problems with credits generations

	PM10 (lbs/yr)	**SOx** (lbs/yr)
Total in AQMD Revised Addendum	***137,799***	***25,438***
	Reductions:	**Reductions:**
Seagull Sanitation (credit returns), BACT not applied	8,030	13,870
RRI Energy Etiwanda	17,281	
Mountainview Generating* (Note – this facility would have even greater reduction according to other problems noted – see previous declaration)	4,261	
O'Brien Calif Cogen	5,516	
KMC Wheel (Operated above permit level)	8,088	5.9
Diamond Pacific (not most recent 2 yrs)	2,497	
Statewide Sandblasting	3,570	
Gateway Sandblasting BACT not applied (also, shutdown inspection was unsuccessful)	2,305	9
Elsinore Ready Mix	1283	
Chandler Aggregates	872 to 2878	
Additional reductions because of overestimation of PM10 fraction of PM total as 50% for all non-combustion sources	?	?
Additional reductions for meeting current BACT standards at all credits generating facilities (unknown)	?	?
Sum of example bad credits (not complete)	**44,722 to 46,728**	**At least 13,885**

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge. Executed this 30th day of June at Berkeley, California.

__[Original signed ______________
Julia May

DECLARATION OF SERVICE

I, Shana Lazerow declare that on June 30, 2010, I served and filed copies of the document entitled

SUPPLEMENTAL EXPERT DECLARATION OF JULIA MAY REGARDING EMISSION REDUCTION CREDITS DOCUMENTATION OFFERED BY SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ATTACHMENTS TO SUPPLEMENTAL EXPERT DECLARATION OF JULIA MAY REGARDING EMISSION REDUCTION CREDITS DOCUMENTATION OFFERED BY SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

INTERVENOR CBE'S UPDATED TENTATIVE EXHIBIT AND DECLARATION LIST

The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:
[http://www.energy.ca.gov/sitingcases/sentinel/index.html]

The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

For service to all other parties:
__XX__sent electronically to all email addresses on the Proof of Service list;
__XX__by personal delivery or by depositing in the United States mail at Oakland, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND
For filing with the Energy Commission:
__XX__ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);

OR
_____depositing in the mail an original and 12 paper copies, as follows:
CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-3
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed on June 30, 2010 at Oakland, California.
___[Original signed]_________________
Shana Lazerow

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE
CPV SENTINEL ENERGY PROJECT
BY THE *CPV SENTINEL, L.L.C*

DOCKET NO. 07-AFC-3

PROOF OF SERVICE

(Revised 3/24/2010)

APPLICANT

CPV Sentinel, LLC
Mark O. Turner, Director
Competitive Power Ventures, Inc.
55 2nd Street, Suite 525
San Francisco, CA 94105
mturner@cpv.com

APPLICANT'S CONSULTANT

Dale Shileikis - URS Corporation
221 Main Street, Suite 600
San Francisco, CA 94105-1916
dale_shileikis@urscorp.com

COUNSEL FOR APPLICANT

Michael J. Carroll
LATHAM & WATKINS LLP
650 Town Center Drive, 20th Floor
Costa Mesa, CA 92626-1925
michael.carroll@lw.com

INTERESTED AGENCIES

California ISO
E-mail preferred
e-recipient@caiso.com

Mohsen Nazemi, PE
South Coast AQMD
21865 Copley Drive
Diamond Bar, CA 91765-4178
mnazemi@aqmd.gov

INTERVENORS

Angela Johnson Meszaros
CA Communities Against Toxics
1107 Fair Oaks Avenue, #246
South Pasadena, CA 91030
Angela@CleanAirMatters.net

*Communities for a Better Environment
c/o Shana Lazerow
1440 Broadway, Suite 701
Oakland, California 94612
slazerow@cbecal.org

ENERGY COMMISSION

JAMES D. BOYD
Vice Chair and Presiding Member
jboyd@energy.state.ca.us

Kenneth Celli, Hearing Officer
kcelli@energy.state.ca.us

John Kessler, Project Manager
jkessler@energy.state.ca.us

Caryn Holmes, Staff Counsel
cholmes@energy.state.ca.us

Jennifer Jennings
Public Adviser
publicadviser@energy.state.ca.us

INTERVENOR CBE'S TENTATIVE EXHIBIT AND DECLARATION LIST
Docket No. 07-AFC-03
Updated 06/30/10

Exhibit No.	CEC Log No.	Document Date	Document Title	Sponsoring Party	Pages
400	N/A	various	Attachments of J. May to expert testimony: • Analysis by Perrin Quarrles Assoc. re: EPA Acid Rain data; • EPA AP42 Chapter 2.1 Refuse Combustion; • Documents produced by AQMD in response to CCAT PRA (individually identifying the facility at issue).	J. May	651
401	N/A	6/15/2010	EXPERT DECLARATION OF JULIA MAY REGARDING EMISSION REDUCTION CREDITS DOCUMENTATION OFFERED BY SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT	J. May	26
402	N/A	6/30/2010	Attachments of J. May to expert testimony: • AP42 Abrasive Blasting (4 pages) • SCAQMD Guidance re PM from Aggregate (8 pages) • Application for Certification 5.1 -- Oakley Powerplant (44 pages) • O'Brien Cogeneration Offset Calculations (13 pages)	J. May	69
403	N/A	6/30/2010	SUPPLEMENTAL EXPERT DECLARATION OF JULIA MAY REGARDING EMISSION REDUCTION CREDITS DOCUMENTATION OFFERED BY SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT	J. May	10

13.2.6 Abrasive Blasting

13.2.6.1 General[1-2]

Abrasive blasting is the use of abrasive material to clean or texturize a material such as metal or masonry. Sand is the most widely used blasting abrasive. Other abrasive materials include coal slag, smelter slags, mineral abrasives, metallic abrasives, and synthetic abrasives. Industries that use abrasive blasting include the shipbuilding industry, automotive industry, and other industries that involve surface preparation and painting. The majority of shipyards no longer use sand for abrasive blasting because of concerns about silicosis, a condition caused by respiratory exposure to crystalline silica. In 1991, about 4.5 million tons of abrasives, including 2.5 million tons of sand, 1 million tons of coal slag, 500 thousand tons of smelter slag, and 500 thousand tons of other abrasives were used for domestic abrasive blasting operations.

13.2.6.2 Process Description[1-9]

Abrasive blasting systems typically include three essential components: an abrasive container (i. e., blasting pot); a propelling device; and a blasting nozzle or nozzles. The exact equipment used depends to a large extent on the specific application and type(s) of abrasive.

Three basic methods can be used to project the abrasive towards the surface being cleaned: air pressure; centrifugal wheels; or water pressure. Air blast (or dry) systems use compressed air to propel the abrasive using either a suction-type or pressure-type process. Centrifugal wheel systems use a rotating impeller to mechanically propel the abrasive by a combination of centrifugal and inertial forces. Finally, the water (or wet) blast method uses either air pressure or water pressure to propel an abrasive slurry towards the cleaned surface.

Abrasive materials used in blasting can generally be classified as sand, slag, metallic shot or grit, synthetic, or other. The cost and properties associated with the abrasive material dictate its application. The following discusses the general classes of commonly used abrasives.

Silica sand is commonly used for abrasive blasting where reclaiming is not feasible, such as in unconfined abrasive blasting operations. Sand has a rather high breakdown rate, which can result in substantial dust generation. Worker exposure to free crystalline silica is of concern when silica sand is used for abrasive blasting.

Coal and smelter slags are commonly used for abrasive blasting at shipyards. Black Beauty™, which consists of crushed slag from coal-fired utility boilers, is a commonly used slag. Slags have the advantage of low silica content, but have been documented to release other contaminants, including hazardous air pollutants (HAP), into the air.

Metallic abrasives include cast iron shot, cast iron grit, and steel shot. Cast iron shot is hard and brittle and is produced by spraying molten cast iron into a water bath. Cast iron grit is produced by crushing oversized and irregular particles formed during the manufacture of cast iron shot. Steel shot is produced by blowing molten steel. Steel shot is not as hard as cast iron shot, but is much more durable. These materials typically are reclaimed and reused.

Synthetic abrasives, such as silicon carbide and aluminum oxide, are becoming popular substitutes for sand. These abrasives are more durable and create less dust than sand. These materials typically are reclaimed and reused.

Other abrasives include mineral abrasives (such as garnet, olivine, and staurolite), cut plastic, glass beads, crushed glass, and nutshells. As with metallic and synthetic abrasives, these other abrasives are generally used in operations where the material is reclaimed. Mineral abrasives are reported to create significantly less dust than sand and slag abrasives.

The type of abrasive used in a particular application is usually specific to the blasting method. Dry blasting is usually done with sand, metallic grit or shot, aluminum oxide (alumina), or silicon carbide. Wet blasters are operated with either sand, glass beads, or other materials that remain suspended in water.

13.2.6.3 Emissions And Controls[1,3,5-11]

Emissions —

Particulate matter (PM) and particulate HAP are the major concerns relative to abrasive blasting. Table 13.2.6-1 presents total PM emission factors for abrasive blasting as a function of wind speed. Higher wind speeds increase emissions by enhanced ventilation of the process and by retardation of coarse particle deposition.

Table 13.2.6-1 also presents fine particulate emission factors for abrasive blasting. Emission factors are presented for PM-10 and PM-2.5, which denote particles equal to or smaller than 10 and 2.5 microns in aerodynamic diameter, respectively. Emissions of PM of these size fractions are not significantly wind-speed dependent. Table 13.2.6-1 also presents an emission factor for controlled emissions from an enclosed abrasive blasting operation controlled by a fabric filter; the blasting media was 30/40 mesh garnet.

Limited data from Reference 3 give a comparison of total PM emissions from abrasive blasting using various media. The study indicates that, on the basis of tons of abrasive used, total PM emissions from abrasive blasting using grit are about 24 percent of total PM emissions from abrasive blasting with sand. The study also indicates that total PM emissions from abrasive blasting using shot are about 10 percent of total PM emissions from abrasive blasting with sand.

Hazardous air pollutants, typically particulate metals, are emitted from some abrasive blasting operations. These emissions are dependent on both the abrasive material and the targeted surface.

Controls —

A number of different methods have been used to control the emissions from abrasive blasting. Theses methods include: blast enclosures; vacuum blasters; drapes; water curtains; wet blasting; and reclaim systems. Wet blasting controls include not only traditional wet blasting processes but also high pressure water blasting, high pressure water and abrasive blasting, and air and water abrasive blasting. For wet blasting, control efficiencies between 50 and 93 percent have been reported. Fabric filters are used to control emissions from enclosed abrasive blasting operations.

Table 13.2.6-1. PARTICULATE EMISSION FACTORS FOR ABRASIVE BLASTING[a]

EMISSION FACTOR RATING: E

Source	Particle size	Emission factor, lb/1,000 lb abrasive
Sand blasting of mild steel panels[b] (SCC 3-09-002-02)	Total PM	
	5 mph wind speed	27
	10 mph wind speed	55
	15 mph wind speed	91
	PM-10[c]	13
	PM-2.5[c]	1.3
Abrasive blasting of unspecified metal parts, controlled with a fabric filter[d] (SCC 3-09-002-04)	Total PM	0.69

[a] One lb/1,000 lb is equal to 1 kg/Mg. Factors represent uncontrolled emissions, unless noted. SCC = Source Classification Code.

[b] Reference 10.

[c] Emissions of PM-10 and PM-2.5 are not significantly wind-speed dependent.

[d] Reference 11. Abrasive blasting with garnet blast media.

References For Section 13.2.6

1. C. Cowherd and J. Kinsey, *Development Of Particulate And Hazardous Emission Factors For Outdoor Abrasive Blasting*, EPA Contract No. 68-D2-0159, Midwest Research Institute, Kansas City, MO, June 1995.

2. Written communication from J. D. Hansink, Barton Mines Corporation, Golden, CO, to Attendees of the American Waterways Shipyard Conference, Pedido Beach, AL, October 28, 1991.

3. South Coast Air Quality Management District, *Section 2: Unconfined Abrasive Blasting,* Draft Document, El Monte, CA, September 8, 1988.

4. A. W. Mallory, “Guidelines For Centrifugal Blast Cleaning”, *J. Protective Coatings And Linings, 1(1)*, June 1984.

5. B. Baldwin, “Methods Of Dust-Free Abrasive Blast Clearing”, *Plant Engineering, 32(4)*, February 16, 1978.

6. B. R Appleman and J. A. Bruno, Jr., “Evaluation Of Wet Blast Cleaning Units”, *J. Protective Coatings And Linings, 2(8)*, August 1985.

7. M. K. Snyder and D. Bendersky, *Removal Of Lead-Based Bridge Paints*, NCHRP Report 265, Transportation Research Board, Washington, DC, December 1983.

8. J. A. Bruno, "Evaluation Of Wet Abrasive Blasting Equipment", *Proceedings Of The 2nd Annual International Bridge Conference*, Pittsburgh, PA, June 17-19, 1985.

9. J. S. Kinsey, *Assessment Of Outdoor Abrasive Blasting*, Interim Report, EPA Contract No. 68-02 4395, Work Assignment No. 29, U. S. Environmental Protection Agency, Research Triangle Park, NC, September 11, 1989.

10. J. S. Kinsey, S. Schliesser, P. Murowchick, and C. Cowherd, *Development Of Particulate Emission Factors For Uncontrolled Abrasive Blasting Operations*, EPA Contract No. 68-D2-0159, Midwest Research Institute, Kansas City, MO, February 1995.

11. *Summary Of Source Test Results, Poly Engineering, Richmond, CA*, Bay Area Air Quality Management District, San Francisco, CA, November 19, 1990.

12. *Emission Factor Documentation For AP-42 Section 13.2.6, Abrasive Blasting, Final Report*, Midwest Research Institute, Cary, NC, September 1997.

South Coast
Air Quality Management District
AQMD
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

Particulate Matter (PM) Emission Factors For Processes/Equipment at Asphalt, Cement, Concrete, and Aggregate Product Plants

June 2007

This document provides emission factors for estimating **total suspended particulate matter (PM) emissions (not PM_{10})** for **individual** emission source at aggregate (sand and gravel), brick and tile, hot mix asphalt, cement, and concrete batch plants. These factors are also applicable to emission sources other than processes identified in recently adopted Rules 1156 and 1157.

The factors and equations are extracted from the US EPA AP-42 document. Some of the complex equations are simplified with either default settings or assumptions that are applicable to the conditions and operations existing in the South Coast Air Basin as shown in the Reference column of the attached table.

Facility is encouraged to apply specific parameters that are applicable to its operations to calculate emissions from the equipment/processes including the results from approved source tests. Supporting documents must be submitted with the Annual Emission Report to show the use of such parameters or source test results in calculating annual emissions.

In the absence of specific parameters and/or source tests, facility can calculate its annual emissions using the factors provided in the attached table and the following equation.

$$\boxed{E = TP \times EF}$$

Where: E = Emission (tons/year)
TP = Annual Throughput
EF = Emission Factor

The unit for TP in this equation must be consistent with the unit of EF. For example, if EF is in pound per ton of material transferred (lb/ton), then TP must be tons of transferred material. For unique emission sources, additional data must be used in determining the factor (EF or TP) before it can be used in emission calculation as discussed in the following notes:

Note 1: For mining/quarrying, **emission factor** is expressed in pound per blast (lb/blast) and is calculated as:

$$\boxed{EF = 0.000014 \times A^{1.5}}$$

Where: A = Total horizontal blasted area in squared foot (ft^2), provided that the blast depth is less than 70 ft.

In this case, the throughput (TP) is number of blast per year.

Note 2: For road emissions (E) caused by vehicle traffic, the **throughput** is expressed in annual vehicle miles traveled (VMT) as follows:

$$\boxed{\mathrm{TP} = \mathrm{VMT} = \mathrm{Road\ Length} \times \left(\frac{\#\ \mathrm{Truck\ Trips}}{\mathrm{Day}}\right) \times \left(\frac{\#\ \mathrm{Days}}{\mathrm{Year}}\right) \times \left(\frac{1\mathrm{Mile}}{5{,}280\mathrm{ft}}\right)}$$

Where: Road Length = One-way distance in feet (ft) of paved or unpaved road within the facility, used by haul trucks and non-haul trucks.

\# Truck Trips = the number of roundtrips the vehicle made.

Definitions:

Haul Road: an unpaved road used by haul trucks to carry materials from the quarry to the unloading/processing area within the facility.

Non-Haul Road: unpaved and/or paved road used by non-haul trucks to carry materials from one location to another location within the facility, usually between the facility's entrance/exit to loading/unloading/processing areas.

Note 3: For PM emissions (E) at **each** conveyor transfer point, the **emission factor** (lb/ton of material transferred) can be determined using the following equation:

$$\boxed{\mathrm{EF} = \mathrm{k} \times 0.0032 \times \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}}$$

Where: k = Particle Size Multiplier (dimensionless)

U = Average Wind Speed (mile per hour)

M. = Average Moisture Content (%)

Note 4: In addition to PM emissions, VOC emissions are also expected from asphalt product during loading out and silo filling operations. **Emission factor** (lb/ton of product loaded) is expressed in as follows:

ASPHALT LOAD-OUT

$$\boxed{\begin{aligned}\mathrm{EF}_{\mathrm{PM}} &= 0.000181 + 0.00141\ (-\mathrm{V})e^{((0.0251\times(T+460))-20.43)}\\ \mathrm{EF}_{\mathrm{VOC}} &= 0.0172\ (-\mathrm{V})e^{((0.0251\times(T+460))-20.43)}\end{aligned}}$$

SILO FILLING

$$\boxed{\begin{aligned}\mathrm{EF}_{\mathrm{PM}} &= 0.000332 + 0.00105\ (-\mathrm{V})e^{((0.0251\times(T+460))-20.43)}\\ \mathrm{EF}_{\mathrm{VOC}} &= 0.0504\ (-\mathrm{V})e^{((0.0251\times(T+460))-20.43)}\end{aligned}}$$

Where: V = Asphalt Volatility (in negative %); (Example -2.5%)

T = Asphalt Product Mix Temperature (degree F)

Operation/Emission Sources	Emission Factor		Unit	References And Assumptions
	UNCONTROLLED	***CONTROLLED***		
ROAD EMISSIONS FROM VEHICLE TRAFFIC				
- **PAVED ROAD**				Chapter 13.2.1, Equation 1
	Aggregate / Crushed Material Plants			Assumptions:
$E = VMT \times k \times \left(\frac{sL}{2}\right)^a \times \left(\frac{W}{3}\right)^b$	EF = 11.65	*EF = 2.33*	lb/VMT	k = 0.082, a = 0.65, b = 1.5 Aggregate / Crushed Material sL = 53 g/m^2 *
Where: E = PM emissions TP = VMT = annual vehicle mile traveled (see **Note 2**)	**Hot Mix Asphalt Plants** EF = 14.73	*EF = 2.95*	lb/VMT	Hot Mix Asphalt sL = 76 g/m^2 * Cement / Concrete / Others sL = 11 g/m^2 *
$EF = k \times \left(\frac{sL}{2}\right)^a \times \left(\frac{W}{3}\right)^b$	**Concrete Batching**			Control Efficiency = 80%
k = particle size multiplier a, b = constants	EF = 4.91	*EF = 0.98*	lb/VMT	W $_{Loaded}$ = 30 tons W $_{Unloaded}$ = 5 tons W $_{Unloaded\ for\ concrete\ Batching}$ = 12 tons
sL = road surface silt loading (g/m^2) W = average weight (tons) of the vehicle	**Cement/Other Plants** EF = 4.19	*EF = 0.84*	lb/VMT	* Per agreement between the District & Industry

Operation/Emission Sources	Emission Factor		Unit	References And Assumptions
	UNCONTROLLED	*CONTROLLED*		
- **UNPAVED ROAD**				
				Assumptions:
				$k = 4.9$, $a = 0.7$, $b = 0.45$
$E = VMT \times k \times \left(\frac{S}{12}\right)^{a} \times \left(\frac{W}{3}\right)^{b}$	**Aggregate Plants**			HAUL
	HAUL VEHICLE			$W_{Loaded} = 120$ tons
Where:	EF = 16.36	*EF = 3.27*	lb/VMT	$W_{Unloaded} = 45$ tons
E = PM emissions	NON-HAUL VEHICLE			$S_{Aggregate} = 8.3\%$
TP = VMT = annual vehicle mile traveled	EF = 8.79	*EF = 1.76*	lb/VMT	$S_{Others} = 7.1\%$
(see **Note 2**)				NON-HAUL
$EF = k \times \left(\frac{S}{12}\right)^{a} \times \left(\frac{W}{3}\right)^{b}$	**Other Plant**			$W_{Loaded} = 30$ tons
	HAUL VEHICLE			$W_{Unloaded} = 5$ tons
k = particle size multiplier	EF = 14.66	*EF = 2.93*	lb/VMT	$S_{Aggregate} = 10\%$
a, b = constants	NON-HAUL VEHICLE			$S_{Others} = 4.8\ \%$
S = surface material silt content (%)	EF = 5.26	*EF =1.05*	lb/VMT	Control Efficiency = 80%
W = average weight (tons) of the vehicle				
OPEN STORAGE PILE TP = annual tonnage of stored material = amount of material loaded into, or out of, the pile	EF = 0.33	*EF = 0.0165*	lb/ton	Chapter 11.19.1, Final Report, Table 4-1 Control Efficiency = 95%

Operation/Emission Sources	Emission Factor		Unit	References And Assumptions
	UNCONTROLLED	***CONTROLLED***		
MINING/QUARRYING				
• **DRILLING** TP = number of hole drilled	EF = 1.3		lb/hole	Chapter 11.9, Table 11.9-4
• **BLASTING** (see **Note 1**) TP = number of blast	EF = 0.000014 (A) $^{1.5}$		lb/blast	Chapter 11.9, Table 11.9-1
LOADING / UNLOADING				
• **CONVEYOR TRANSFER POINT**	**Aggregate/Crushed Miscellaneous Base/ Asphalt Plants**			Chapter 13.2.4, Equation 1(b) Assumptions: k = 0.74 U = 6.3 mph M = 2.5% Control Efficiency = 95%
$\mathrm{EF} = k \times 0.0032 \times \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$	EF = 0.00234	*EF = 0.00012*	lb/ton	
k= Particle size multiplier M = Material moisture content U = Mean wind speed	**Concrete Batching and Others** SAND: EF = 0.0021	*EF = 0.00011*	lb/ton	
For a system of multiple transfer points, this EF must be multiplied by the number of transfer points (where materials drop from one point to another). Refer to Rule 1157 definition for more detail. Also see **Note 3.**	AGGREGATE: EF = 0.0069	*EF = 0.00035*	lb/ton	

Operation/Emission Sources	**Emission Factor**		**Unit**	**References And Assumptions**
	UNCONTROLLED	***CONTROLLED***		
• **WEIGHT HOPPER / SURGE BIN**	EF = 0.0051	*EF = 0.00026*	lb/ton	Chapter 11.12, Table 11.12-2 Control Efficiency = 95%
• **SILOS**				
Cement	EF = 0.72	*EF = 0.00099*	lb/ton	Chapter 11.12, Table 11.12-2
Cement Supplements (Fly Ash)	EF = 3.14	*EF = 0.0089*	lb/ton	Control Efficiency = 99%
• **CONCRETE TRUCK MIX LOADING**	EF = 0.995	*EF = 0.0568*	lb/ton	Chapter 11.12, Table 11.12-2
• **CONCRETE CENTRAL MIX LOADING**	EF = 0.544	*EF = 0.0173*	lb/ton	Chapter 11.12, Table 11.12-2
• **ASPHALT PRODUCTS LOAD OUT**		**PM:** *EF = 0.00052*	lb/ton	Chapter 11.1, Table 11.1-14
(see **Note 4)**		**VOC:** *EF = 0.0042*	lb/ton	V=-0.5, T=325 ^{o}F
• **ASPHALT SILO FILLING**		**PM:** *EF = 0.00059*	lb/ton	Chapter 11.1, Table 11.1-14
(see **Note 4)**		**VOC:** *EF = 0.0122*	lb/ton	V=-0.5, T=325 ^{o}F

Operation/Emission Sources	**Emission Factor**		**Unit**	**References And Assumptions**
	UNCONTROLLED	***CONTROLLED***		
CRUSHING				
- **PRIMARY CRUSHER**	EF = 0.014^{*}	*EF = 0.00031*	lb/ton	Chapter 11.6, Table 11.6-4 Control Efficiency = 97.8%
- **TERTIARY CRUSHER**	EF = 0.055^{*}	*EF = 0.0012*	lb/ton	Chapter 11.19.2, Table 11.19.2-2 Control Efficiency = 97.8%
- **FINE CRUSHER**	EF = 0.136^{*} **** Based on using controlled EF & control efficiency of 97.8%***	*EF = 0.003*	lb/ton	Chapter 11.19.2, Table 11.19.2-2 Control Efficiency = 97.8%
SCREENING				
- **COARSE**	EF = 0.056^{*}	*EF = 0.0022*	lb/ton	Chapter 11.19.2, Table 11.19.2-2 Control Efficiency = 96.1%
- **FINE**	EF = 0.092^{*}	*EF = 0.0036*	lb/ton	Chapter 11.19.2, Table 11.19.2-2 Control Efficiency = 96.1%
- **SAND**	EF = 0.21^{*} **** Based on using controlled EF & control efficiency of 96.1%***	*EF = 0.0083*	lb/ton	Chapter 11.19.1, Final Report, Table 4-3 Control Efficiency = 96.1%

Operation/Emission Sources	Emission Factor		Unit	References And Assumptions
	UNCONTROLLED	*CONTROLLED*		
MILLING				
• **GENERAL**	EF = 0.62*	*EF = 0.0062*	lb/ton	Chapter 11.3, Table 11.3-1
				Control Efficiency = 99%
• **CEMENT**				
Raw Mill	EF = 1.2*	*EF = 0.012*	lb/ton	Chapter 11.6, Table 11.6-4
Finish Grinding Mill	EF = 0.8*	*EF = 0.008*	lb/ton	Control Efficiency = 99%
	**** Based on using controlled EF & control efficiency of 99%***			
OTHER PROCESS/EQUIPMENT				
• **MATERIAL DRYER**				
SAND and GRAVEL	EF = 2.0	*EF = 0.039*	lb/ton	Chapter 11.19.1, Table 11.19.1-1
BATCH MIX ASPHALT	EF = 32	*EF = 0.042*	lb/ton	Chapter 11.1, Table 11.1-1
DRUM MIX ASPHALT	EF = 28	*EF = 0.033*	lb/ton	Chapter 11.1, Table 11.1-3
BRICK MANUFACTURING	EF = 0.187		lb/ton	Chapter 11.3., Table 11.3-1
• **KILNS**				
BRICK	EF = 0.96		lb/ton	Chapter 11.3., Table 11.3-1
CEMENT	EF = 109*	*EF = 1.09*	lb/ton	Chapter 11.6, Table 11.6-2
CLINKER COOLER	EF = 14.7*	*EF = 0.147*	lb/ton	Control Efficiency = 99%
	**** Based on using controlled EF & control efficiency of 99%***			

5.1 Air Quality

5.1.1 Introduction

This section presents the methodology and results of an analysis performed to assess potential effects of airborne emissions from the construction and routine operation of the Contra Costa Generating Station Project (CCGS). Section 5.1.1 presents the introduction, applicant information, and the basic Bay Area Air Quality Management District (BAAQMD) rules applicable to the project. Section 5.1.2 presents the project description, both current and proposed. Section 5.1.3 presents data on the emissions of criteria and air toxic pollutants from the project. Section 5.1.4 discusses the Best Available Control Technology (BACT) evaluation for the project. Section 5.1.5 presents the air quality effects analysis for the project. Section 5.1.6 presents applicable laws, ordinances, regulations, and standards (LORS). Section 5.1.7 presents agency contacts, and Section 5.1.8 presents permit requirements and schedules. Section 5.1.9 contains references cited or consulted in preparing this section.

Radback Energy (Applicant) is proposing to construct and operate the Contra Costa Generating Station (CCGS) which will be a nominally rated 624 MW, natural gas-fired combined cycle facility.

The project will operate as a base loaded power plant and is proposed to be permitted for 5,525 hours of operation per year, with an expected facility capacity factor at 63 percent. The project will consist of the following:

- Installation of two (2) nominally rated 213 megawatt (MW) GE 7FA Dry Low NO_x (DLN) combustion turbines with evaporative inlet air cooling.
- Installation of two (2) non-fired HRSGs coupled to a condensing steam turbine generator capable of producing 270 MW.
- SCR and CO catalyst systems on both turbine/HRSG power trains.
- Installation of air cooled condenser to provide cooling and heat rejection from the new power block process.
- Installation of an auxiliary boiler rated at 34,000 lbs steam/hr, firing natural gas. The boiler will provide auxiliary steam when the main power block is offline and during startups. The boiler will be equipped with SCR and a CO catalyst.
- Installation of all required auxiliary support systems.

The project design will incorporate the air pollution emission controls designed to meet BAAQMD BACT determinations. These controls will include DLN combustors in the CTG to limit nitrogen oxide (NO_x) production, selective catalytic reduction (SCR) with aqueous ammonia for additional NO_x reduction in the HRSG, an oxidation catalyst to control carbon monoxide (CO) and precursor organic compounds (POC) emissions. Fuel to be used will be pipeline specification natural gas**.** The auxiliary boiler will be equipped with low NO_x burners, SCR, and a CO catalyst.

5.1.2 Project Description

5.1.2.1 Current Site and Facilities

The project site is a 21.95-acre site located within the boundary of an existing 210-acre site owned by E. I. DuPont. CCGS holds an option to purchase the 21.95-acre site, and DuPont is currently proceeding with a lot line adjustment to separate the site from the larger 210-acre parcel. The project site is currently zoned "heavy industrial", with surrounding land uses comprised of industrial, vacant industrial, commercial, and agricultural. The site is located in the City of Oakley, Contra Costa County, California. The City of Oakley is presently revising its zoning regulations to match the 2020 General Plan. The site zoning will change from "heavy industrial" to "utility energy" land use, with the reminder of the DuPont site classified as "business park" or "light industrial".

The project site is bounded to the west by the Pacific Gas and Electric Company's (PG&E's) Antioch Terminal, a large natural gas transmission hub, to the north by DuPont property that is either industrial or vacant industrial, to the east by DuPont's titanium dioxide landfill area, and to the south by the Atchison, Topeka and Santa Fe railroad. Immediately south of the railroad is a large parcel currently in agriculture. A 74.6-acre commercial development, the Rivers Oaks Crossing, has been proposed for this parcel.

The site Universal Transverse Mercator (UTM) coordinates are as follows: 610,176.8 meters easting, 4,207,415 meters northing, Zone 10 (NAD27).

The project site elevation is approximately 20 feet above mean sea level (MSL). Because the site is located within the existing disturbed property boundary, the project site and surrounding areas are highly developed, and have been subject to disturbance for many years.

The project's primary objective is to provide electrical power to the growing power needs of Contra Costa County.

5.1.2.2 Project Equipment Specifications

The facility will consist of the following equipment.

- Two 213 MW GE 7FA combustion turbines.
- Two unfired HRSGs.
- One auxiliary boiler rated at 50.6 MMBtu/hr (HHV).
- One air-cooled condenser
- One evaporative condenser (with drift eliminators in the 0.003 percent range)
- One fire pump

All power from the facility will be sold to the California power grid under the control of the California Independent System Operator (CAISO).

The equipment specifications for the new emissions sources are summarized in Table 5.1-1, Combustion Equipment Specification, as follows:

TABLE 5.1-1
Combustion Equipment Specifications

Parameter	59 F/60 Percent RH
Net Facility Output, MW*	637
CTG Heat Input, mmbtu/hr (LHV)	1,896
Net Facility Heat Rate, Btu/kWh (LHV)	6,760

*Under ISO conditions.
Source: Radback-CCGS Team, 2009.

Specifically, the combustion turbine-HRSG/emission sources will have the following characteristics.

5.1.2.2.1 Combustion Turbine

- Manufacturer: GE
- Model: 7FA
- Fuel: Pipeline quality natural gas
- Heat Input: 2,150 MMBtu/hr (HHV) at 34°F
- Fuel consumption: up to ~1,030,238 standard cubic feet per hour
- Exhaust flow: ~1,150,100.00 actual cubic feet per minute at 60 degrees Fahrenheit (°F) and 65 percent relative humidity
- Exhaust temperature: ~191 °F at the HRSG stack top exit

5.1.2.2.2 Heat Recovery Steam Generator

- Manufacturer: Not Selected
- Model: N/A
- Fuel: None
- Duct Burner Heat Input : No duct burners
- Steam Production Rating: 659 Klbs/hr (maximum)

5.1.2.2.3 Auxiliary Boiler

- Manufacturer: Not Selected
- Fuel: Pipeline quality natural gas
- Heat Input: 50.6 MMBtu/hr (HHV)
- Steam Production: 30,062 lb/hr

5.1.2.2.4 Evaporative Fluid Cooler

- Manufacturer: Marley or equivalent
- Number of Cells: 3
- Number of Fans: 3 (~190,600 actual cubic feet per minute each)
- Water circulation rate: 5,880 gallons per minute total
- Drift rate: 0.003 percent (0.00003 fraction)
- Expected total dissolved solids (TDS): ~1,500 parts per million by weight (ppmw)

5.1.2.2.5 Fire Pump

- Manufacturer: Clarke model number JW6H-UFAD80
- Fuel: Ultra low sulfur diesel
- Horsepower: 400 BHP

Natural gas will be the only fuel used during plant operation with the exception of the fire pump which will fire ultra low sulfur diesel fuel. The typical natural gas composition is shown in Appendix 5.1A. Natural gas combustion results in the formation of NO_x, CO, precursor organic compounds (POCs), SO_2, PM_{10}, and $PM_{2.5}$. Because natural gas is a clean-burning fuel, there will be minimal formation of combustion PM_{10}, $PM_{2.5}$, and SO_2.

The fuel used on this project is similar to the fuels used on similar combined cycle power generation facilities. Table 5.1-2 presents a fuel use summary for the facility. Fuel use values are based on the maximum heat rating of each system, fuel specifications, and maximum operational scenario. Fuel analysis data for both natural gas and diesel fuel is presented in Appendix 5.1A, Air Quality Data.

TABLE 5.1-2
Estimated Fuel Use Summary for the Project

System	Fuel	Per Hour, mmscf	Per Day, mmscf	Per Year, mmscf
Combustion Turbine	Natural gas	2.104	50.496	17,526,000
Auxiliary Boiler	Natural Gas	0.0495	0.396	19.95
Fire Pump	Ultra Low Sulfur Diesel	20 gallons/hr	20 gallons/day	1000 gallons/yr

*Natural gas heat rate of ~1022 Btu/scf
Source: Radback-CCGS Team, 2009.

5.1.2.3 Climate and Meteorology

The overall climate in the project area is dominated by the semi-permanent eastern Pacific high pressure system, centered over the northeastern Pacific Ocean. This high is typically centered between the 140 W and 150 W meridians. Its position and size typically governs California's weather. In the summer, the high is strongest and moves to its northernmost position, which results in strong northwesterly air flow and negligible precipitation. A thermal low pressure area from the Sonoran-Mojave Desert also causes air to flow onshore over the San Francisco Bay area much of the summer.

The steady northwesterly flow around the eastern edge of the Pacific high pressure cell exerts a stress on the ocean surface along the west coast. This causes cold water to form at the surface, which cools the air even further. This cooling produces a high incidence of fog and clouds along the northern California coast in summer.

In the winter, the high weakens and moves southwestward toward Hawaii, which allows storms originating in the Gulf of Alaska to reach northern California, bringing wind and rain. About 80 percent of the region's annual rainfall of approximately 19.5 inches occurs between November and March. During the winter rainy periods, inversions are weak or nonexistent, winds are often moderate, and the air pollution potential is very low. During summer and fall, when the Pacific high becomes dominant, inversions become strong and often are surface based; winds are light and the pollution potential is high. These periods are often characterized by winds that flow out of the Central Valley into the Bay Area and often include tule fog.

Historical climatic data for the project area was derived from the following sites located near the project site:

- BAAQMD
- National Weather Service
- National Climatic Data Center

Data for the Antioch Pump Plant (#040232) for the period 3-1-1955 through 12-31-2008 shows the following:

- Annual average maximum temperature = 73.3 Fo
- Annual average minimum temperature = 48.0 Fo
- Annual average total precipitation = 13.17 in.

Appendix 5.1B contains summary climate and meteorological data for the Antioch station. Annual and quarterly wind roses for the CCP meteorological monitoring station for the period 2001 through 2006 are also presented in Appendix 5.1B. The annual wind rose data indicates that a majority of the regional wind flow is from the west through northwest, with periods of calm winds experienced approximately 8.48% of the time.

5.1.3 Emissions Evaluation

5.1.3.1 Facility Emissions

Installation and operation of the project will result in the emissions signature for the site that will be considered a major source under the BAAQMD rules but will not trigger the major source thresholds for the Prevention of Significant Deterioration (PSD) program. Criteria pollutant emissions from the new combustion turbines/HRSGs and auxiliary equipment are delineated in the following sections, while emissions of hazardous air pollutants are delineated in Section 5.9. Backup data for both the criteria and hazardous air pollutant emission calculations are provided in Appendix 5.1A, Air Quality Data.

The daily and annual emissions for all criteria pollutants, with the exception of $PM_{2.5}$ are based on the following assumptions:

- 6,924 hours of operations at full load with 1,500 hours at peak load, 1 cold start, 51 warm/hot starts and 52 shutdowns per year for a total of 8,449 hours per year with up to 24-hour per day of operation

- 403 hours per year of operation for the Auxiliary boiler with no more than 8-hours per day of operation

- 1,500 hours per year for the evaporative cooler with no more than 11 hours per day of operation

- 50 hours per year for fire pump testing

The daily and annual emissions for $PM_{2.5}$ are based on the following assumptions:

- 4000 hours of full load with 1,500 hours at peak load, 1 cold start, 51 warm/hot starts and 52 shutdowns per year for a total of 5,525 hours per year with no more than 11 hours per day of operation
- 3,260 hours per year of operation for the Auxiliary boiler with 8 hours per day of operation
- 1,500 hours per year for the evaporative cooler and up to 11 hours per day
- 50 hours per year for fire pump testing

The need for setting a lower limit on the daily and annual emissions for $PM_{2.5}$ is a direct result of the Environmental Protection Agency repealing the PM_{10} surrogacy policy for purposes related to air quality impact analysis. The BAAQMD has established $PM_{2.5}$ significance thresholds at 1.2 $\mu g/m^3$ for 24-hour averages and 0.3 $\mu g/m^3$ for annual averages. The existing background 24-hour $PM_{2.5}$ monitoring data from Concord is already at the Federal standard. Thus, this project must demonstrate that all 24-hour $PM_{2.5}$ impacts are less than significant. The BAAQMD is expecting to be formally re-designated as a Federal non-attainment area for $PM_{2.5}$, but until this formal re-designation occurs, the area is considered attainment. Once the area is designated non-attainment, the $PM_{2.5}$ modeling will be revised to reflect the short term and annual assumptions for the other criteria pollutants. Additionally, the project will conform to the BAAQMD requirements for offsets, if needed, for $PM_{2.5}$.

The proposed project will be a major new source as defined by the air district's siting regulations, and will be subject to District requirements for emission offsets and air quality modeling analyses for criteria pollutants and toxics. The proposed project will not trigger the PSD significant emission rates as all of the emissions will be less than the applicability thresholds.

The applicant has prepared an air quality emissions and impact analysis to comply with the BAAQMD and the California Energy Commission (CEC) regulations. The modeling analysis includes impact evaluations for those pollutants shown in Table 5.1-3 and the CEC requirements for evaluation of project air quality impacts.

TABLE 5.1-3
BAAQMD PSD Significant Emissions Thresholds

Pollutant	Cumulative Increase (tons/yr)	Significant Emissions Threshold (tons/yr)	Major PSD Source
NO_x	98.8	100	No
SO_2	12.5	100	No
CO	96.1	100	No
$PM_{10}/PM_{2.5}$	41.8	100	No
POC	30.0	100	No

Per Table 5.1-3, the project will not result in emissions that will exceed BAAQMD PSD significance thresholds for any criteria or non-criteria (sulfuric acid mist) pollutant.

Emissions from the proposed project will exceed the BAAQMD thresholds defining a major source for purposes of New Source Review (NSR). The project triggers the BAAQMD offset requirements for NO$_x$ and POC only An air quality, toxics, and cumulative impacts analyses are required as part of the major source permit application. Modeled ambient impacts were below the levels at which preconstruction monitoring is required.

The emissions calculations presented in the application represent the highest potential emissions. As stated previously, the turbines will be the General Electric Model 7FA, each equipped with dry low NOx combustors. Each turbine will incorporate General Electrics' Rapid Response capability with cold, warm, and hot starts taking no longer than 1-hour to demonstrate compliance with normal steady state emission limits. Each turbine will also include an unfired HRSG. During periods of plant shutdown, a 50.6 MMBtu/hr auxiliary boiler will be utilized to maintain temperature in the steam turbine.

5.1.3.2 Normal Operations

Operation of the proposed process and equipment systems will result in emissions to the atmosphere of both criteria and toxic air pollutants. Criteria pollutant emissions will consist primarily of NO$_x$, CO, POCs, sulfur oxides (SO$_x$), total suspended particulates (TSP), PM$_{10}$, and PM$_{2.5}$. Air toxic pollutants will consist of a combination of toxic gases and toxic PM species. Table 5.1-4, lists the pollutants that may potentially be emitted from the project.

TABLE 5.1-4
Chemical Substances Potentially Emitted to the Air from the Project

Criteria Pollutants

Particulate Matter
Carbon Monoxide
Sulfur Oxides
Nitrogen Oxides
Volatile Organic Compounds
Lead

Noncriteria Pollutants (Toxic Pollutants)

Ammonia
Polycyclic Aromatic Hydrocarbons (PAHs)
Acetaldehyde
Acrolein
Benzene
1-3 Butadiene
Ethylbenzene
Formaldehyde
Hexane (n-Hexane)
Naphthalene
Propylene
Propylene Oxide
Toluene
Xylene
Arsenic
Aluminum
Cadmium
Chromium VI
Copper
Iron
Mercury
Manganese
Nickel
Silver
Zinc
Diesel PM

5.1.3.3 Criteria Pollutant Emissions

Tables 5.1-5 through 5.1-8 present data on the criteria pollutant emissions expected from the facility equipment and systems under normal operating scenarios. As stated above for $PM_{2.5}$, the calculated daily emissions were based on plant operation of 11 hours per day, and 5,525 hours per year of operation. The maximum hourly emissions are based on Case 01C (34°F day with full load operation) or are based on cold start maximum hourly emission rate. A cold start is defined as a one hour event with the turbine emissions in BACT compliance at the end of the first hour. The worst case day is defined at one cold start, one shutdown, and 22 hours of base load operation (Case 01F stack parameters and Case 01E emissions). The worst-case day for SO_2 and $PM_{10/2.5}$ is based on 24-hours of full load operation (Case 01F).

TABLE 5.1-5
Combustion Turbine/HRSG and Aux Boiler Emissions for the Project (Steady State Operation-Controlled Per Turbine)

Pollutant	Emission Factor and Units	Max Hour Emissions (lbs)	Max Daily Emissions (lbs)	Max Annual Emissions (tons)
NO_x	2.0 ppmvd[a]	15.52	372.48	49.3
CO	3.0 ppmvd	9.45	226.8	47.9
POC	2.0 ppmvd	5.41	129.84	15.0
SO_x	<=0.00279 lbs/MMBtu	6.00	144.0	6.3
$PM_{10/2.5}$[b]	<=0.00357 lbs/MMBtu	7.50	82.5	20.7
NH_3	5.0 ppmvd	14.36	344.64	60.66
Auxiliary Boiler				
NO_x	9.0 ppmvd	0.55	13.2	0.110
CO	50.0 ppmvd	1.85	44.4	0.372
POC	5.0 ppmvd	0.11	2.64	0.021
SO_x	0.00276 lbs/MMBtu	0.14	3.36	0.028
$PM_{10/2.5}$	0.0045 lbs/MMBtu	0.228	5.47	0.046
NH_3	5.0 ppmvd	0.11	2.64	0.022

[a] Annual NO_x emissions are based on 1.5 ppmvd.
[b] $PM_{2.5}$ daily operations based upon 11 hours per day, 5,525 hours per year.

Note: Auxiliary boiler operates up to 24 hours per day when turbines are not operational and 8 hours per day during turbine operation.

Source: Radback-CCGS Team, 2009.

TABLE 5.1-6
Rapid Response Startup and Shutdown Emissions Per Turbine

Parameter/Mode	Cold Startup	Hot/Warm Startup	Shutdown
NO_x, lbs/event	96.0	22.0	39.0
CO, lbs/event	540.0	138.0	206.0
POC, lbs/event	67.0	31.0	17.0
PM_{10}, lbs/event	3.7	1.1	1.1
SO_x, lbs/event	0.8	0.2	0.2
Event Time, minutes (hours)	45 minutes	14 minutes	14 minutes
Number of Events/Year	1	51	52

Source: Radback-CCGS Team, 2009.

TABLE 5.1-7
Combustion Turbine/HRSG Emissions for the Project (Including Base Load Cold, Hot/Warm Startup and Shutdown, Whichever is Greater)

Pollutant	Emission Factor	Max Hour Emissions (pounds)	Max Daily Emissions (pounds)	Max Annual Emissions (tons)
NO_x	N/A	45.0	499.98	49.3
CO	N/A	540.0	968.24	47.9
POCs	N/A	67.0	214.23	15.0
SO_x	N/A	6.0	144.0	6.3
$PM_{10/2.5}$	N/A	7.5*	82.5[1]	20.7

*Based on 11 hours per day

Source: Radback-CCGS Team, 2009.

TABLE 5.1-8
Evaporative Condenser and Fire Pump Engine Emissions for the Project

Pollutant	TDS (mg/L)	Max Hour Emissions (pounds)	Max Daily Emissions (pounds)	Max Annual Emissions (tons)
		Evaporative Condenser		
$PM_{10/2.5}$	1,500	0.132	1.45	0.099
Pollutant	**g/hp-hr**	**Max Hour Emissions (pounds)**	**Max Daily Emissions (pounds)**	**Max Annual Emissions (tons)**
		Fire Pump Engine		
NO_x	2.61	2.302	2.302	0.0576
CO	0.84	0.741	0.741	0.0185
POC	0.10	0.092	0.092	0.0023
SO_x	—	0.004	0.004	0.0001
$PM_{10/2.5}$	0.10	0.091	0.091	0.0023

Notes: Evaporative condenser operates 11 hours per day, 1,500 hours per year.
Fire pump operates 1 hour per day, 50 hours per year.

Source: Radback-CCGS Team, 2009.

Table 5.1-9 presents a summary of the total proposed facility operational emissions.

TABLE 5.1-9
Summary of Total Facility Emissions for the Project

Pollutant	pounds/hour	pounds/day	tons/year
NO_x	215.83	1,015.46	98.8
CO	1,096.03	1,981.62	96.1
POCs	134.20	431.19	30.0
SO_x	12.14	289.13	12.5
TSP	15.45	168.37	41.8*
$PM_{10/2.5}$	15.45	168.37	41.8*
NH_3	28.83	347.28	121.34

*Annual TSP/PM limited to 41.8 tons per year based on 5,525 hours per year of operation from the turbines, 3,260 hours for the auxiliary boiler, and 1,500 hours per year for the evaporative condenser.

Source: Radback-CCGS Team, 2009.

5.1.3.3.1 Greenhouse Gas Emissions

Operational emissions of greenhouse gases (GHG) will be primarily from the combustion of fuels in the turbine, auxiliary boiler, and the fire pump. Appendix 5.1A, Air Quality Data, contains the support data for the GHG emissions evaluation. Estimated carbon dioxide (CO_2e) emissions for the project are as follows:

- CO_2e = 1,941,449 tons/year (depending upon temperature and run hours)

The emission factors are based on the California Climate Action Registry General Protocol, June 2006.

5.1.3.3.2 NSR Facility Status

BAAQMD regulations 2-2-215, 302 and 303 require CCGS to provide emission offsets (emissions reduction credits, or ERCs) when emissions exceed specified levels on a pollutant-specific basis. Section 2-2-302 requires POC and NO_x emission reduction credits to be provided at an offset ratio of 1:1 or 1.15:1 dependent upon emissions levels. Because both POC and NO_x contribute to the Bay Area Basin ozone levels, Section 2-2-302.2 allows emission reduction credits of POC's to be used to offset increased emissions of NO_x, at the required offset ratios as stated above. Section 2-2-303 requires emissions offsets for emissions increases at facilities that emit more than 100 tpy of SO_2 and $PM_{10/2.5}$. As facility emissions of SO_2 and $PM_{10/2.5}$ will be below 100 tpy, these pollutants will not need to be offset based upon BAAQMD rules.

Currently, the BAAQMD air basin is attainment/unclassified for nitrogen dioxide (NO_2), sulfur dioxide (SO_2), $PM_{2.5}$, and CO, and is non-attainment for PM_{10} and ozone. The BAAQMD is expecting to be re-designated as non-attainment for $PM_{2.5}$. Detailed emissions data on the facility are presented in Appendix 5.1A, Air Quality Data. Based upon the annual emission presented in Table 5.1-9, the facility will not trigger the PSD program requirements for any attainment pollutant, including TSP. Therefore, neither a PSD increment analysis nor a Class I effects assessment will be required (see Appendix 5.1C, Air Quality Data). The proposed criteria pollutant mitigation strategy for the project is discussed in Appendix 5.1G, Air Quality Data, and is summarized below.

- NO_x and POC mitigation, in the form of Emission Reduction Credits (ERCs) to satisfy BAAQMD Regulations 2-2-215, 302 and 303.
- $PM_{10/2.5}$ and SO_2 mitigation will be achieved by developing CEQA based mitigation programs, such as fireplace replacement, street sweeping, or funding the Carl Moyer program. These approaches will be discussed with the CEC staff.
- CO offsets are not required since the air basin is in attainment.

5.1.3.4 Hazardous Air Pollutants

See Section 5.9, Public Health, for a detailed discussion and quantification of HAP emissions from the project and the results of the health risk assessment. See Appendix 5.1D, Public Health, for the public health analysis health risk assessment (HRA) support materials. Sections 5.5 and 5.9, also discusses the need for Risk Management Plans pursuant to 40 CFR 68 and the California Accidental Release Program regulations.

5.1.3.5 Construction

Construction-related emissions are based on the following:

- The Applicant leases or purchases the current project site. Construction of the new facility is expected to result in the temporary disturbance of approximately 20 acres. A 20-acre construction laydown and parking area will also be used for materials storage and craft labor parking.
- Moderate site preparation will be required prior to construction of the turbine/HRSGs, and evaporative condenser, building foundations, support structures, etc.
- Construction activity is expected to last for a total of 33 months.

Construction-related issues and emissions at the project site are consistent with issues and emissions encountered at any construction site. Compliance with the provisions of the following permits will generally result in minimal site emissions: (1) grading permit, (2) Stormwater Pollution Prevention Plan (SWPPP) requirements (construction site provisions), (3) use permit, (4) building permits, and (5) the BAAQMD Permit to Construct (PTC), which will require compliance with the provisions of all applicable fugitive dust rules that pertain to the site construction phase. An analysis of construction site emissions is presented in Appendix 5.1E, Air Quality Data. This analysis incorporates the following mitigation measures or control strategies:

- The Applicant will have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the proposed construction mitigations will be provided on a periodic basis.
- All unpaved roads and disturbed areas in the project and construction laydown and parking area will be watered as frequently as necessary to control fugitive dust. The frequency of watering will be on a minimum schedule of every 2.5 hours during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.
- On-site vehicle speeds will be limited to 5 mph on unpaved areas within the project site construction site.
- The construction site entrance will be posted with visible speed limit signs.
- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.
- Gravel ramps will be provided at the tire cleaning area.
- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.
- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.

- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction SWPPP to prevent runoff to roadways.
- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.
- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air-filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.
- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or shall be treated with appropriate dust suppressant compounds.
- All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions will be covered, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of 2 feet will be required on all bulk materials transport.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.
- Disturbed areas, which are presently vegetated, will be re-vegetated as soon as practical.

To mitigate exhaust emissions from construction equipment, the Applicant is proposing the following:

- The Applicant will work with the general contractor to utilize to the extent feasible, Environmental Protection Agency (EPA)/Air Resources Board Tier II/Tier III engine compliant equipment for equipment over 100 horsepower.
- Ensure periodic maintenance and inspections per the manufacturers specifications.
- Reduce idling time through equipment and construction scheduling.
- Use California low sulfur diesel fuels (<=15 ppmw Sulfur).

Based on the temporary nature and the time frame for construction, the Applicant believes that these measures will reduce construction emissions and effects to levels that are less than significant. Use of these mitigation measures and control strategies will ensure that the site does not cause any violations of existing air quality standards as a result of construction-related activities. Appendix 5.1E, Air Quality Data, presents the evaluation of construction related emissions as well as data on the construction related ambient air quality effects.

Table 5.1-10, BAAQMD CEQA Significance Thresholds, presents data on the regional air quality significance thresholds currently being implemented by the BAAQMD. The specific construction and operational thresholds were derived from the BAAQMD California Environmental Quality Act (CEQA) guidance.

TABLE 5.1-10
BAAQMD CEQA Significance Thresholds

Pollutant	Annual Operations Thresholds	Daily Operations Thresholds
NO_x	15 tpy	80 lbs/day
CO	—	—
POCs	15 tpy	80 lbs/day
SO_x	—	—
PM_{10}	15 tpy	80 lbs/day
$PM_{2.5}$	—	—

Note: The BAAQMD has not established numerical thresholds for construction activities, but rather the BAAQMD relies upon a set of feasible control measures to mitigate emissions. The construction mitigation measures as proposed above and in Appendix 5.1E meet the Districts CEQA guidelines.

Source: BAAQMD CEQA Manual, 12/99.

In addition to the local and regional significance criteria, the following general conformity analysis thresholds are as follows in accordance with Code of Federal Regulations (40 CFR Parts 6 and 51):

- NO_x – 100 tons per year
- POCs – 100 tons per year
- CO – 100 tons per year
- SO_x – 100 tons per year
- PM_{10} – 70 tons per year
- $PM_{2.5}$ – no value available (use 100 tpy based on PM_{10} moderate NA area value)

Emissions from the construction phase are not estimated to exceed the conformity levels noted above. Emissions from the operational phase are subject to the BAAQMD NSR and general permitting provisions, and as such, are exempt from a conformity determination or analysis.

5.1.4 Best Available Control Technology Evaluation

5.1.4.1 Current Facility Control Technologies

Table 5.1-11, BACT Values for Combustion Turbines/HRSGs, summarizes the control technologies currently proposed for use on the combustion turbines/HRSGs.

TABLE 5.1-11
BACT Values for Combustion Turbines/HRSGs

Pollutant	BACT Emissions Range*	Proposed BACT
NO_x	2.0 – 2.5 ppmvd	2.0 ppmvd
CO	3.0 – 6.0 ppmvd	3.0 ppmvd
POCs	2.0 ppmvd	2.0 ppmvd
SO_x	1.0 gr S/100 scf (short term)	0.75 gr S/100 scf (short term)

TABLE 5.1-11
BACT Values for Combustion Turbines/HRSGs

Pollutant	BACT Emissions Range*	Proposed BACT
Natural Gas	0.33 gr S/100 scf (long term)	0.33 gr S/100 scf (long term)
TSP, $PM_{10}/PM_{2.5}$	0.003 – 0.009 lbs/MMBtu	<= 0.00349 lbs/MMBtu

*Source: CARB, BAAQMD, SDAPCD, SJVUAPCD, and BAAQMD BACT Guidelines.
Source: Radback-CCGS Team, 2009.

5.1.4.2 Proposed Best Available Control Technology

Table 5.1-12, Proposed BACT for the Combustion Turbines/HRSGs, presents the proposed BACT for the new combustion turbines/HRSGs.

TABLE 5.1-12
Proposed BACT for the Combustion Turbines/HRSGs

Pollutant	Proposed BACT Emissions Level	Proposed BACT System(s)	Meets Current BACT Requirements
NO_x	2.0 ppmvd	DLN (turbine) with SCR	Yes
CO	3.0 ppmvd	Oxidation Catalyst	Yes
POCs	2.0 ppmvd	Oxidation Catalyst	Yes
SO_x	1.0 gr S/100 scf (short term) 0.25 gr S/100 scf (long term)	Natural Gas	Yes
TSP, $PM_{10}/PM_{2.5}$	≤ 7.50 lbs/hr	Natural Gas	Yes
NH_3	5.0 ppmvd	Reagent for SCR System 29.4% aqueous ammonia	Yes

Note: HRSGs are unfired.
Source: CARB, BAAQMD, SDAPCD, SJVUAPCD, and BAAQMD BACT Guidelines.

5.1.4.2.1 Evaporative Condenser BACT

BAAQMD Regulation 2, Rule 1, section 128.4 exempts the cooling tower (evaporative condenser) from the permit process and is, therefore, not subject to the BACT requirements of Regulation 13. Additionally, Regulation 2, Rule 1, section 319 exempts a source from permitting if the emissions are less than five (5) tpy. CCGS emissions of $PM_{10/2.5}$ are less than 200 lbs/year. BACT is referenced here for the CEC. BACT for the new evaporative condenser cells will be high efficiency drift eliminators rated at 0.00003 drift fraction (0.003 percent). Due to the small size of the evaporative condenser, BACT at 0.003% is proposed.

5.1.4.2.2 Auxiliary Boiler BACT

The proposed auxiliary boiler is rated at 50.6 MMBtu/hr (HHV), and will be used for a maximum of 8 hours per day and 403 hours per year. The auxiliary boiler will be fired exclusively on natural gas and will be equipped with SCR and a CO Catalyst. Exhaust concentrations of NOx and CO will be limited to 9 and 50 ppmvd at 3% O_2, respectively. POC emissions will be controlled to a level of 5 ppmvd while PM_{10} emissions are estimated to be 0.0045 lb/MMBtu (HHV). These emissions levels meet the BAAQMD BACT limits for limited use small boilers firing clean fuels such as natural gas.

5.1.4.2.3 Fire Pump Engine BACT

The fire pump engine will be fired exclusively on California certified ultra low sulfur diesel fuel and will meet all the emissions standards as specified in: (1) CARB ATCM, (2) EPA/CARB Tier III, and (3) NSPS Subpart IIII. Due to the low use rate of the engine for testing and maintenance, as well as its intended use for emergency fire protection, the engine meets the current BACT requirements of the BAAQMD.

5.1.5 Air Quality Impact Analysis

This section describes the results, in both magnitude and spatial extent, of ground level concentrations resulting from emissions from the project site. The maximum modeled facility concentrations were added to the maximum background concentrations to calculate a total impact when appropriate (e.g., for comparison to ambient air quality standards).

Potential air quality impacts were evaluated based on air quality dispersion modeling, as described herein and presented in the Air Quality Modeling Protocol previously submitted and approved by the BAAQMD and the CEC. A copy of the Air Quality Modeling Protocol is included in Appendix 5.1, Air Quality Data. All input and output modeling files are contained on a CD-ROM disk provided to the BAAQMD and CEC Staff under separate cover. All modeling analyses were performed using the techniques and methods as discussed with the BAAQMD and CEC through development of the Air Quality Modeling Protocol.

5.1.5.1 Dispersion Modeling

For modeling the potential impact of the project site in terrain that is both below and above stack top (defined as simple terrain when the terrain is below stack top and complex terrain when it is above stack top) the USEPA guideline model AERMOD (version 07026) was used as well as the latest versions of the AERMOD preprocessors to determine surface characteristics (AERSURFACE version 08009), to process meteorological data (AERMET version 06341), and to determine receptor slope factors (AERMAP version 09040). The purpose of the AERMOD modeling analysis was to evaluate compliance with the California and federal air quality standards.

The nearest representative surface data set in the general area of the proposed project site is the PG&E database collected at the Contra Costa Power Plant (CCP), located approximately 1.5 km northwest of the project site. This surface meteorological data set was provided by the BAAQMD for the years 2001-2002 and 2004-2006 and, for each of the listed years, data recovery exceeds 90 percent. The corresponding upper air data was collected at the Oakland International Airport for the same time periods. The CCP meteorological data provided were already processed for input to AERMOD by BAAQMD for the surface characteristics based on the meteorological monitoring location. Due to the slight differences in surface roughness between the meteorological monitoring location and the project site, the merged data files provided by BAAQMD were re-processed with Stage 3 of AERMET for the surface characteristics of the project site location. AERSURFACE was executed for the project site using the BAAQMD-recommended sectors (76° – 147°, 147° – 277°, 277° – 355°, and 355° –

76º) and moisture conditions determined by BAAQMD for each month of every year of the original CCP dataset using Antioch Pump Plant 3 meteorological station precipitation data and the percentile method specified in the AERSURFACE User's Guide. Months were assigned to each season according to BAAQMD defaults as follows: spring—February and March; summer—April through July; autumn—August through October; and winter—November through January. Both sets of meteorological data will be used to model the facility in the screening analysis and the worst-case from either set of screening runs will be used in the refined modeling analyses. Albedo, Bowen ratio, and surface roughness were classified for the CCP meteorological monitoring location by the BAAQMD. These parameters were also determined for the project site to prepare a second set of modeling files for the screening analysis (as noted above, these surface characteristics are relatively consistent throughout the area, including the locations of the meteorological monitoring site and project site). The AERSURFACE program (version 08009) was used to generate the surface characteristics for the project site as specified in EPA's January 2009 AERMOD Guidance Document and AERSURFACE User's Guide using default settings where appropriate. Surface roughness was determined by AERSURFACE for the sectors determined by BAAQMD for each location (see Figure 2 in the Air Quality Modeling Protocol). These AERSURFACE inputs/outputs are listed below in Table 5.1-13, AERSURFACE Inputs/Outputs for Use in AERMET.

TABLE 5.1-13
AERSURFACE Inputs/Outputs for Use in AERMET

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Seasonal Assignments and Other Assumptions for Both Meteorological Datasets:												
Season	**Winter**	**Spring**	**Spring**	**Summer**	**Summer**	**Summer**	**Summer**	**Autumn**	**Autumn**	**Autumn**	**Winter**	**Winter**
Snow	No	—	—	—	—	—	—	—	—	—	No	No
Arid	No	No	No	No	No	No	No	No	No	No	No	No
Airport	No	No	No	No	No	No	No	No	No	No	No	No
Bowen Ratio Classification for each Month/Year based on Antioch Pump Plant 3:												
2001	Avg	Wet	Dry	Avg	Avg	Wet	Dry	Wet	Dry	Dry	Avg	Wet
2002	Dry	Dry	Avg	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Avg	Wet
2004	Avg	Wet	Dry	Dry	Avg	Dry	Dry	Dry	Dry	Wet	Avg	Wet
2005	Wet	Avg	Wet	Avg	Avg	Wet	Dry	Dry	Dry	Dry	Dry	Wet
2006	Avg	Avg	Wet	Wet	Dry	Dry	Dry	Dry	Dry	Avg	Dry	Avg
SURFACE CHARACTERISTICS FOR THE CCP METEOROLOGICAL DATA LOCATION **(608644, 4208274 meters, UTM Zone 10, NAD83)** **Surface Roughness (meters) for Sectors 1 (62º-150º) / 2 (150º-182º) / 3 (182º-243º) / 4 (243º-274º) / 5 (274º-62º):**												
Sector 1	0.437	0.493	0.493	0.550	0.550	0.550	0.550	0.550	0.550	0.550	0.437	0.437
Sector 2	0.317	0.397	0.397	0.460	0.460	0.460	0.460	0.460	0.460	0.460	0.317	0.317
Sector 3	0.433	0.488	0.488	0.534	0.534	0.534	0.534	0.534	0.534	0.534	0.433	0.433
Sector 4	0.609	0.634	0.634	0.651	0.651	0.651	0.651	0.651	0.651	0.651	0.609	0.609
Sector 5	0.041	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.041	0.041
Albedo	0.16	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Bowen Ratio by surface moisture (surface moisture classification for each month/year given at the top of this table):												
Avg	0.49	0.34	0.34	0.42	0.42	0.42	0.42	0.49	0.49	0.49	0.49	0.49
Wet	0.33	0.27	0.27	0.30	0.30	0.30	0.30	0.33	0.33	0.33	0.33	0.33
Dry	0.94	0.70	0.70	0.83	0.83	0.83	0.83	0.94	0.94	0.94	0.94	0.94

TABLE 5.1-13
AERSURFACE Inputs/Outputs for Use in AERMET

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
SURFACE CHARACTERISTICS FOR THE PROJECT SITE LOCATION (610176.8, 4207394.7 meters, UTM Zone 10, NAD27) Surface Roughness (meters) for Sectors 1 (76°-147°) / 2 (147°-277°) / 3 (277°-355°) / 4 (355°-76°):												
Sector 1	0.121	0.195	0.195	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.121	0.121
Sector 2	0.233	0.320	0.320	0.399	0.399	0.399	0.399	0.399	0.399	0.399	0.233	0.233
Sector 3	0.217	0.311	0.311	0.409	0.409	0.409	0.409	0.409	0.409	0.409	0.217	0.217
Sector 4	0.253	0.343	0.343	0.415	0.415	0.415	0.415	0.415	0.415	0.415	0.253	0.253
Albedo	0.16	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Bowen Ratio by surface moisture (surface moisture classification for each month/year given at the top of this table):												
Avg	0.52	0.34	0.34	0.43	0.43	0.43	0.43	0.51	0.51	0.51	0.52	0.52
Wet	0.34	0.26	0.26	0.30	0.30	0.30	0.30	0.34	0.34	0.34	0.34	0.34
Dry	1.00	0.71	0.71	0.88	0.88	0.88	0.88	1.00	1.00	1.00	1.00	1.00

Source: Modeling Protocol, 2009.

AERMOD input data options are listed below. Use of these options follows the USEPA's modeling guidance. Default model option[1] for temperature gradients, wind profile exponents, and calm processing, which includes final plume rise, stack-tip downwash, and elevated receptor terrain heights option, and all sources were modeled as rural sources.

5.1.5.2 Model Selection

Several other USEPA models and programs were used to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations. The models used were Building Profile Input Program for PRIME (BPIP-PRIME, current version 04274), the HARP On-Ramp preprocessor, and the SCREEN3 (version 96043) dispersion model for fumigation impacts. These models, along with options for their use and how they are used, are discussed below.

- Comparison of impacts to significant impact levels.
- Compliance with state and federal ambient air quality standards (AAQS).
- Calculation of health risk impacts through the use of the HARP On-Ramp program.

5.1.5.3 Good Engineering Practice Stack Height Analysis

The Good Engineering Practice (GEP) stack height was calculated at 310 feet based on existing onsite and offsite structure dimensions (i.e., the air-cooled condenser) for all onsite stacks (i.e., turbines, fire pump, and wet cells). The design stack heights are less than GEP stack height, thus downwash impacts were included in the modeling analysis.

BPIP-PRIME was used to generate the wind-direction-specific building dimensions for input into AERMOD. All on-site were included for analysis with BPIP-PRIME. The building location plan, located in Appendix 5.1, Air Quality Data, shows the buildings included in the downwash analysis.

---

[1] To reduce run times for the area source modeled for fugitive dust and the large number of point sources modeled for mobile combustion source equipment, the TOXICS keyword was used for modeling construction impacts.

5.1.5.4 Receptor Grid Selection and Coverage

Receptor and source base elevations were determined from the U.S. Geological Survey (USGS) Digital Elevation Model (DEM) data using 10-meter spacing between grid nodes. All coordinates were referenced to UTM North American Datum 1927 (NAD27), Zone 10. The receptor locations and elevations from the DEM files will be placed exactly on the DEM nodes. Every effort was made to maintain receptor spacing across DEM file boundaries.

Cartesian coordinate receptor grids are used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impacts locations. The receptor grids used in this analysis are listed below.

- 10-meter resolution from the project site fenceline and extending outwards in all directions 500-meters. This is called the downwash grid. In addition, receptors were placed at 10-meter intervals or less along the project site fenceline.
- 50-meter resolution that extends outwards from the edge of the downwash grid to 2 kilometers in all directions. This is referred to as the intermediate grid.
- 200-meter resolution that extends outwards from the edge of the intermediate grid to about 10 kilometers in all directions (and more if necessary to calculate the extent of any significant impact area(s)). This is referred to as the coarse grid.
- 10-meter resolution around any location on the coarse and intermediate grids where a maximum impact is modeled that is above the concentrations on the downwash grid.
- For the HARP On-Ramp program, the minimum receptor spacing was changed to 100 meter resolution due to the limitation of the number of receptors On-Ramp can use.

Concentrations within the facility fence-line will not be calculated. The receptor grid figure, located in Appendix 5.1, Air Quality Data, displays the receptors grids used in the modeling assessment. A facility boundary figure is also presented in Appendix 5.1, Air Quality Data.

5.1.5.5 Meteorological Data Selection

The use of the five years of meteorological data collected at CCP, which were also reprocessed to include surface characteristics for the project site location and included in the modeling analyses, satisfies the definition of on-site data. Detailed discussions of the representativeness of the meteorological data and comparisons of the CCP and project site locations (including aerial photo figures) are contained in the Air Quality Modeling Protocol (included in Appendix 5.1, Air Quality Data) that was previously submitted and approved by the BAAQMD and the CEC.

A graphical wind rose for 2001-2006 period is attached to the Air Quality Modeling Protocol included in Appendix 5.1, Air Quality Data. Five-year quarterly wind roses for the modeling data set are also provided in Appendix 5.1, Air Quality Data.

The area surrounding the project site, within 3 kilometers, can be characterized as mostly rural in accordance with the Auer land use classification methodology (USEPA's "*Guideline on Air Quality Models*"), with the water of the San Joaquin River to the north and open/undeveloped areas, commercial/industrial areas, and residential areas surrounding the project site. Therefore, in the modeling analyses supporting the permitting of the facility, all emissions were modeled as rural sources. Aerial photos and a Auer land use classification of the project site are contained in the Air Quality Modeling Protocol included in Appendix 5.1, Air Quality Data

5.1.5.6 Background Air Quality

In 1970, the United States Congress instructed the USEPA to establish standards for air pollutants, which were of nationwide concern. This directive resulted from the concern of the effects of air pollutants on the health and welfare of the public. The resulting Clean Air Act (CAA) set forth air quality standards to protect the health and welfare of the public. Two levels of standards were promulgated—primary standards and secondary standards. Primary national ambient air quality standards (NAAQS) are "those which, in the judgment of the administrator [of the USEPA], based on air quality criteria and allowing an adequate margin of safety, are requisite to protect the public health (state of general health of community or population)." The secondary NAAQS are "those which in the judgment of the administrator [of the USEPA], based on air quality criteria, are requisite to protect the public welfare and ecosystems associated with the presence of air pollutants in the ambient air." To date, NAAQS have been established for seven criteria pollutants as follows: SO_2, CO, ozone, NO_2, PM_{10}, $PM_{2.5}$, and lead.

The criteria pollutants are those that have been demonstrated historically to be widespread and have a potential to cause adverse health effects. USEPA developed comprehensive documents detailing the basis of, or criteria for, the standards that limit the ambient concentrations of these pollutants. The State of California has also established AAQS that further limit the allowable concentrations of certain criteria pollutants. Review of the established air quality standards is undertaken by both USEPA and the State of California on a periodic basis. As a result of the periodic reviews, the standards have been updated and amended over the years following adoption.

Each federal or state AAQS is comprised of two basic elements: (1) a numerical limit expressed as an allowable concentration, and (2) an averaging time which specifies the period over which the concentration value is to be measured. Table 5.1-14, State and Federal Ambient Air Quality Standards, presents the current federal and state AAQS.

TABLE 5.1-14
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1-hour	0.09 ppm (180 μg/m^3)	—
	8-hour	0.07 ppm (137 μg/m^3)	0.075 ppm (147 μg/m^3) (3-year average of annual 4th-highest daily maximum)
Carbon Monoxide	8-hour	9.0 ppm (10,000 μg/m^3)	9 ppm (10,000 μg/m^3)
	1-hour	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)
Nitrogen dioxide	Annual Average	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)
	1-hour	0.18 ppm (339 μg/m^3)	—

TABLE 5.1-14
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Sulfur dioxide	Annual Average	—	0.030 ppm (80 µg/m^3)
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)
	3-hour	—	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	—
Respirable particulate matter (10 micron)	24-hour	50 µg/m^3	150 µg/m^3
	Annual Arithmetic Mean	20 µg/m^3	—
Fine particulate matter (2.5 micron)	Annual Arithmetic Mean	12 µg/m^3	15.0 µg/m^3 (3-year average)
	24-hour	—	35 µg/m^3 (3-year average of 98th percentiles)
Sulfates	24-hour	25 µg/m^3	—
Lead	30-day	1.5 µg/m^3	—
	3 Month Rolling Average	—	0.15 µg/m^3

Source: CARB website, table updated 11/17/08

µg/m^3 = micrograms per cubic meter
ppm = parts per million

Brief descriptions of health effects for the main criteria pollutants are as follows.

Ozone—Ozone is a reactive pollutant that is not emitted directly into the atmosphere, but rather is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving precursor organic compounds (POC) and NO_x. POC and NO_x are therefore known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of POC and NO_x under the influence of wind and sunlight. Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. In addition to causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Carbon Monoxide—CO is a non-reactive pollutant that is a product of incomplete combustion. Ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic and are also influenced by meteorological factors such as wind speed and atmospheric mixing. Under inversion conditions, CO concentrations may be distributed more uniformly over an area out to some distance from vehicular sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia, as well as fetuses.

Particulate Matter (PM_{10} and $PM_{2.5}$)—PM_{10} consists of particulate matter that is 10 microns or less in diameter (a micron is 1 millionth of a meter), and fine particulate matter, $PM_{2.5}$, consists of particulate matter 2.5 microns or less in diameter. Both PM_{10} and $PM_{2.5}$ represent fractions of particulate matter, which can be inhaled into the air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, combustion, and atmospheric photochemical reactions. Some of these operations, such as demolition and construction activities, contribute to increases in local PM_{10} concentrations, while others, such as vehicular traffic, affect regional PM_{10} concentrations.

Several studies that the USEPA relied on for its staff report have shown an association between exposure to particulate matter, both PM_{10} and $PM_{2.5}$, and respiratory ailments or cardiovascular disease. Other studies have related particulate matter to increases in asthma attacks. In general, these studies have shown that short-term and long-term exposure to particulate matter can cause acute and chronic health effects. $PM_{2.5}$, which can penetrate deep into the lungs, causes more serious respiratory ailments.

Nitrogen Dioxide and Sulfur Dioxide—NO_2 and SO_2 are two gaseous compounds within a larger group of compounds, NO_x and SO_x, respectively, which are products of the combustion of fuel. NO_x and SO_x emission sources can elevate local NO_2 and SO_2 concentrations, and both are regional precursor compounds to particulate matter. As described above, NO_x is also an ozone precursor compound and can affect regional visibility. (NO_2 is the "whiskey brown-colored" gas readily visible during periods of heavy air pollution.) Elevated concentrations of these compounds are associated with increased risk of acute and chronic respiratory disease.

SO_2 and NO_2 emissions can be oxidized in the atmosphere to eventually form sulfates and nitrates, which contribute to acid rain. Large power facilities with high emissions of these substances from the use of coal or oil are subject to emissions reductions under the Phase I Acid Rain Program of Title IV of the 1990 CAA Amendments. Power facilities, with individual equipment capacity of 25 MW or greater that use natural gas or other fuels with low sulfur content, are subject to the Phase II Program of Title IV. The Phase II program requires facilities to install Continuous Monitoring Systems (CMS) in accordance with 40 CFR Part 75 and report annual emissions of SO_x and NO_x. Thus, the acid rain program provisions will apply to the project site. The project site will participate in the Acid Rain allowance program through the purchase of SO_2 allowances. Sufficient quantities of SO_2 allowances are available for use on this project site.

Lead—Gasoline-powered automobile engines used to be the major source of airborne lead in urban areas. Excessive exposure to lead concentrations can result in gastrointestinal disturbances, anemia, and kidney disease, and, in severe cases, neuromuscular and neurological dysfunction. The use of lead additives in motor vehicle fuel has been eliminated in California and lead concentrations have declined substantially as a result.

The nearest criteria pollutant air quality monitoring sites to the project site would be the stations located at Bethel Island, Pittsburg, and Concord. Ambient monitoring data for these sites for the most recent three-year period is summarized in Table 5.1-16, Summary of Air Quality Monitoring Data for the Most Recent 3 Year Period. Data from these sites is estimated to present a reasonable representation of background air quality for the project site and the facility's impact area.

Table 5.1-15, BAAQMD Attainment Status Table, presents the BAAQMD attainment status.

TABLE 5.1-15
BAAQMD Attainment Status

Pollutant	Averaging Time	Federal Status	State Status
Ozone	1-hr	NA	NA
Ozone	8-hr	NA	NA
NO$_2$	All	UNC/ATT	ATT
CO	All	ATT	ATT
SO$_2$	All	ATT	ATT
PM$_{10}$	All	UNC	NA
PM$_{2.5}$	All	UNC/ATT	NA

ATT = attainment
NA = non-attainment
UNC = unclassified

Source: BAAQMD Website, 2008 and 40 CFR 81.305.

TABLE 5.1-16
Summary of Air Quality Monitoring Data for Most Recent 3-Year Period

Pollutant	Site	Avg. Time	2006	2007	2008
Ozone, ppm	Bethel Isl.	1-Hr Max	.116	.093	.109
	Pittsburg		.105	.100	.106
	Bethel Isl.	8-Hr Max	.085	.071	.076
	Pittsburg		.079	.067	.067
PM$_{10}$, µg/m^3	Bethel Isl.	24-Hr Max	82	47	478
	Pittsburg		58	56	74
	Bethel Isl.	Annual AM	19.4	18.8	24
	Pittsburg		19.9	19.4	20
PM$_{2.5}$, µg/m^3	Concord	24-Hr 98th Percentile	38.8	45	38
	Concord	Annual AM	19.0	8.7	10.2
CO, ppm	Bethel Isl.	1-Hr Max	1.3	1.1	1.0
	Pittsburg		3.3	2.8	2.8
	Bethel Isl.	8-Hr Max	1.0	.8	.8
	Pittsburg		1.9	1.5	1.4
NO$_2$, ppm	Bethel Isl.	1-Hr Max	.044	.048	.03
	Pittsburg		.052	.051	.044
	Bethel Isl.	Annual AM	.008	.008	.006

TABLE 5.1-16
Summary of Air Quality Monitoring Data for Most Recent 3-Year Period

Pollutant	Site	Avg. Time	2006	2007	2008
	Pittsburg		.011	.01	.009
SO_2, ppm	Bethel Isl.	1-Hr Max	.017	.018	.012
		3-Hr Max	.011	.013	.009
		24-Hr Max	.007	.005	.004
		Annual AM	.002	.002	.002
	Pittsburg	1-Hr Max	.045	.047	.023
		3-Hr Max	.025	.024	.015
		24-Hr Max	.009	.007	.006
		Annual AM	.003	.002	.002

Source: AQMD website, Air Quality Monitoring Summaries for 2006-2008. EPA AIRS Data System, EPA Website, 2009.

Table 5.1-17, Background Air Quality Values, shows the background air quality values (converted to µg/m^3 when appropriate) based upon the data presented in Table 5.1-16, Summary of Air Quality Monitoring Data for the Most Recent 3-Year Period. The background values represent the highest values reported for any site during any single year of the most recent three-year period. Appendix 5.1, Air Quality Data, presents the background air quality data summaries.

TABLE 5.1-17
Background Air Quality Values

Pollutant and Averaging Time	Background Value, µg/m^3
Ozone – 1-hr	227
Ozone – 8-hr	166.5
PM_{10} – 24-hr	82
PM_{10} – Annual	24
$PM_{2.5}$ – 24-hr	35*
$PM_{2.5}$ – Annual	9[a]
CO – 1-hr	3,771
CO – 8-hr	2,171
NO_2 – 1-hr	98.1
NO_2 – Annual	20.8
SO_2 – 1-hr	122.2
SO_2 – 3-hr	65.0
SO_2 – 24-hr	23.4
SO_2 – Annual	7.8
Sulfate, 24-hr	Nd

*Regulatory-defined background for project vicinity based on the 2006-2008 98th percentiles (February 26, 2009 BAAQMD guidance).

5.1.5.6.1 Impacts on Class II Areas

Operational characteristics of the combustion turbine such as emission rate, exit velocity, and exit temperature vary by operating load and ambient temperature. The project site will be operated over a variety of these temperature ranges. Thus, the air quality analysis considered the range of operational characteristics over a variety of ambient temperatures. The screening modeling analysis, using AERMOD and the five-year set of hourly meteorology (i.e., years 2001-2002 and 2004-2006 of the CCP meteorological dataset prepared by BAAQMD for AERMOD and the same dataset reprocessed to include the surface characteristics Albedo, Bowen ratio, and surface roughness for the project site) was performed for various load conditions in order to determine the combustion turbine operating condition that will result in the highest modeled concentrations for averaging periods of 24 hours or less. These conditions were considered for following ambient temperature conditions: 34°F (a cold day), 59°F (average conditions), and 104°F (a hot day). The 59°F condition was assumed to represent annual average conditions. As such, no screening analyses were performed for annual average concentrations, which were modeled for the 59°F case at 100 percent load (evaporative cooling on), which is the typical operating scenario.

The results of the load screening analysis are listed in Appendix 5.1, Air Quality Data. The screening analysis shows that the worst-case load and ambient temperature condition is 80 percent load at 34°F for all short-term impacts. In addition, the CCP meteorological data processed with the project site surface characteristics produced higher turbine screening impacts for all pollutants and averaging times. Therefore, the CCP meteorological data processed with the project site surface characteristics were used for the refined analysis and construction impacts modeling.

5.1.5.7 Refined Analysis

All facility sources were modeled in the analysis for comparisons with Significant Impact Levels (SILs) and California Ambient Air Quality Standards (CAAQS)/National Ambient Air Quality Standards (NAAQS), as necessary.

The project will use GE’s Rapid Response technology which will limit all startup/shutdown periods to one (1) hour or less. Since AERMOD is based on one (1) hour steady state conditions, the startup/shutdown emission rate used for modeling assumed the remaining time periods were at full load operation. For example, to model the one (1) hour cold start condition of 45 minutes, the remaining 15 minutes in the hour was set to full load operation emissions after adjusting the full load emission by the time (0.25). For the two (2) proposed turbines, start-up/shutdown emissions were also accounted for in the refined analysis for all short-term (24-hours or less) and long-term (annual) averages in the air quality modeling. For short-term averaging times, the highest one-hour emissions during the start-up of the combustion turbines (cold start) were used for determining one-hour NO_x and CO impacts. For the eight-hour CO modeling during startup, one cold start (1-hour), one shutdown (1-hour) and six (6) hours of base load operation were assumed. Annual emission estimates already include emissions from start-up, shutdown, and maintenance activities. Detailed emission calculations for all averaging periods are included in Appendix 5.1, Air Quality Data. The modeling assumptions included the following:

- Auxiliary boiler operation is 8 hours per day and 3260 per year for $PM_{2.5}$ modeling
- Auxiliary boiler operation is 8 hours per day and 403 hours per year for NO_x and SO_X modeling
- Fire pump operates 1 hour per day, 50 hours per year
- Evaporative cooler operates 11 hours per day and 1,500 hours per year
- Turbine operates 11 hours per day
- Annual $PM_{2.5}$: 4,000 hours base load, 1,500 hours peak load, 51 hot starts, 1 cold start, 52 shutdowns for a total of 25 hours in startup/shutdown = 5,525 hours
- Annual NO_x and SO_x: 6,924 hours base load, 1,500 hours peak load, 51 hot starts, 1 cold start, 52 shutdowns for a total of 25 hours in startup/shutdown = 8,449 hours
- Cold start is 45 minutes which is the worst case start
- CO 8-hour impacts calculated as 1 cold start + one shutdown + 6 hours base load
- Fire pump not tested during 1 hour start cycle
- Aux boiler assumed to operate two hours for 8-hour CO startup modeling

The worst-case modeling input information for each pollutant and averaging period are shown in Table 5.1-18, Stack Parameters and Emission Rates for the Modeled Sources, for normal operating conditions and combustion turbine startup/shutdown conditions. As discussed above, the combustion turbine stack parameters used in modeling the impacts for each pollutant and averaging period reflected the worst-case operating condition for that pollutant and averaging period identified in the load screening analysis. Stack parameters associated with operation at 80 the percent load case and evaporative cooler off were modeled for all short-term averaging times while the 100 percent load case with evaporative cooler on at the average temperature of 59°F were used in modeling annual average impacts.

TABLE 5.1-18
Stack Parameters and Emission Rates for Each of the Modeled Sources

	Stack Height (m)	Stack Temp. (deg K)	Exit Vel. (m/s)	Stack Diam. (m)	Emission Rates (g/s)			
					NO_x	SO_2	CO	$PM_{10/2.5}$
Averaging Period: 1-hour for Normal Operating Conditions								
Each Turbine/HRSG	47.396	358.0	19.26	5.5992	1.956	0.756	1.191	—
Fire Pump	4.877	714.26	32.22	0.2032	2.901E-1	5.040E-4	0.093	—
Auxiliary Boiler	15.240	416.48	15.08	0.7620	6.930E-2	1.764E-2	0.233	—

TABLE 5.1-18
Stack Parameters and Emission Rates for Each of the Modeled Sources

	Stack Height (m)	Stack Temp. (deg K)	Exit Vel. (m/s)	Stack Diam. (m)	Emission Rates (g/s)			
					NO_x	SO_2	CO	$PM_{10/2.5}$
Averaging Period: 3-hours for Normal Operating Conditions								
Each Turbine/HRSG	47.396	358.0	19.26	5.5992	—	0.756	-	—
Fire Pump	4.877	714.26	32.22	0.2032	—	1.680E-4	-	—
Auxiliary Boiler	15.240	416.48	15.08	0.7620	—	1.764E-2	-	—
Averaging Period: 8-hours for Normal Operating Conditions								
Each Turbine/HRSG	47.396	358.0	19.26	5.5992	—	—	1.191	—
Fire Pump	4.877	714.26	32.22	0.2032	—	—	1.167E-2	—
Auxiliary Boiler	15.240	416.48	15.08	0.7620	—	—	0.233	—
Averaging Period: 24-hours for Normal Operating Conditions								
Each Turbine/HRSG	47.396	358.0	19.26	5.5992	—	0.756	—	0.396
Fire Pump	4.877	714.26	32.22	0.2032	—	2.100E-5	—	4.778E-4
Auxiliary Boiler	15.240	416.48	15.08	0.7620	—	5.880E-3	—	9.576E-3
Each Evap. Cooler Cell	7.010	304.21	10.19	3.353	—	—	—	2.541E-3
Averaging Period: Annual for Normal Operating Conditions								
Each Turbine/HRSG	47.396	361.4	22.04	5.5992	1.424	0.176	—	0.595
Fire Pump	4.877	714.26	32.22	0.2032	1.655E-3	3.103E-6	—	6.532E-5
Auxiliary Boiler	15.240	416.48	15.08	0.7620	3.163E-3	8.190E-4	—	1.069E-2
Each Evap. Cooler Cell	7.010	304.21	10.19	3.353	—	—	—	9.493E-4
Averaging Period: 1-hour for Start-up/Shutdown Conditions								
Each Turbine/HRSG	47.396	358.0	19.26	5.5992	12.585	—	68.338	—
Fire Pump	4.877	714.26	32.22	0.2032	—	—	—	—
Auxiliary Boiler	15.240	416.48	15.08	0.7620	6.930E-2	—	0.233	—
Averaging Period: 8-hours for Start-up/Shutdown Conditions								
Each Turbine/HRSG	47.396	358.0	19.26	5.5992	—	—	12.794	—
Fire Pump	4.877	714.26	32.22	0.2032	—	—	1.167E-2	—
Auxiliary Boiler	15.240	416.48	15.08	0.7620	—	—	0.058	—

Source: Radback-CCGS Team, 2009.

5.1.5.8 Normal Operations Impact Analysis

In order to determine the magnitude and location of the maximum impacts for each pollutant and averaging period, the AERMOD model was used. Table 5.1-19 summarizes maximum modeled concentrations for each criteria pollutant and associated averaging periods. In order to assess the significance of the modeled concentrations, they were compared to the Class II PSD and BAAQMD SILs. All modeled facility pollutant concentrations are less than the SILs for those pollutants.

Maximum impacts for 24-hour and annual averages for SO$_2$, NO$_X$, and PM$_{10/2.5}$ occurred in the 50-meter spaced intermediate grid. Therefore, additional 10-meter spaced refined receptor grids were modeled for these pollutants and averaging times. Additionally, the 8-hour CO startup was also modeled with the additional 10-meter spaced grid. The maximum impacts for the other pollutants and averaging times (i.e., NO$_2$ 1-hour averages, CO 1-hour and 8-hour averages, and SO$_2$ 1-hour and 3-hour averages) occurred in the immediate vicinity of the facility either on the fenceline or within the downwash grid in the 10-meter-spaced receptor areas. Therefore, no additional 10-meter-spaced receptor grids in the coarse or intermediate receptor grid areas were required for these pollutants/averaging times. Again, it should be noted that the refined modeling analyses was performed with the CCP meteorological data processed with the project site surface characteristics based on the results of the turbine screening analyses.

The maximum modeled impacts for all pollutants and averaging times are less than all applicable significance impact levels with the exception of 1-hour NO$_2$. Therefore, the project site would not significantly affect the attainment status of any pollutant and facility impacts are considered to not be discernable from or significantly increase existing background pollutant concentrations. Facility impacts are also less than the 1-hour NO$_2$ CAAQS. Total concentrations (maximum modeled impacts plus maximum background concentrations) only exceed CAAQS/NAAQS for those pollutants and averaging times where background concentrations already equal or exceed the standards (i.e., the 24-hour and annual PM$_{10}$ CAAQS and the 24-hour PM$_{2.5}$ NAAQS).

TABLE 5.1-19
Air Quality Impact Results for Refined Modeling Analysis of Project

Pollutant	Avg. Period	Maximum Concentration (µg/m^3)	Background (µg/m^3)	Total (µg/m^3)	Class II Significance Level (µg/m^3)	Ambient Air Quality CAAQS/NAAQS	
						(µg/m^3)	(µg/m^3)
Normal Operating Conditions							
NO$_2$	1-hour	177.5	98.1	275.6	19	339	-
	Annual	0.59	20.8	21.4	1	57	100
CO	1-hour	65.497	3771	3836.5	2,000	23,000	40,000
	8-hour	33.6	2171	2204.6	500	10,000	10,000
SO$_2$	1-hour	10.1	122.2	132.3	-	655	-
	3-hour	7.5	65.0	72.5	25	-	1,300
	24-hour	2.0	23.4	25.4	5	105	365
	Annual	0.07	7.8	7.9	1	-	80

TABLE 5.1-19
Air Quality Impact Results for Refined Modeling Analysis of Project

Pollutant	Avg. Period	Maximum Concentration (μg/m³)	Background (μg/m³)	Total (μg/m³)	Class II Significance Level (μg/m³)	Ambient Air Quality CAAQS/NAAQS (μg/m³)	(μg/m³)
PM_{10}	24-hour	1.196	82	83.2	5	50	150
	Annual	0.29	24	24.3	1	20	-
$PM_{2.5}$	24-hour	1.196	35	36.2	1.2	-	35
	Annual	0.29	9	9.3	0.3	12	15.0
Start-up/Shutdown Periods							
NO_2	1-hour	162.86	98.1	260.96	19	339	-
CO	1-hour	881.45	3771	4652.45	2,000	23,000	40,000
	8-hour	92.0	2171	2263	500	10,000	10,000
Commissioning Activities							
NO_2	1-hour	126.09	98.1	224.19	19	339	-
CO	1-hour	220.65	3771	3991.65	2,000	23,000	40,000
	8-hour	122.74	2171	2293.74	500	10,000	10,000

Source: Radback-CCGS Team, 2009.

There are several scenarios that are possible during commissioning which are expected to result in NO_x, CO and POC emissions that are greater than during normal operations. During commissioning, SO_2 and $PM_{10/2.5}$ emissions are expected to be no greater than full load operations. Typically, these commissioning activities occur prior to the installation of the abatement equipment, e.g., SCR and oxidation catalyst, while the combustion turbines are being tuned to achieve optimum performance. During combustion turbine tuning, NO_x and CO emission control systems would not be functioning.

For the purposes of air quality modeling, NO_2 and CO impacts could be higher during commissioning than under other operating conditions already evaluated. The commissioning activities for the combustion turbine are expected to consist of several phases. Though precise emission values during the phases of commissioning cannot be provided given the consideration for contingencies during shakedown, the worst case short-term emissions profile during expected commissioning-period operating loads are summarized in Table 5.1-20, Estimated Maximum Hourly Emissions Rates.

TABLE 5.1-20
Estimated Maximum Hourly Emissions Rates During Commissioning*

		NO_X	CO	POC	$PM_{10/2.5}$	SO_x
Emission Rate	lb/hr	120	210	20	7.5	6.0

* Turbines only
Source: Radback-CCGS Team, 2009.

The new combustion turbine's commissioning period (prior to SCR and CO catalyst loading), with an estimated duration of 625 operating hours total, is expected to consist of the following processes and time periods as delineated in Table 5.1-21, Commissioning Schedule.

TABLE 5.1-21
Commissioning Schedule

Stage	Activities	Emissions Controls	Duration (time, hours)
1	1) Combustion turbine first fire 2) Combustion turbine no load testing 3) HRSG boil out	DLN: None SCR/CO: None/None	144 hours
2	1) Steam blow 2) Combustion turbine tuning and no load operation	DLN: Partial SCR/CO: None/None	288 hours
3	1) Combustion turbine generator load testing 2) HRSG steam production	DLN: Full SCR/CO: None/None	96 hours
4	1) Combustion turbine full load tuning 2) Combustion turbine control system tuning	DLN: Full SCR/CO: Partial/Partial	48 hours
5	1) Emissions control final tuning 2) Full load testing	DLN: Full SCR/CO: Full/Full	360 hours

Source: Radback-CCGS Team, 2009.

The emissions during the 943 hours of commissioning activities are expected to be as follows:

- NO_x – 32.36 tons
- CO – 24.53 tons
- POC – 3.26 tons
- TSP, $PM_{10/2.5}$ – 3.53 tons
- SO_x – 2.88 tons

Appendix 5.1, Air Quality Data, lists the specific emissions during each phase of the commissioning activity.

The modeling presented in Table 5.1-19 summarizes the results of the commissioning assessment.

Fumigation analyses with the USEPA Model SCREEN3 (version 96043) were conducted based on USEPA guidance given in *"Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised"* (EPA-454/R-92-019) and BAAQMD guidance contained in *"Permit Modeling Guidance"* (June 2007). Stack parameters for the worst-case 1-hour source configuration from the AERMOD screening analysis were used for the fumigation analysis. The site is classified as a rural source location based on the Auer land use classification methodology. Therefore, only rural dispersion conditions were considered since there is no need to adjust fumigation impacts for urban dispersion conditions.

The inversion breakup fumigation impact of 1.243 micrograms/cubic meter ($\mu g/m^3$) for a unitized emission rate (1 gram/second, [g/s]) was predicted to occur 16,055 meters (m) from the turbines for a single turbine stack. This result is predicted to occur by SCREEN3 for rural conditions of F stability and 2.5 m/s wind speed at the stack release height. At the inversion breakup fumigation distance for the turbines, the maximum auxiliary boiler and fire pump impacts were 8.469 and 11.10 µg/m^3, respectively, for a 1 g/s emission rate for each stack under rural conditions for all SCREEN3 meteorological combinations. No inversion breakup fumigation impacts are predicted to occur by SCREEN3 for the auxiliary boiler or fire pump stacks.

These unitized impacts were used to calculate 1-hour inversion breakup impacts for all pollutants by multiplying the unitized impacts by the pollutant emission rates (in g/s). The fumigation impacts from the two proposed turbines are added to the SCREEN3 fire pump and auxiliary boiler impacts at the same location to obtain combined pollutant impacts for the entire facility. The maximum fumigation impact is compared to the maximum 1-hour impacts from the refined AERMOD analyses in the following table.

TABLE 5.1-22
Inversion Breakup Fumigation Impacts

	Impacts (µg/m3) at Inversion Breakup Location				
Pollutant/Avg. Time	**Fumigation impacts for Two (2) Turbines**	**Aux. Blr Impacts**	**Fire Pump Impacts**	**Total Impacts**	**Maximum refined Impacts from AERMOD**
NO_x 1-hour	4.863	3.220	2.797	7.660	177.5
SO_2 1-hour	0.763	1.879	0.196	0.006	10.1
CO 1-hour	1.636	2.961	2.586	1.032	65

As shown above, the maximum 1-hour inversion breakup fumigation impacts are less than maximum 1-hour facility impacts predicted by AERMOD to occur under normal dispersion conditions. (The maximum fumigation impacts are also less than the SCREEN3 maxima predicted to occur under normal dispersion conditions as shown in the model output files provided to the agency.) Therefore, no further analysis of fumigation impacts for additional short-term averaging times (3-hours, 8-hours, or 24-hours) is required as described in Section 4.5.3 of *"Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised"* (EPA-454/R-92-019).

Shoreline fumigation impacts were also assessed since the nearest distance to the shoreline of the San Joaquin River is less than 3000 meters from the turbine stacks. Like the inversion breakup fumigation analysis, the SCREEN3 model was also used to perform the shoreline fumigation analysis. The default Thermal Internal Boundary Layer (TIBL) factor in the SCREEN3 model is set to a value of 6.0. Shoreline fumigation for TIBL factors from 2 to 6 were also calculated as required by the BAAQMD Modeling Guidance by revising and recompiling SCREEN3 for TIBL factors of 2.0, 3.0, 4.0, and 5.0. The final effective plume centerline height for the turbine stacks is 165 meters for rural conditions of F stability and 2.5 meter/second (m/s) wind speeds at the turbine stack release height. TIBL heights at the nearest turbine stack to the shoreline of the San Francisco Bay (a distance of about 950 meters) range from 62 to 154 meters for TIBL factors from 2.0 to 5.0 (for a 6.0 TIBL factor, the TIBL height at the turbine stack location is greater than the final effective plume centerline height, so no shoreline fumigation impacts would occur for a 6.0 TIBL factor). No shoreline fumigation impacts are predicted to occur by SCREEN3 for either the fire pump or auxiliary boiler stacks for any TIBL factor modeled from 2.0 to 6.0. Like the inversion breakup fumigation analysis, SCREEN3 was used to assess impacts at the shoreline fumigation location for these other facility sources using rural dispersion conditions with all SCREEN3 meteorological combinations and ignoring terrain at the distance of the maximum fumigation concentration.

The highest turbine shoreline fumigation impact from varying the TIBL factor was 8.730 μg/m^3 for a unitized emission rate of 1.0 g/s/turbine for a 5.0 TIBL factor at a distance of 1347 meters from the turbine stack. At this distance, the maximum auxiliary boiler and fire pump impacts were 56.85 and 76.96 μg/m^3, respectively, for a 1 g/s emission rate for each stack under rural conditions for all SCREEN3 meteorological combinations. These unitized impacts were used to calculate total 1-hour impacts for the entire facility by multiplying the unitized impacts by the pollutant emission rates (in g/s) and adding the impacts together. These 1-hour pollutant impacts are shown in the following table.

TABLE 5.1-23
Shoreline Fumigation Impacts

	Impacts (µg/m^3) at Inversion Breakup Location				
Pollutant/Avg. Time	**Fumigation impacts for Two (2) Turbines**	**Aux. Blr Impacts**	**Fire Pump Impacts**	**Total Impacts**	**Maximum refined Impacts from AERMOD**
NO_x 1-hour	34.152	22.326	19.394	75.872	177.5
SO_2 1-hour	13.200	1.358	0.039	14.597	10.1
CO 1-hour	20.795	17.932	7.157	45.884	65
PM 1-hour	15.095	2.211	0.882	18.185	20.116

As shown above, the maximum 1-hour inversion breakup fumigation impacts are less than maximum 1-hour facility impacts predicted by AERMOD (or SCREEN3) to occur under normal dispersion conditions for all pollutants other than SO_2. (The maximum fumigation impacts are also less than the SCREEN3 maxima predicted to occur under normal dispersion conditions for all pollutants other than SO_2 as shown in the model output files provided to the agency.) Therefore, no further analysis of fumigation impacts for additional short-term averaging times (3-hours, 8-hours, or 24-hours) is required for NOx, CO, and PM. For SO_2, impacts for other short-term averaging times were calculated as described in Section 4.5.3 of *"Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised"* (EPA-454/R-92-019). These SO_2 impacts are shown below compared to the significance levels and ambient air quality standards.

TABLE 5.1-24
SO_2 Impact Results for Shoreline Fumigation

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	Class II Significance Level ($\mu g/m^3$)	Ambient Air Quality CAAQS/NAAQS ($\mu g/m^3$)	($\mu g/m^3$)
Normal Operating Conditions							
	1-hour	14.6	122.2	136.8	—	655	—
SO_2	3-hour	8.2	65.0	73.2	25	—	1,300
	24-hour	0.7	23.4	24.1	5	105	365

A comparison to Table 5.1-24 shows that the 1-hour and 3-hour SO_2 shoreline fumigation impacts are greater than the maximum refined AERMOD results. However, like the AERMOD results, all of these facility impacts are less than the applicable significance levels and total facility impacts plus background concentrations are far less than the ambient air quality standards. Therefore, the fumigation impacts do not change the conclusions of the refined AERMOD analyses.

5.1.5.9 Impacts on Soils, Vegetation, and Sensitive Species

Impacts on soils, vegetation, and sensitive species were determined to be “insignificant” for the following reasons:

- No soils, vegetation, or sensitive species were identified in the project area, which are recognized to have any known sensitivity to the types or amounts of air pollutants expected to be emitted by the facility. A more complete summary is presented in the Biology Section of the AFC.
- The facility emissions are expected to be in compliance with all applicable air quality rules and regulations.
- The facility impacts are not predicted to result in violations of existing air quality standards, nor will the emissions cause an exacerbation of an existing violation of any quality standard.

5.1.6 Laws, Ordnances, Regulations, and Statutes (LORS)

Table 5.1-25 presents a summary of federal, state, and local air quality LORS deemed applicable to the project site.

TABLE 5.1-25
Applicable Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Federal			
Title 40 CFR Part 50	Establishes AAQS for criteria pollutants.	EPA Region IX	CCGS will conduct a dispersion modeling analysis to determine if the project will exceed the state or federal AAQS. Dispersion modeling indicates the CCGS will not exceed the state or federal AAQS for the attainment pollutants. Non-attainment pollutant emissions will be mitigated through the surrendering of emission reduction credits consistent with the BAAQMD's SIP-Approved New Source Review program.
Title 40 CFR Part 51, NSR (BAAQMD Reg 2 Rule 2)	Requires pre-construction review and permitting of new or modified stationary sources of air pollution to allow industrial growth without interfering with the attainment and maintenance of ambient air quality standards.	EPA Region IX	Requires NSR facility permitting for construction or modification of specified stationary sources. The NSR requirements are implemented at the local level with EPA oversight (BAAQMD Reg 2 Rule 2). Because the CCGS will exceed the 10 lb/day trigger for at least one of the regulated pollutants, an ATC and PTO application will be obtained from the BAAQMD prior to construction of the project site. As a result, the compliance requirements of 40 CFR, Part 51.165 will be met.
Title 40 CFR Part 52, PSD	The PSD program allows new sources of air pollution to be constructed or existing sources to be modified in areas classified as attainment, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I Areas (e.g., national parks and wilderness areas).	EPA Region IX	The PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing major stationary source. BAAQMD classifies an unlisted source (which is not in the specified 28 source categories) that emits or has the potential to emit 250 tons per year (tpy) of any pollutant regulated by the Act as a major stationary source. For listed sources, the threshold is 100 tpy. NO_x or SO_x emissions from a modified major source are subject to PSD if the cumulative emission increases for either pollutant exceeds 40 tpy. In addition, a modification at a non-major source is subject to PSD if the modification itself would be considered a major source. Because the CCGS is a combined-cycle project, it would be considered one of the 28 source categories. Therefore, the emission rates were compared to the 100 ton per year threshold. As shown in Table 5.1-8, the emission increase in NO_x, CO, PM_{10}, SO_2, and POC would be less than 100 tons per year per pollutant. Therefore, CCGS would not be subject to PSD analysis requirements.

TABLE 5.1-25
Applicable Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Title 40 CFR, Part 60	Establishes national standards of performance for new or modified facilities in specific source categories.	BAAQMD with EPA Region IX oversight	**Turbines:** 40 CFR Part 60 Subpart KKKK – NO_x Emission Limits for New Stationary Combustion Turbines applies to all new combustion turbines that commence construction, modification, or reconstruction after February 18, 2005. The rule requires natural-gas-fired turbines greater than or equal to 30 MW to meet a NO_x emission limit of 50 nanograms per Joule (ng/J) (0.39 pounds per megawatt-hour [lb/MW-hr]), and an SO_2 limit of 73 ng/J (0.58 lb/MW-hr). Alternatively, a fuel sulfur limit of 500 parts per million by weight (ppmw) could be met. Stationary combustion turbines regulated under this subpart would be exempt from the requirements of Subpart GG. The proposed turbines will utilize low NO_x combustors along with an SCR system, pipeline-quality natural gas, and will comply with both the NO_x and SO_2 limits. The certified NO_x Continuous Emission Monitoring System (CEMS) will ensure compliance with the standard. Records of natural gas usage and fuel sulfur content will ensure compliance with the SO_2 limit.
Title 40 CFR, Part 60	Establishes national standards of performance for new or modified facilities in specific source categories.	BAAQMD with EPA Region IX oversight	**Fire Pump:** 40 CFR Part 60 Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) would apply to the diesel fire pump. The NMHC+NO_x emission limit for a model year 2009 fire pump between 175 and 300 hp would be 3.0 g/bhp, the CO emission limit would be 2.6 g/bhp, and the PM_{10} emission limit would be 0.15 g/bhp. The proposed CI ICE used to operate the emergency fire pump would be a Tier III, 200 bhp ICE. Therefore, the engine would meet the NMHC+NO_x, CO, and PM_{10} emission standards.

TABLE 5.1-25
Applicable Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Title 40 CFR, Part 63	Establishes national emission standards to limit emissions of hazardous air pollutants (HAPs, or air pollutants identified by EPA as causing or contributing to the adverse health effects of air pollution but for which NAAQS have not been established) from facilities in specific categories.	BAAQMD with EPA Region IX oversight	Title 40, Code of Federal Regulations, Part 63—National Emission Standards for Hazardous Air Pollutants for Source Categories, establishes emission standards to limit emissions of hazardous air pollutants from specific source categories for Major HAP sources. Sources subject to Part 63 requirements must either use the maximum achievable control technology (MACT), be exempted under Part 63, or comply with published emission limitations. The potential NESHAPS applicable to the project are Subpart YYYY, which sets a formaldehyde emission limit or an operational limit of 91 parts per billion by volume (ppbv) for the turbines and subpart ZZZZ the NESHAPS for Stationary Reciprocating Internal Combustion Engines (RICE). CCGS would be subject to the Subpart YYYY requirements if the HAP PTE is greater or equal to 25 tpy for combined HAPs and 10 tpy for individual HAPs, i.e., major source of HAPs. As shown in Section 5.9 (Public Health), CCGS will not exceed the major source thresholds for HAPs (10 tpy for any one pollutant or 25 tpy for all HAPs combined). Therefore, CCGS will not be subject to Subpart YYYY. Subpart ZZZZ applies to area (minor) sources as well as major sources. Therefore, CCGS will be subject to Subpart ZZZZ for the fire pump engine.

TABLE 5.1-25
Applicable Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Title 40 CFR Part 64 (CAM Rule)	Establishes onsite monitoring requirements for emission control systems.	BAAQMD with EPA Region IX oversight	Title 40, Code of Federal Regulations, Part 64—Compliance Assurance Monitoring (CAM), requires facilities to monitor the operation and maintenance of emissions control systems and report any control system malfunctions to the appropriate regulatory agency. If an emission control system is not working properly, the CAM rule also requires a facility to take action to correct the control system malfunction. The CAM rule applies to emissions units with uncontrolled potential to emit levels greater than applicable major source thresholds. Emission control systems governed by Title V operating permits requiring continuous compliance determination methods are generally exempt from the CAM rule. CCGS would have an emission control systems for NO_x and CO (SCR and oxidation catalyst). However, emissions of NO_x and CO would be directly measured by a continuous monitoring system. Therefore, CCGS would not be subject to the CAM provisions.
Title 40 CRF part 70 (BAAQMD Reg 2, Rule 6)	CAA Title V Operating Permit Program	BAAQMD with EPA Region IX oversight	Title 40, Code of Federal Regulations, Part 70—Operating Permits Program, requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, recordkeeping, and reporting requirements. The requirements of 40 CFR, Part 70 apply to facilities that are subject to NSPS requirements and are implemented at the local level through BAAQMD Reg 2, Rule 6. According to Reg 2, Rule 6, a facility would be considered a Major Facility if the facility had a potential to emit greater than 100 tpy on a pollutant specific basis or the HAP PTE is greater or equal to 25 tpy for combined HAPs and 10 tpy for individual HAPs.

TABLE 5.1-25
Applicable Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Title 40 CFR part 72 (BAAQMD Reg 2, Rule 7)	CAA Acid Rain Program	BAAQMD with EPA Region IX oversight	Title 40, Code of Federal Regulations, Part 72—Acid Rain Program, establishes emission standards for SO_2 and NO_x emissions from electric generating units through the use of market incentives, requires sources to monitor and report acid gas emissions, and requires the acquisition of SO_2 allowances sufficient to offset SO_2 emissions on an annual basis. This program is implemented through BAAQMD's Reg 2, Rule 7. An acid rain facility, such as CCGS, must also obtain an acid rain permit as mandated by Title IV of the Clean Air Act. A permit application must be submitted to the BAAQMD at least 24 months before operation of the new units commences. The application must present all relevant sources at the facility, a compliance plan for each unit, applicable standards, and estimated commencement date of operation. The necessary Title IV applications will be included during the CEC licensing proceeding.
State			
California Code of Regulations, Section 41700	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	BAAQMD with ARB oversight	The CEC conditions of exemption and the air quality management district (AQMD) ATC processes are developed to ensure no adverse public health affects or public nuisances result from operation of the project site.
California Code of Regulations Sections 93115 (Diesel ATCM)	The purpose of the airborne toxics control measure (ATCM) is to reduce diesel particulate emissions from stationary diesel fired compression engines.	BAAQMD with ARB oversight	The diesel ATCM applies to stationary compression engines with a rating of greater than 50 brake horsepower and requires the use of ARB-certified diesel fuel or equivalent, and limits emissions from the operation of compression engines. The proposed fire pump would be greater than 50 bhp. However, the fire pump would meet the Tier III emission standards and non-emergency hours of operation would be limited to 50 hours or less per year. Therefore, the project site would comply with the diesel ATCM.
California Assembly Bill 32 – Global Warming Solutions Act of 2006 (AB32)	The purpose is to reduce carbon emissions within the state by approximately 25% by the year 2020.	BAAQMD with ARB oversight	There are currently no applicable facility-specific greenhouse gas emission limits or caps. Therefore, greenhouse gas emissions have been estimated for CCGS for informational purposes at this time.

TABLE 5.1-25
Applicable Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Local			
BAAQMD Reg 1, Section 301 (Public Nuisance)	Prohibits the emissions of air contaminants or other material which create a public nuisance.	BAAQMD	The CEC conditions of exemption and the BAAQMD ATC process is designed to ensure that the operation of the project site will not cause a public nuisance.
BAAQMD Regulation 2, Rule 2 (Permits – NSR)	Purpose of this Rule is to provide for the review of new and modified sources and provide mechanisms, including the use of Best Available Control Technology (BACT), Best Available Control Technology for Toxics (TBACT), and emission offsets, by which authorities to construct such sources may be granted.	BAAQMD	Applicability: As part of the NSR permit approval process, an air quality dispersion analysis must be conducted using a mass emissions-based analysis contained in the rule or an approved dispersion model, to evaluate impacts of increased criteria pollutant emissions from any new or modified facility on ambient air quality. Compliance: An air quality dispersion analysis was conducted, using a mass emissions-based analysis contained in the rule and the AERMOD dispersion model. Applicability: The PSD requirements apply on a pollutant-specific in areas attaining the state and federal AAQS to any project that is a new major stationary source or a major modification to an existing major stationary source. (See Title 40 CFR Part 51 and Part 52 discussion for thresholds). Applicability: BACT shall be applied to all new and modified sources with a potential to emit 10 pounds or more of any of the following: POC, NPOC, NOx, SO_2, PM_{10} or CO. (BAAQMD 2-2-301). Compliance: Based on the BACT thresholds, a BACT analysis was conducted for the following: POC, NOx, PM_{10} and CO. Applicability: A source shall be exempt from MACT requirements if the combined potential to emit from all related sources in a proposed modification is less than 10 tpy of any HAP and less than 25 tpy of any combination of HAPs. (BAAQMD 2-2-114). Compliance: The CCGS does not exceed the major source thresholds for HAPs (10 tpy for any one pollutant or 25 tpy for all HAPs combined). Applicability: Offsets for NOx are required at a 1.0 to 1.15 ratio if a modification to the permit causes a cumulative increase greater than 35 tpy. Offsets for PM_{10} and SO_x are required for a Major Facility at a 1.0 to 1.0 ratio if a modification to the permit causes a cumulative increase of 100 tpy. (BAAQMD 2-2-302 and 2-2-303). See Appendix 5.1G for offset strategy.

TABLE 5.1-25
Applicable Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
			Applicability: A visibility, soils, and vegetation analysis is required if the proposed project is subject to PSD requirements and is within 10 kilometers of a Class I Area. (BAAQMD 2-2-417).
BAAQMD Regulation 2, Rule 3 (Permits – ATC and Permit to Operate [PTO] for Power Plants)	The purpose of this rule is to outline the special permitting provisions for the construction of power plants within the District.	BAAQMD	In conjunction with the submittal of the AFC to the CEC, CCGS will work with the BAAQMD to provide the information needed for the issuance of a ATC. As stated in this rule, the review will be conducted as outlined in Regulation 2, Rule 2.
BAAQMD Regulation 2, Rule 5 (Permits – Toxics NSR)	The purpose of this rule is to provide for the review of new and modified sources of TAC emissions in order to evaluate potential public exposure and health risk, to mitigate potentially significant health risks resulting from these exposures, and to provide net health risk benefits by improving the level of control when existing sources are modified or replaced.	BAAQMD	TBACT shall be applied to any new or modified source of TACs where the source risk is a cancer risk greater than 1.0 in a million (10^{-6}), and/or a chronic hazard index greater than 0.20. An ATC or PTO will be denied if the facility cancer risk exceeds 10 in a million, or the facility chronic hazard index exceeds 1.0, or the facility acute hazard index exceeds 1.0. Section 5.9 and Appendix 5.1D present the results of the facility risk assessment, which shows compliance with all applicable AQMD significance values.
BAAQMD Regulation 2, Rule 6 (Permits – Title V)	The purpose of this rule is to implement the operating permit requirements of Title V of the CAA as amended in 1990.	BAAQMD with EPA Oversight	See Federal, Title 40 CFR, Part 70 to review applicability and the compliance assessment.
BAAQMD Regulation 2, Rule 7 (Permits – Acid Rain)	The purpose of this rule is to incorporate by reference the provisions of 40 CFR Part 72 for purposes of implementing an acid rain program that meets the requirements of Title IV of the CAA.	BAAQMD with EPA Oversight	See Federal, Title 40 CFR, Part 72 to review applicability and the compliance assessment.
BAAQMD Regulation 6 (Particulate Matter and Visible Emissions)	Purpose of this Regulation is to limit the quantity of particulate matter in the atmosphere through the establishment of limitations on emission rates, concentration, visible emissions, and opacity.	BAAQMD	Exhaust emissions shall not be darker than No. 1 when compared to the Ringleman Chart for any period(s) aggregating 3 minutes in any hour, exceed the opacity standard of not greater than 20 percent for a period or periods aggregating 3 minutes in any hour, or exceed the 0.15 grains per dry standard cubic feet of exhaust gas volume. The use of clean fuels (natural gas and California certified low sulfur diesel fuel will insure compliance with these limits.

TABLE 5.1-25
Applicable Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
BAAQMD Regulation 7 (Odorous Substances)	The purpose of this regulation is to place general limitations on odorous substances and specific emission limitations on certain odorous compounds.	BAAQMD	Emissions of odorous substances shall not remain odorous after dilution with odor-free air at a rate of 1,000 volumes of odor-free air per volume of source sample. The maximum emissions of ammonia shall not exceed 5,000 ppm. Ammonia emissions from the SCR catalyst will be less than [number] ppmv. Therefore, maximum emissions will be below the 5,000 ppm limit, and odors from the CCGS are expected to be less than significant.
BAAQMD Regulation 9, Rule 1	Establishes emission limits for sulfur dioxide from all sources and limits ground-level concentrations of SO_2	BAAQMD	Dispersion modeling will be conducted to determine if off-property SO_2 ground level concentrations are less than 0.5 ppm for 3 consecutive minutes, 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Sulfur contents in the fuel will be less than 0.5% and gas stream concentrations will be less than 300 ppm (dry).
BAAQMD Regulation 9, Rule 9	Purpose of this rule is to limit emissions of NO_x from stationary gas turbines.	BAAQMD	For turbines with a heat input rating greater than 500 million British thermal units per hour (MMBtu/hr) (40+ MW), NO_x emission levels shall not exceed 0.72 lb/MW-hr or 25 ppmv. BACT levels of less than 2.5 ppmv for NO_x will be applied to the project site; therefore, the NO_x emission levels for the project site will not exceed the 25 ppmv level.
BAAQMD Regulation 10 (40 CFR Part 60)	Establishes national standards of performance for new or modified facilities in specific source categories.	BAAQMD	See Federal, Title 40 CFR, Part 60 to review applicability and the compliance assessment.

5.1.7 Agencies and Agency Contacts

Table 5.1-26 presents data on the following: (1) air quality agencies that may or will exercise jurisdiction over air quality issues resulting from the power facility, (2) the most appropriate agency contact for the project site, (3) contact address and phone information, and (4) the agency involvement in required permits or approvals.

TABLE 5.1-26
Agencies, Contacts, Jurisdictional Involvement, Required Permits For Air Quality

Agency	Contact	Jurisdictional Area	Permit Status
California Energy Commission (CEC)	Assigned Project Manager 1516 Ninth St. Sacramento, CA 95814	Primary reviewing and certification agency.	Will certify the facility under the energy siting regulations and CEQA. Certification will contain a variety of conditions pertaining to emissions and operation.
Bay Area AQMD	Brian Bateman Dir. Engineering Div. 939 Ellis St. San Francisco, CA 94109 (415) 771-4653	Prepares Determination of Compliance (DOC) for CEC, Issues BAAQMD Authority to Construct (ATC) and Permit to Operate (PTO), Primary air regulatory and enforcement agency.	DOC will be prepared subsequent to AFC submittal. AFC plus District permit forms in Appendix 5.1I comprise the required District application.
California Air Resources Board (CARB)	Mike Tollstrup Chief, Project Assessment Branch 1001 I St., 6th Floor Sacramento, CA 95814 (916) 322-6026	Oversight of AQMD stationary source permitting and enforcement program	CARB staff will provide comments on applicable AFC sections affecting air quality and public health. CARB staff will also have opportunity to comment on draft PTC.
Environmental Protection Agency, Region IX	Gerardo Rios Chief, Permits Section USEPA-Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974	Oversight of all AQMD programs, including permitting and enforcement programs	USEPA Region 9 staff will receive a copy of the DOC. USEPA Region 9 staff will have opportunity to comment on draft PTC

5.1.8 Permits and Permit Schedule

An ATC application is required in accordance with the BAAQMD rules. Appendix 5.1-I contains the BAAQMD permitting application forms. These forms in conjunction with the AFC in its entirety, but specifically Section 2.0, Project Description; Section 5.1, Air Quality; Section 5.9, Public Health’ and Appendixes 5.1-A through 5.1-I constitute the required Authority to Construct application pursuant to the District rules.

5.1.9 References

CARB (California Air Resources Board). 1999. Guidance for Power Plant Siting and Best Available Control Technology, PAB-SSD. July.

CARB (California Air Resources Board). 2008. Best Available Control Technology Clearinghouse Program, http://www.arb.ca.gov/bact/bact.htm. August.

CARB (California Air Resources Board). 2009. California Air Quality Data Statistics, 2006-2008 Data, ADAM Database, http://www.arb.ca.gov/adam, Air Quality Data Branch, Sacramento, California. June.

CARB (California Air Resources Board). 2009. The 2009 California Almanac of Emissions and Air Quality. CARB, Technical Support Division.

CEC (California Energy Commission). 2008. Energy Facilities Siting/Licensing Process Web Site. http://www.energy.ca.gov/sitingcases/index.html.

Holzworth, G.C. 1972. Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution throughout the Contiguous United States. January.

Lee and Atkinson 1992. Procedures for Substituting Values for Missing NWS Meteorological Data for Use in Regulatory Air Quality Models, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 2771 July.

Midwest Research Institute. 1996. Improvement of Specific Emission Factors (BACM Project No. 1), Final Report. Prepared by Midwest Research Institute for South Coast AQMD. March.

Nappo et. al. 1982. The Workshop on the Representativeness of Meteorological Observations, Bull. Am. Meteorological Society, 63, 761-764.

NWS (National Weather Service). 2009. California Climate data — Normals, Means, and Extremes for the Antioch Pump Station #040232.

BAAQMD (Bay Area Air Quality Management District). 1999. CEQA Air Quality Handbook. December 1999.

BAAQMD (Air Quality Management District) website. June 2009. http://www.baaqmd.gov/.

U.S. Department of Agriculture Forest Service. 2002. USDA Forest Service Class I Area Information. http://www.fs.fed.us/r6/aq/natarm/r5/. August.

USEPA (U.S. Environmental Protection Agency). 1985. Guideline for Determination of Good Engineering Stack Height (Technical Support Document for the Stack Height Regulation) (Revised), EPA-450/4-80-023R. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. June.

USEPA (U.S. Environmental Protection Agency). 1989. 40 CFR Part 51, Appendix W: Guideline on Air Quality Models and CARB (Reference Document for California Statewide Modeling Guideline. April.

USEPA (U.S. Environmental Protection Agency). 1991. Nonroad Engine and Vehicle Emission Study — Report, 21A-2001, Office of Mobile Sources, Washington, D.C. 20460. November.

USEPA (U.S. Environmental Protection Agency). 1992. Workbook for Plume Visual Impact Screening and Analysis (Revised), EPA-454/R-92-023, Office of Air and Radiation, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. October.

USEPA (U.S. Environmental Protection Agency). 1995. Compilation of Air Pollution Emission Factors, Volume I, Fifth Edition; AP-42.

USEPA (U.S. Environmental Protection Agency). 1995. Onsite Meteorological Program Guidance for Regulatory Model Applications, EPA-450/4-87-013, August.

USEPA (U.S. Environmental Protection Agency). 1995. User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, EPA-454/B-95-003a, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. September.

USEPA (U.S. Environmental Protection Agency). 1995. User's Guide to the Building Profile Input Program (Revised), EPA-454/R-93-038, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. February.

USEPA (U.S. Environmental Protection Agency). 2005. User's Guide for the AERMOD Model, EPA-454/B-03-001, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. September.

Radback Energy – Contra Costa Project Team. 2009. Fieldwork, observations, and research.

OFFSET SOURCE CALCULATION/VERIFICATION FORM

Facility Name: O'BRIEN CALIF COGEN LTD
Facility ID: 50813
Facility Location: 17306 FLALLON AVE, ARTESIA, CA 90701
Type of Business: POWER PLANT

Offset Credit ID No.:
PM10: ______
SOx: ______

Application No. 362822
Equipment Description: TURBINE ENGINE (<=50 MW) NAT GAS ONLY

Is the Permit Inactivated? Yes
Inactivation Year: 2000
Shutdown Year (if different): 1999

Is the Equipment Still Shutdown? Yes
Inspection Date: 4/20/2010
Inspected By: Garrett Kakishita

Were any ERCs Issued for the Removal of this Equipment? No

Facility Reported Emissions from AER Reports for Most Recent 2 Years

Pollutant	Equipment/Activity Code	AER Year 1	Amount of AER Year 1 (lb/yr)	AER Year 2	Amount of AER Year 2 (lb/yr)
PM	TURBINE (NATURAL GAS)	FY (98-99)	11325.00	FY (97-98)	11962.50
SOx	TURBINE (NATURAL GAS)	FY (98-99)	906.00	FY (97-98)	957.00

Calculated Emissions for TURBINE ENGINE (<=50 MW) NAT GAS ONLY

PM10 Reductions: (Year 1 + Year 2)/2 11644 lbs/yr ☐ Non-Combustion source (PM10 = 50% PM)
SOx Reductions: (Year 1 + Year 2)/2 932 lbs/yr

Other Assumptions/ Comments: (See Attached)

Completed By: William Thompson, P.E.
Senior Manager
P.E. License No.: M 25818

Signature: Will Thompson
Date: 05/05/2010

FAC ID 50813

INSPECTION OF FACILITIES WITH INACTIVE PERMITS

Sector RC

O'BRIEN CALIF COGEN LTD	17306 FLALLON AVE.	ARTESIA, 90701

Last Inspection Date:	TS Code:	Compliance Team	Business Status:
11/6/2001	4	Ref/Energy	☐Active ☐Unknown ☐New Owner ☒Out of Business

Contact Name:	Title:	Ph:
N/A		

Eq. #	Permit #	Equipment Description	Comment	On premises?	In operation?
				(UTC Unable to Confirm)	
	F24198	TURBINE ENGINE (<=50 MW) NAT GAS ONLY		☐Yes ☒No ☐UTC	☐Yes ☒No ☐UTC

To be completed for new operator of equipment(if applicable)

Fac. ID (If applicable)	Fac Name:	Change of Ownership? ☐Yes ☐No

Contact:	Title:	Phone:

Equipment permitted?	Equipment #					
	1	2	3	4	5	6
Permit #						

Comments:* Explain all "Unable to confirm" "(U)" entries in this section

INSPECTED 17306 FLALLON AV, ARTESIA, SITE NOW A PARKING LOT, NO EQUIPMENT ON SITE.

Conclusions/Recommendations

Follow up recommended? ☐Yes ☒No

Conclusion: Equipment... ☒Removed from site ☐ On site, but rendered non-operable ☐ Operable, but not operated ☐Operated w/o permits ☐Operated under new ID ☐Other

NC #:	Rules:	NOV #:	Rules:

Inspector:	Inspection Date:	Reviewed By:	Date:
GK03 GARRETT KAKISHITA	4/29/10	J. Vergara	4/29/10

Attorney work product—prepared at the direction of and for Legal Department

NO B1 DATA

NO B4 DATA

E1 DATA

FacilityID	Company	year	permitted	emittent_id	fuel_id	source_id	row	annual_usage	emission_factor	emission	
050813	O'BRIEN CALIF COGEN LTD	9798	P	CO	1	2	1	1595	35	55825	
050813	O'BRIEN CALIF COGEN LTD	9798	P	ROG	1	2	1	1595	7	11165	
050813	O'BRIEN CALIF COGEN LTD	9900	P	ROG	1	2	1	306.67	7	2146.69	
050813	O'BRIEN CALIF COGEN LTD	9900	P	CO	1	2	1	306.67	1.08	331.2	
050813	O'BRIEN CALIF COGEN LTD	9899	P	TSP	1	2	1	1510	0.4 7.5	11325	9899 PM
050813	O'BRIEN CALIF COGEN LTD	9899	P	SOX	1	2	1	1510	0.6 ~~0.83~~	1253.3	9899 SOx 1510 * 0.6 = 906
050813	O'BRIEN CALIF COGEN LTD	9899	P	ROG	1	2	1	1510	7	10570	
050813	O'BRIEN CALIF COGEN LTD	9899	P	CO	1	2	1	1510	35	52850	
050813	O'BRIEN CALIF COGEN LTD	9798	P	TSP	1	2	1	1595	7.5	11962.5	9798 PM
050813	O'BRIEN CALIF COGEN LTD	9900	P	TSP	1	2	1	306.67	7.5	2300.03	
050813	O'BRIEN CALIF COGEN LTD	9596	P	NOX	1	2	1	1661	37.13	61674.59	
050813	O'BRIEN CALIF COGEN LTD	9697	P	TSP	1	2	1	1766.29	7.5	13247.18	
050813	O'BRIEN CALIF COGEN LTD	9697	P	SOX	1	2	1	1766.29	0.83	1466.02	
050813	O'BRIEN CALIF COGEN LTD	9697	P	ROG	1	2	1	1766.29	7	12364.03	
050813	O'BRIEN CALIF COGEN LTD	9697	P	CO	1	2	1	1766.29	1.08	1907.59	
050813	O'BRIEN CALIF COGEN LTD	9596	P	TSP	1	2	1	1661	7.5	12457.5	
050813	O'BRIEN CALIF COGEN LTD	9596	P	SOX	1	2	1	1661	0.83	1378.63	
050813	O'BRIEN CALIF COGEN LTD	9596	P	ROG	1	2	1	1661	7	11627	
050813	O'BRIEN CALIF COGEN LTD	9798	P	SOX	1	2	1	1595	0.6 ~~0.83~~	1323.85	9798 SOx 1595 * 0.6 = 957
050813	O'BRIEN CALIF COGEN LTD	9596	P	CO	1	2	1	1661	1.08	1795.54	

Note: Emission factor for SOx changed
to 0.6 per mmcf which is new AER default.

Facility Name: O'BRIEN CALIF COGEN LTD
Facility ID: 050813

E1 DATA

Facility ID	Company	year	emittent_id	permitted	source_id	fuel_id	annual_usage	emission_factor	emission
050813	O'BRIEN CALIF COGEN LTD	9798	CO	P	2	1	1595	35	55825
050813	O'BRIEN CALIF COGEN LTD	9798	ROG	P	2	1	1595	7	11165
050813	O'BRIEN CALIF COGEN LTD	9798	SOX	P	2	1	1595	0.83	1323.85
050813	O'BRIEN CALIF COGEN LTD	9798	TSP	P	2	1	1595	7.5	11962.5
050813	O'BRIEN CALIF COGEN LTD	9899	CO	P	2	1	1510	35	52850
050813	O'BRIEN CALIF COGEN LTD	9899	ROG	P	2	1	1510	7	10570
050813	O'BRIEN CALIF COGEN LTD	9899	SOX	P	2	1	1510	0.83	1253.3
050813	O'BRIEN CALIF COGEN LTD	9899	TSP	P	2	1	1510	7.5	11325

changed to 0.6.

E1 DATA LEGEND

Column	Value	Description
Year	9798, 9899	9798 = Emissions Reporting Year, July 1, 1997 to June 30, 1998; 9899 = Emissions Reporting Year, July 1, 1998 to June 30, 1999
emittent_id	CO, ROG, SOX, TSP	CO (carbon monoxide), ROG (reactive organic gas), SOX (oxides of sulfur), TSP (total suspended particulates)
permitted	P	permitted equipment
source_id	2	turbine engine
fuel_id	1	natural gas
annual_usage	as reported	million standard cubic feet of gas burned
emission_factor	as reported	pounds of emittent per million standard cubic feet of gas burned
emission	as reported	pounds of emittent

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive, Diamond Bar, 91765

FACILITY PERMIT TO OPERATE

O'BRIEN CALIF COGEN LTD
17306 FLALLON AVE
ARTESIA, CA 90701

NOTICE

IN ACCORDANCE WITH RULE 206, THIS PERMIT TO OPERATE OR A COPY THEREOF MUST BE KEPT AT THE LOCATION FOR WHICH IT IS ISSUED.

THIS PERMIT DOES NOT AUTHORIZE THE EMISSION OF AIR CONTAMINANTS IN EXCESS OF THOSE ALLOWED BY DIVISION 26 OF THE HEALTH AND SAFETY CODE OF THE STATE OF CALIFORNIA OR THE RULES OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT. THIS PERMIT SHALL NOT BE CONSTRUED AS PERMISSION TO VIOLATE EXISTING LAWS, ORDINANCES, REGULATIONS OR STATUTES OF ANY OTHER FEDERAL, STATE OR LOCAL GOVERNMENTAL AGENCIES.

Barry R. Wallerstein, D. Env.
EXECUTIVE OFFICER

By ______________________
Carol Coy
Deputy Executive Officer
Engineering & Compliance

FACILITY PERMIT TO OPERATE
O'BRIEN CALIF COGEN LTD

SECTION A: FACILITY INFORMATION

LEGAL OWNER &/OR OPERATOR:	O'BRIEN CALIF COGEN LTD
LEGAL OPERATOR (if different than owner):	
EQUIPMENT LOCATION:	17306 FLALLON AVE ARTESIA, CA 90701-2605
MAILING ADDRESS:	1121 NICOLLET MALL STE 700 MINNEAPOLIS, MN 55403-2445
RESPONSIBLE OFFICIAL:	MARK ANDERSON
TITLE:	
TELEPHONE NUMBER:	(612) 373-5350
CONTACT PERSON:	BILL COTTON
TITLE:	PLANT MANAGER
TELEPHONE NUMBER:	(562) 924-7080

TITLE V	RECLAIM
YES	NOx: YES SOx: NO CYCLE: 2 ZONE: COASTAL

SECTION B: RECLAIM ANNUAL EMISSION ALLOCATION

The annual allocation of NOx RECLAIM Trading Credits (RTCs) for this facility is calculated pursuant to Rule 2002.Total NOx emission shall not exceed such annual allocations unless the operator obtains RTCs corresponding to the facility's increased emissions in compliance with Rules 2005 and 2007.

RECLAIM POLLUTANT ANNUAL ALLOCATION (POUNDS)

Year Begin (month/year)	End	Zone	NOx RTC Initially Allocated	NOx RTC[1] Holding as of 07/01/99 (pounds)	Non-Tradable[2] Credits (NTCs) (pounds)
7/1994	6 /1995	Coastal	24180	-13503	0
1/1995	12/1995	Coastal	0	0	0
7/1995	6 /1996	Coastal	24180	-13488	0
7/1996	6 /1997	Coastal	24180	-67	0
7/1997	6 /1998	Coastal	24180	0	
7/1998	6 /1999	Coastal	24180	24180	
7/1999	6 /2000	Coastal	61788	24180	
7/2000	6 /2001	Coastal	24180	24180	
7/2001	6 /2002	Coastal	21923	21923	
7/2002	6 /2003	Coastal	19666	19666	
7/2003	6 /2004	Coastal	17410	17410	
7/2004	6 /2005	Coastal	17410	17410	
7/2005	6 /2006	Coastal	17410	17410	
7/2006	6 /2007	Coastal	17410	17410	
7/2007	6 /2008	Coastal	17410	17410	
7/2008	6 /2009	Coastal	17410	17410	
7/2009	6 /2010	Coastal	17140	17140	
7/2010	6 /2011	Coastal	17140	17140	

Footnotes:

1. Changes to this figure due to trades, sales, or purchases of RTCs are not shown but current total RTC information can be obtained from the District's RTC Listing.
2. The use of such credits is subject to restrictions set forth in paragraph (h)(2) of Rule 2002.

SECTION C: FACILITY PLOT PLAN

(TO BE DEVELOPED)

SECTION D: FACILITY DESCRIPTION AND EQUIPMENT SPECIFIC CONDITIONS

The operator shall comply with the terms and conditions set forth below:

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
Process 1 : COGENERATION SYSTEM					
TURBINE, NATURAL GAS, GENERAL ELECTRIC, MODEL LM2500, WITH STEAM OR WATER INJECTION, 235 MMBTU/HR WITH A/N: 362822	D1	D2	NOX: MAJOR SOURCE**	CO: 10 PPMV NATURAL GAS (4) **[RULE 1303(a)(1)-BACT,5-10-1996]** ; CO: 2000 PPMV NATURAL GAS (5) **[RULE 407,4-2-1982]** NH3: 20 PPMV NATURAL GAS (4) **[RULE 1303(a)(1)-BACT,5-10-1996]** ; NOX: 9 PPMV NATURAL GAS (4) **[RULE 1303(a)(1)-BACT,5-10-1996]** NOX: 98 PPMV (8) **[40CFR 60 Subpart GG,3-6-1981]** ; PM: 0.1 GRAINS/SCF NATURAL GAS (5) **[RULE 409,8-7-1981]** PM: 11 LBS/HR NATURAL GAS (5A) **[RULE 475,10-8-1976;*RULE 475,8-7-1978*]** ; PM: 0.01 GRAINS/SCF NATURAL GAS (5B) **[RULE 475,10-8-1976** *RULE 475,8-7-1978*] ; SOX: 150 PPMV (8) **[40CFR 60 Subpart GG,3-6-1981]**	1-1, 1-2, 28-1, 63-1, 67-1, 73-1, 82-1, 82-2, 313-1, 315-1, 327-1
GENERATOR, 22.4 MW					
BOILER, HEAT RECOVERY, WATER TUBE TYPE					
TURBINE, STEAM, SHIN NIPPON					

* (1)	Denotes RECLAIM emission factor	(2)	Denotes RECLAIM emission rate
(3)	Denotes RECLAIM concentration limit	(4)	Denotes BACT emission limit
(5)(5A)(5B)	Denotes command and control emission limit	(6)	Denotes air toxic control rule limit
(7)	Denotes NSR applicability limit	(8)(8A)(8B)	Denotes 40 CFR limit(e.g. NSPS, NESHAPS,etc.)
(9)	See App B for Emission Limits	(10)	See Section J for NESHAP/MACT requirements

** Refer to Section F and G of this permit to determine the monitoring, recordkeeping and reporting requirements for this device.

SECTION D: FACILITY DESCRIPTION AND EQUIPMENT SPECIFIC CONDITIONS

The operator shall comply with the terms and conditions set forth below:

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
Process 1 : COGENERATION SYSTEM					
BURNER, DUCT, NATURAL GAS, COEN, MODEL LOWNOX, 80 MMBTU/HR A/N: 362822	D2	D1 C4	NOX: MAJOR *SOURCE***	CO: 10 PPMV NATURAL GAS (4) **[RULE 1303(a)(1)-BACT,5-10-1996]** ; CO: 2000 PPMV NATURAL GAS (5) **[RULE 407,4-2-1982]** NH3: 20 PPMV NATURAL GAS (4) **[RULE 1303(a)(1)-BACT,5-10-1996]** ; NOX: 9 PPMV NATURAL GAS (4) **[RULE 1303(a)(1)-BACT,5-10-1996]** NOX: 98 PPMV (8) **[40CFR 60 Subpart GG,3-6-1981]** ; PM: 0.1 GRAINS/SCF NATURAL GAS (5) **[RULE 409,8-7-1981]** PM: 11 LBS/HR NATURAL GAS (5A) **[RULE 475,10-8-1976;*RULE 475,8-7-1978*]** ; PM: 0.01 GRAINS/SCF NATURAL GAS (5B) **[RULE 475,10-8-1976** *RULE 475,8-7-1978*] ; SOX: 150 PPMV (8) **[40CFR 60 Subpart GG,3-6-1981]**	1-1, 1-2, 28-1, 63-1, 67-1, 73-1, 82-1, 82-2, 313-1, 315-1, 327-1
Process 2 : AIR POLLUTION CONTROL SYSTEM					
STORAGE TANK, AMMONIA A/N: 204770	D3				

* (1) Denotes RECLAIM emission factor
(2) Denotes RECLAIM emission rate
(3) Denotes RECLAIM concentration limit
(4) Denotes BACT emission limit
(5)(5A)(5B) Denotes command and control emission limit
(6) Denotes air toxic control rule limit
(7) Denotes NSR applicability limit
(8)(8A)(8B) Denotes 40 CFR limit(e.g. NSPS, NESHAPS,etc.)
(9) See App B for Emission Limits
(10) See Section J for NESHAP/MACT requirements

** Refer to Section F and G of this permit to determine the monitoring, recordkeeping and reporting requirements for this device.

SECTION D: FACILITY DESCRIPTION AND EQUIPMENT SPECIFIC CONDITIONS

The operator shall comply with the terms and conditions set forth below:

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
Process 2 : AIR POLLUTION CONTROL SYSTEM					
SELECTIVE CATALYTIC REDUCTION, JOHNSON MATTHEY, HEIGHT: 34 FT; LENGTH: 8 FT; WIDTH: 11 FT WITH A/N: 204770	C4	D2 C6			
AMMONIA INJECTION	C5				
CO OXIDATION CATALYST, HEIGHT: 8 FT; LENGTH: 2 FT 1 IN; WIDTH: 9 FT 6 IN A/N: 204770	C6	C4 S7			
STACK A/N: 204770	S7	C6			
Process 3 : R-219 EXEMPT EQUIPMENT SUBJECT TO SOURCE-SPECIFIC RULES					
RULE 219 EXEMPT EQUIPMENT, COATING EQUIPMENT, PORTABLE, ARCHITECTURAL COATINGS	E11			**ROG:** (9) [RULE 1113,11-8-1996;*RULE 1113,5-14-1999;*RULE 1171,6-13-1997;*RULE 1171,10-8-1999*]	67-2
RULE 219 EXEMPT EQUIPMENT, HALON UNIT	E12				23-1

* (1)	Denotes RECLAIM emission factor	(2)	Denotes RECLAIM emission rate
(3)	Denotes RECLAIM concentration limit	(4)	Denotes BACT emission limit
(5)(5A)(5B)	Denotes command and control emission limit	(6)	Denotes air toxic control rule limit
(7)	Denotes NSR applicability limit	(8)(8A)(8B)	Denotes 40 CFR limit(e.g. NSPS, NESHAPS,etc.)
(9)	See App B for Emission Limits	(10)	See Section J for NESHAP/MACT requirements

** Refer to Section F and G of this permit to determine the monitoring, recordkeeping and reporting requirements for this device.

Sympony Towers, Suite 2740
750 "B" Street
San Diego, CA 92101
619.615.7666

O'Brien California Cogen Ltd.

For records filing

May 3, 2000

Annie DeJesus
Customer Service Department
South Coast Air Quality Management District
P.O. Box 4943
Diamond Bar, CA 91765-0943

Subject: Request for Inactive Status for Facility ID 50813

Dear Ms. DeJesus:

O'Brien California Cogen Ltd. is transmitting this letter to request that all SCAQMD permit(s) related to the O'Brien California Cogeneration Plant at 17306 Flallon Avenue, Artesia, California, facility ID 50813, be closed. The facility was shut down on September 1, 1999, and is being permanently dismantled. Per a conversation on April 12, 2000 between Linda Miszkewycz of CH2M HILL and your customer service department, no fees are associated with canceling the permit(s). O'Brien California Cogen Ltd. also understands that there will not be any future reporting obligations under AB-2588 or the SCAQMD's emission fee billing program.

O'Brien California Cogen Ltd. asks for written confirmation that SCAQMD acknowledges this request. Please reply with a list of permit(s) that have been cancelled by SCAQMD based on this correspondence.

If there are any questions related to this matter, please contact Linda Miszkewycz of CH2M HILL at 714/429-2020, extension 2635 or myself at 619/615-6731.

Sincerely

Tim Hemig
Manager, Environmental Services - California

cc: Phil Krumpos/ NRG
John Yee / SCAQMD
Kyu Kyu Remillard / SCAQMD
Tom Chico / SCAQMD
Linda Miszkewycz / CH2M HILL

PROCESSED
MAY 10 2000
CUSTOMER SERVICE UNIT
By

Diary Status Date	Diary Status	Facility Team	Eng Init Asgnd	Source Of Entry	Diary Comments	Close Date	Close User Id
12/8/1999 00:00:00	RECD-1	C		elvar			
1/20/2000 11:36:45	ASG-1	C	HS01	meaton			
1/21/2000 08:36:59	LNKDWLD						
1/26/2000 10:37:16	LNKUPLD	C	HS01				
1/26/2000 14:37:51	LNKUPLD	C	HS01				
1/27/2000 09:23:30	LNKUPLD	C	HS01				
2/3/2000 00:00:00	PO	C	HS01	johny	Dispositioned by CAPPS		
5/10/2000 14:30:12	MOD_PER	EN		annied	FACILITY SHUT DOWN 9/1/99/LTR 5/3/00		

362822