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City of Anaheim
PUBLIC UTILITIES DEPARTMENT
Electric Operations Division

September 29, 2014

Mr. Dale Rundquist
Compliance Project Manager
Siting, Transmission and Environmental Protection (STEP) Division
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, CA 95814

Subject: Canyon Power Plant Petition to Amend (07-AFC-09C)

Dear Mr. Rundquist:

Electrical demand is such that the City of Anaheim ("City") can utilize the Canyon Power Plant's (CPP) generating capability more during peak demand periods, thus avoiding the need to secure more costly electrical power from other resources. Also, the California Independent System Operator (CAISO) is now requiring load serving entities, such as the City, to provide flexible capacity capable of responding quickly to supply fluctuations caused renewable resources such as solar and wind.

The City, as Southern California Public Power Authority's ("SCPPA") operating agent for CPP, proposes to modify CPP's license to allow each turbine to operation 280 regular hours per month, 60 start-ups and shutdowns per month, and 10 hours of combustion turbine maintenance per year. In addition, the City proposes to reduce the allowable particulate matter emission rate, based on source test results and reduce the maximum allowable operating hours for the black start engine to 50 hours per year. To initiate these proposed changes, the City is hereby submitting the attached Petition to Amend CPP's California Energy Commission license for approval.

The new CAISO flexible capacity rules become effective January 1, 2015, so we respectfully request CEC approval schedule that would accommodate this effective date.

Please call me with any questions.

Sincerely,

M. Robledo

Manny Robledo
Electric Operations Manager
City of Anaheim – Operating Agent for Canyon Power Plant

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Canyon Power Plant
(07-AFC-09C)

Amendment 2

Submitted to the
California Energy Commission

Submitted by
Southern California Public Power Authority

September 2014

With Assistance from
CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

Contents

Attachment

SECTION 1

Introduction

1.1 Background

On March 17, 2010, the California Energy Commission (CEC) approved and licensed Southern California Public Power Authority's (SCPPA) Canyon Power Plant (CPP) (07-AFC-09C). The CPP project is a nominal 200-megawatt simple-cycle power plant located in the City of Anaheim (COA). The project site is a 10-acre parcel located about 3.25 miles northeast of downtown Anaheim at 3071 East Miraloma Avenue. The primary source of process water for the project is reclaimed water supplied from the Orange County Groundwater Replenishment System (GWRS) via a new 2,185-foot-long, 14-inch pipeline utilizing a new offsite booster pump station. There are four new underground 69-kilovolt (kV) circuits leaving the site: two interconnect to the existing Vermont-Yorba 69-kV overhead lines across the street from the site and two interconnect to the existing Dowling-Yorba 69-kV line at East La Palma Avenue. Natural gas for the project is supplied via a new Southern California Gas Company 3,240-foot-long, 12-inch natural gas pipeline that connects into Southern California Gas Company's line L-1218 at East Orangethorpe Avenue. Construction of the project began on April 5, 2010 and commercial operation commenced in November 2011.

SCPPA submitted an amendment petition to the CEC license on May 8, 2012 to increase the carbon monoxide (CO) start-up limit in Condition of Certification AQ-2. The South Coast Air Quality Management District (SCAQMD) approved a modification to the applicable permit condition and issued a revised temporary Permit to Operate on June 14, 2012. The CEC issued an order approving the petition to amend Condition of Certification AQ-2 on September 17, 2012.

1.2 Description of Proposed Amendment

The purpose of this filing is to request the CEC's approval to amend the CPP Conditions of Certification AQ-1, AQ-2, and AQ-20 to increase the allowable operating hours per turbine per month to 335 hours, increase the number of monthly start-up and shutdowns per turbine to 60, provide up to 10 hours per year in maintenance testing for each turbine, and reduce the number of annual black start engine operating hours from 200 to 50. More detailed information on these proposed changes are provided in Section 2.

1.3 Necessity of Proposed Changes

Sections 1769 (a)(1)(A), (B), and (C) of the CEC Siting Regulations require a discussion of the necessity for the proposed revision to the CPP project and whether the revision is based on information known by the petitioner during the certification proceeding. The proposed changes are necessary to allow increased operation of the CPP turbines consistent with the power requirements of the SCPPA system, in compliance with applicable air quality regulations and permits.

1.4 Summary of Environmental Impacts

Section 1769 (a)(1)(E) of the CEC Siting Regulations requires that an analysis be conducted to address impacts the proposed revision may have on the environment and proposed measures to mitigate significant adverse impacts. Section 1769 (a)(1)(F) requires a discussion of the impacts of the proposed revision on the facility's ability to comply with applicable laws, ordinances, regulations, and standards (LORS). Section 3 discusses the potential impacts of the proposed changes on the environment, as well as the conformance with applicable LORS.

1.5 Consistency of the Changes with the License

Section 1769 (a)(1)(D) of the CEC Siting Regulations requires a discussion of the consistency of each proposed revision with the assumptions, rationale, findings, or other basis of the Final Decision of the project and whether the revision is based on new information that changes or undermines the basis of the Final Decision of the project. Also required is an explanation of why the revision should be permitted. The proposed changes do not undermine the assumptions, rationale, findings, or other basis of the Final Decision for the project. In addition, the project amendment, as proposed, is expected to comply with all applicable LORS.

SECTION 2

Description of Project Changes

Consistent with Section 1769 (a)(1)(A) of the CEC Siting Regulations, this section includes a description of the proposed project modifications, as well as the necessity for the changes.

2.1 Proposed Changes

SCPPA's electrical demand is such that it can utilize the CPP's generating capability more during peak demand periods, thus avoiding the need to secure more costly electrical power from other resources. Also, the California Independent System Operator (CAISO) is now requiring load serving entities, such as the SCPPA member utilities, to provide flexible capacity capable of responding quickly to supply fluctuations caused renewable resources such as solar and wind. SCPPA proposes to modify CPP's license to allow 335 hours per month of turbine operation; including 280 normal operating hours, plus 60 start-ups and shutdowns per month, and 10 hours of combustion turbine maintenance per year. In addition, SCPPA proposes to reduce the allowable particulate matter with an aerodynamic diameter equal to or less than 10 micrometers (PM_{10}) emission rate, for each combustion turbine, from 3 pounds per hour (lb/hr) to 1.67 lb/hr, based on source test results. Finally, SCPPA proposes to reduce the maximum allowable operating hours, for the black start engine, from 200 to 50 hours per year, inclusive of maintenance and performance testing. These proposed changes will not require any construction activities or soil disturbance.

The impacts associated with the proposed changes are discussed in Section 3.

2.2 Necessity of Proposed Changes

Sections 1769 (a)(1)(B) and (C) of the CEC Siting Regulations require a discussion of the necessity for the proposed revision to the project and whether this modification is based on information that was known by the petitioner during the certification proceeding.

The proposed changes to Conditions of Certification AQ-1, AQ-2, and AQ-20 were not known during the CPP licensing process, as the underlying conditions manifested during the initial operation of the facility.

SECTION 3

Environmental Analysis of the Project Changes

SCPPA has reviewed the modification proposed herein to determine if the proposed changes will result in any environmental impacts that were not originally analyzed by the CEC when it approved the project in March 2010. The only disciplines that could be affected by the proposed changes described in this amendment are air quality and public health. This determination is based on the fact that the proposed changes to CPP will not require any construction or earth-moving activities.

3.1 Air Quality

The proposed changes to CPP's operations include the following changes to the facility operating profile on a per combustion turbine basis:

- Monthly operating hours; excluding start, stop and maintenance hours, increase from 90 to 280
- Monthly start-ups and shutdowns increase from 20 to 60
- Annual maintenance hours increase from 0 to 10
- Annual operating hours; excluding start, stop and maintenance hours, increase from 1,080 to 2,674

Additionally, the black start annual operating hours are proposed to decrease from 200 to 50, inclusive of maintenance and performance testing.

The proposed changes to CPP's operations will result in an increase in criteria pollutant and hazardous air pollutants emissions. Table 3-1 presents an estimate of the combustion turbine emissions on a maximum monthly, average daily, and annual basis. Table 3-1 is based on 280 turbine operating hours per month, 60 start-ups and shutdowns per month, and 10 maintenance operating hours per month for each of the four turbines.

Table 3-2 presents an estimate of the black start engine's emissions on a maximum monthly, average daily, and annual basis assuming 50 hours per year of operation.

Table 3-1
CPP Proposed Combustion Turbine Emissions Estimate (Four Turbines, combined)

Pollutant	Normal Operating Hours per Month	Operating Emission Rate (lb/hr)	Start-ups / Shutdowns per Month	Start-up Emission Rate (lb/start-up)	Shutdown Emission Rate (lb/shutdown)	Maintenance Hours per Month	Maintenance Emission Rate (lb/hr)	Number of Start-ups per Year	Operating Hours per Year	Maximum Monthly Emissions (lb)	30-Day Average Emissions (lb)	Annual PTE (lb)
NOx	1,120	3.98	240	10.1	0.69	40	44.0	1,460	10,696	8,805	293	60,069
CO	1,120	4.24	240	11.6	0.62	40	19.4	2,160	8,800	8,458	282	64,483
VOC	1,120	1.20	240	0.79	0.27	40	1.25	1,460	10,696	1,648	55.0	14,433
$PM_{10}/PM_{2.5}$	1,120	1.67	240	0.75	0.18	40	1.67	1,460	10,696	2,160	72.0	19,287
SO_2	1,120	0.34	240	0.14	0.02	40	0.34	1,460	10,696	433	14.4	3,884
CO_2e [1]	--	--	--	--	--	--	--	--	11,382	--	--	300,787

Source: CPP Air Permit Application, Appendix A, August 2014

Notes:
CO_2 = carbon dioxide
lb = pound(s)
NOx = oxides of nitrogen
$PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 micrometers
PTE = potential to emit
SO_2 = sulfur dioxide
VOC = volatile organic compounds

[1] Metric tons of carbon dioxide equivalents (CO_2e).

Table 3-2

CPP Proposed Black Start Engine Emissions Estimate

Pollutant	Operating Hours per Month	Operating Emission Rate (lb/hr)	Maximum Monthly Emissions (lb)	30-Day Average Emissions (lb)	Annual PTE (lb)	Annual PTE (tons)
NOx	4.35	12.1	52.5	1.75	603	0.30
CO	4.35	6.53	28.4	0.95	327	0.16
VOC	4.35	0.05	0.22	0.01	2.50	0.00
$PM_{10}/PM_{2.5}$	4.35	0.05	0.22	0.01	2.50	0.00
SO_2	4.35	0.01	0.04	0.00	0.50	0.00
CO_2 [1]	4.35	--	--	--	--	27.4

Source: CPP Air Permit Application, Appendix A, August 2014

Notes:

[1] Metric tons of CO_2e.

Table 3-3 presents a comparison of the proposed CPP emissions for the combustion turbines and black start engine to those considered during the licensing of the CPP. As shown, there is an increase in the emissions for all pollutants.

Table 3-3

Comparison of Proposed Emissions to Licensed Emissions for the CPP

Pollutant	As Licensed [1]		As Proposed [2]		Difference	
	30-Day Average Emissions (lb)	Annual PTE (tons)	30-Day Average Emissions (lb)	Annual PTE (tons)	30-Day Average Emissions (lb)	Annual PTE (tons)
NOx	78.3	15.0	295	30.3	217	15.4
CO	84.4	15.7	283	32.4	198	16.7
VOC	17.2	3.11	55.0	7.22	37.7	4.11
$PM_{10}/PM_{2.5}$	39.9	7.19	72.0	9.64	32.1	2.45
SO_2	4.51	0.81	14.4	1.94	9.92	1.13
CO_2 [3]	--	128,234	--	300,814	--	172,581

Source: CPP Air Permit Application, Appendix A, August 2014

Notes:

[1] Final Decision Condition AQ-1 and Final Staff Assessment Air Quality Table 14 and GHG Table 3.

[2] Proposed emissions taken from Tables 3-1 and 3-2.

[3] Metric tons of CO_2e.

The proposed changes in CPP operations will result in increases of PM_{10}, volatile organic compounds (VOC), sulfur dioxide (SO_2), and CO emissions on a 30-day average. SCPPA estimates that 39 pounds per day (lb/day) of PM_{10} offsets[1] will be needed for all four turbines combined, based upon the project's PM_{10} emissions increase of 32.1 lb/day and an offset

[1] PM_{10} Emission Reduction Credits (ERCs) = 32.09 lb/day x 1.2

ratio of 1.2:1. The SCAQMD estimated total VOC offset requirements are 40 lb/day,[2] based upon an offset ratio of 1.2:1. The SO_2 emissions are below the SCAQMD offset threshold of 4 tons per year and are, therefore, exempt from offset requirements pursuant to SCAQMD Rule 1304. However, the 39 lb/day of PM_{10} offsets are sufficient to mitigate the increase in both PM_{10} and SO_2 on a 1 to 1 basis.[3] Finally, the South Coast air basin is in attainment with CO standards, so offsets do not apply.

The proposed changes in CPP operations will also result in an increase of annual oxides of nitrogen (NOx) emissions, such that an additional 30,717 pounds of Regional Clean Air Markets (RECLAIM) Trading Credits (RTCs) must be retained at the time the revised permit is issued, pursuant to SCAQMD Rule 2005. This offset requirement reflects the increase from all four turbines when maintenance emissions occur, and the decrease in annual NOx emissions that will be attributed to the reduced operating schedule of the black start engine.

SCPPA has purchased offsets to accommodate the proposed changes and SCAQMD has recorded the transfers. Table 3-4 includes a summary of PM_{10}, VOC, and NOx RTCs that have been purchased for the project. SCPPA will acquire an additional 4 lb/day of VOC ERCs prior to the issuance of the Permit to Construct to satisfy the ERC obligation for the proposed change to the operating profile. Copies of transfer certificates are included in Attachment 1.

Table 3-4
CPP ERC/RTC

Pollutant	Certificate	Amount	Zone/Cycle
PM_{10} (lb/day)	AQ013820	4	Coastal
PM_{10} (lb/day)	AQ013819	31	Coastal
PM_{10} (lb/day)	AQ013747-AQ013752	2	Coastal
PM_{10} (lb/day)	AQ013759-AQ013764	1	Coastal
PM_{10} (lb/day)	AQ013753-AQ013758	1	Coastal
VOC (lb/day)	AQ013821	36	Coastal
NOx (lb/year)	2015+	16,220	Coastal/Cycle 1
NOx (lb/year)	2016+	25,000	Coastal/Cycle 2
NOx (lb/year)	2015+	8,776	Coastal/Cycle 1

To determine if the increased air emissions result in significant air quality impacts, air dispersion modeling was performed consistent with the requirements of the SCAQMD. This modeling effort was conducted using 5-years of meteorological data from the Anaheim meteorological station (AQS ID 060590007) for the years 2006 to 2009 and 2012. Upper air meteorological data were collected from the Miramar Naval Air Station near San Diego for the same period.

The AERMOD dispersion model (version 14134) was used to determine ambient air quality impacts of the proposed changes. The AERMOD modeling was performed using the urban modeling option and assumed all NOx was emitted in the form of nitrogen dioxide (NO_2)

[2] Based on a September 12, 2014 email from Ms. Vicky Lee/SCAQMD to Mr Karl Lany/SCEC.

[3] The natural gas fuel sulfur content is typically less than the allowable limit of 0.25 grains per 100 standard cubic feet in Condition AQ-6.

(i.e., no Ozone Limiting Modeling was performed). Further details on the dispersion modeling methodology can be found in Attachment 1, which contains the Air Quality Impact Analysis submitted with the air permit application.

Ambient background concentrations were collected from the Anaheim monitoring station (California Air Resources Board [CARB] ID 30178/SCAQMD ID 061) located at 1630 Pampas Lane, Anaheim, CA 92802. This monitoring station is located approximately 5 miles from CPP and was used in the original CPP licensing air quality analysis.

Table 3-5 presents the operational air dispersion modeling results for the proposed increases in combustion turbine start-ups, shutdowns, and operating hours. The federal 1-hour NO_2 results presented in Table 3-5 exclude the black start engine as this unit is being permitted to operate up to 50 hours per year and is not expected to contribute significantly to the annual distribution of daily maximum 1-hour concentrations.[4] The air dispersion modeling files are provided on a compact diskette.

TABLE 3-5
CPP Operation Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m³)	Background Concentration (µg/m³) [1]	Total Predicted Concentration (µg/m³)	Most Stringent Standard (µg/m³)	Comply (Yes/No)
NO_2 [2]	Federal 1-hour [3]	18.04	115	133.02	188	Yes
	1-hour	109.5	115	224.5	339	
	Annual	0.093	32.9	33.02	57	
SO_2	Federal 1-hour [4]	0.20	24.9	25.10	196	Yes
	3-hour	0.19	157	157.2	1,300	
	24-hour	0.09	5.50	5.59	105	
CO	1-hour	161	3,437	3,598	23,000	Yes
	8-hour	30.9	2,635	2,666	10,000	
PM_{10}	24-hour	0.44	53.0	53.44	50	Yes
	Annual	0.027	24.8	24.83	20	
$PM_{2.5}$	24-hour [3]	0.29	28.1	28.39	35	Yes
	Annual	0.027	11.0	11.03	12	

Source: CPP Air Permit Application, Appendix B, August 2014

Notes:
µg/m³ = micrograms per cubic meter

[1] Background concentrations were the highest concentrations monitored during 2008 through 2010.
[2] The hourly and annual NO_2 concentrations conservatively assume a complete conversion of NOx to NO_2.
[3] Total predicted concentrations for the federal 1-hour NO_2 standard and 24-hour $PM_{2.5}$ standard are the respective maximum modeled concentrations combined with the three-year average of 98th percentile background concentrations.
[4] Total predicted concentration for the federal 1-hour SO_2 standard is the maximum modeled concentration combined with the 3-year average of 99th percentile background concentrations.

[4] http://www.epa.gov/ttn/scram/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf

3.1.1 Air Quality Regulatory Evaluation

This section provides an evaluation of the proposed changes relative to the applicable Federal, State, and local regulations.

Federal and State Regulations

The SCAQMD is responsible for issuing the federal and state New Source Review (NSR) permits and is delegated enforcement of applicable Federal Clean Air Act requirements.

Local Regulations

The basis for the compliance demonstration contained in the CPP Final Decision for SCAQMD Rules 212, 218, 401, 402, 404, 407, 409, 431.1, 431.2, and 475 are still applicable and will not be reiterated herein.

Regulation XIII, Rule 1303 and Regulation XX, Rule 2005

Best Available Control Technology
The proposed increase in monthly operating hours does not result in an increase in pollutant concentrations or hourly air emissions beyond the levels determined by the SCAQMD to be Best Available Control Technology (BACT). Additionally, the SCAQMD has not recently determined BACT levels for simple-cycle gas turbines which differ from CPP's emissions levels. Therefore, the proposed changes are consistent with SCAQMD Rule 1303 BACT requirements.

Dispersion Modeling
As shown in Table 3-5, the proposed increase in air emissions will not cause or contribute to the violation of an ambient air quality standard nor do the annual impacts exceed the significant change concentrations in SCAQMD Rules 1303 or 2005.

Emission Offsets
As shown in Table 3-4, an increase in average daily emissions is expected. Because the South Coast air basin is in attainment with applicable CO standards, no offsets are required. Offsets for VOC, SO_2, and PM_{10} emissions will be provided consistent with SCAQMD Rule 1303(b)(2). The annual NOx emissions increase will be mitigated by securing RTCs prior to the issuance of the revised permit, consistent with SCAQMD Rule 2005.

Regulation XVII – Prevention of Significant Deterioration

The SCAQMD is delegated authority to administer the Prevention of Significant Deterioration (PSD) pre-construction permitting program, including greenhouse gases (GHGs). During the original licensing proceeding, the CEC staff concluded that CPP was not subject to PSD review/permitting because the criteria pollutant air emissions did not exceed the PSD significant emissions rate threshold of 250 tons per year. The proposed changes considered in this petition do not alter the conclusions reached by CEC staff that the CPP's emissions do not exceed the PSD significant emissions rate threshold for criteria pollutants. Based on discussions with the SCAQMD, and in light of the recent U.S. Supreme Court decision, the SCAQMD will not be issuing a PSD permit for GHGs.[5]

[5] Personnel communication with Vicky Lee (Air Quality Engineer, SCAQMD, 909-396-2284) on August 29, 2014.

3.1.2 Cumulative Impact Assessment

The proposed changes to the CPP license do not alter the basis of the cumulative impact assessment used in preparing the approved CPP license.

3.2 Public Health

The proposed increase in CPP's toxic air contaminant (TAC) emissions has the potential of resulting in a significant public health impact. Table 3-6 presents the CPP's hourly and annual TAC emissions for the combustion turbines and black start engine based on the change in annual operating hours and the number of start-ups and shutdowns. The TAC emissions presented in Table 3-6 represent 2,958 turbine operating hours and assume a heat input of 479 million British thermal units per hour (MMBtu/hr) on a higher heating value basis.

Table 3-6
CPP TAC Emissions Estimate

Compound	Emission Factor (lb/MMBtu)	One Turbine (lb/hr)	Four Turbines (lb/year)	Source
Acetaldehyde	4.00E-05	1.92E-02	2.27E+02	AP-42
Acrolein [1]	3.62E-06	1.73E-03	2.05E+01	AP-42
Ammonia	--	3.64E+00	4.31E+04	AP-42
Benzene [1]	3.26E-06	1.56E-03	1.85E+01	AP-42
Butadiene (1,3)	4.30E-07	2.06E-04	2.44E+00	AP-42
Ethylbenzene	3.20E-05	1.53E-02	1.81E+02	AP-42
Formaldehyde [1]	3.60E-04	1.72E-01	2.04E+03	AP-42
Hexane	2.56E-04	1.23E-01	1.45E+03	CATEF
Benzo(a)pyrene	1.37E-08	6.56E-06	7.76E-02	CATEF
Benzo(a)anthracene	2.23E-08	1.07E-05	1.26E-01	CATEF
Benzo(b)flouranthene	1.12E-08	5.36E-06	6.35E-02	CATEF
Benzo(k)flouranthene	1.09E-08	5.22E-06	6.18E-02	CATEF
Chrysene	2.49E-08	1.19E-05	1.41E-01	CATEF
Dibenz(a,h)anthracene	2.32E-08	1.11E-05	1.31E-01	CATEF
Indeno(1,2,3-cd)pyrene	2.32E-08	1.11E-05	1.31E-01	CATEF
Naphthalene	1.64E-06	7.86E-04	9.29E+00	CATEF
Propylene	2.90E-05	1.39E-02	1.64E+02	AP-42
Toluene	1.30E-04	6.23E-02	7.37E+02	AP-42
Xylene	6.40E-05	3.07E-02	3.63E+02	AP-42
Diesel Particulate Matter [2]	--	4.96E-02	2.48E+00	

Source: CPP Air Permit Application, Appendix A, August 2014

Notes:
CATEF = California Air Toxics Emission Factor Database
lb/MMBtu = pounds per million British thermal unit

[1] Formaldehyde, Benzene, and Acrolein emission factors were taken from the background document for AP-42, Section 3.1, Table 3.4-1 for a natural gas combustion turbine with a CO catalyst. Hourly emission rates reflect a heat input of 479 MMBtu/hr, as listed in the CPP's RECLAIM permit.
[2] Diesel particulate matter emissions are only emitted by the black start engine; annual emissions were based on the hourly emission rate for 50 hours per year.

A facility wide health risk assessment (HRA) was conducted for the proposed CPP operating hours using HARP version 1.4f. AERMOD (version 14134) output utilizing unit emissions of 1 gram per second per emission source were used as dispersion modeling results input for HARP. AERMOD inputs and outputs are provided on a compact diskette submitted under a separate cover. Emission sources included in the facility wide health risk assessment were the four combustion turbines and the black start generator. Cooling tower emissions were not modeled as no changes to this sources operating profile are proposed. Emissions were input for each unit in terms of maximum pounds per hour and pounds per year. Speciated toxics were input for each unit, except the Black Start Generator, where diesel PM is the emitted toxic.

The maximum incremental cancer risk (MICR), chronic health index (HIC) and acute health index (HIA) at their respective point of maximum impact (PMI) are summarized below in Table 3-7. The cancer PMI is located on the northeast side of the facility fence-line. The chronic and acute PMIs are located approximately 132 and 188 meters northeast of the facility, respectively. The facility would be less than significant for the cancer risk, chronic, and acute hazard indexes. The South Coast Air Quality Management District (SCAQMD) thresholds of significance are summarized in Table 3-7 below.

Table 3-7
CPP Health Risk Assessment Results at the PMI

Receptor Location	Maximum Excess Cancer Risk[a]	Maximum Hazard Index Chronic[a]	Maximum Hazard Index Acute
PMI	0.0998 per million[b]	0.000654	0.00327
SCAQMD Significance Threshold	10 in one million	1.0	1.0

Note:

[a] Derived (OEHHA) Method used at each receptor

[b] Derived Adjusted Method yields a MICR PMI of 0.077 per million

SECTION 4

Proposed Modifications to the Conditions of Certification

Consistent with the requirements of Section 1769 (a)(1)(A) of the CEC Siting Regulations, this section addresses the proposed modification to the project's Conditions of Certification.

4.1 Conditions of Certification

A modification to Conditions of Certification AQ-1, AQ-2 and AQ-20 be required to allow for an increased number of operating hours, start-ups/shutdowns, and the reduction in the black start engines annual operating hours. SCPPA has provided draft revisions to Conditions of Certification AQ-1, AQ-2, and AQ-20 below for consideration. No changes are proposed to the verification language for these conditions; therefore, it was not included below.

AQ-1 The project owner shall limit emissions from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
VOC	Less than or equal to 412~~129~~ lbs IN ANY CALENDAR MONTH
PM10	Less than or equal to 540~~299~~ lbs IN ANY CALENDAR MONTH
SOx	Less than or equal to 108~~34~~ lbs IN ANY CALENDAR MONTH

For the purposes of this condition, the above emission limits shall be based on the emissions from a single turbine.

~~The turbine shall not commence with normal operation until the commissioning process has been completed. Normal operation commences when the turbine is able to supply electrical energy to the power grid as required under contract with the relevant entities. The District shall be notified in writing once the commissioning process for each turbine is completed.~~

~~Normal operation may commence in the same calendar month as the completion of the commissioning process provided the turbine is in compliance with the above emission limits.~~

The project owner shall calculate the monthly emissions for VOC, PM10, and SOx using the equation below.

Monthly Emissions, lbs/month = (Monthly fuel usage in mmscf/month) * (Emission factors indicated below)

~~For commissioning, the emission factors shall be as follows: VOC, 3.76 lbs/mmcf; PM10, 6.03 lbs/mmcf; and SOx, 0.68 lbs/mmcf.~~

For normal operation, the emission factors shall be as follows: VOC, 2.59 lbs/mmcf; PM10, 3.357~~6.03~~ lbs/mmcf; and SOx, 0.68 lbs/mmcf.

~~For a month during which both commissioning and normal operation take place, the monthly emissions shall be the total of the commissioning emissions and the normal operation emissions.~~

The project owner shall maintain records in a manner approved by the District to demonstrate compliance with this condition and the records shall be made available to District personnel upon request.

[RULE 1303(b)(2)–Offset, 5-10-1996; RULE 1303(b)(2)–Offset, 12-6-2002]

AQ-2 The 2.5 ppm NOx, 4.0 ppm CO, and 2.0 ppm ROG emission limits shall not apply during turbine commissioning, start-up, ~~and~~ shutdown, and maintenance periods. ~~Commissioning shall not exceed 156 hours total.~~ Each start-up shall not exceed 35 minutes. Each shutdown shall not exceed 10 minutes. Each turbine shall be limited to a maximum of ~~240~~ 540 start-ups per year. Maintenance will include (but is not limited to) activities such as tuning and testing of the emission control systems, and such maintenance shall not exceed 10 hours per turbine per year.

NOx, CO, and ROG emissions for an hour that includes a start-up shall not exceed 14.27 lbs for NOx, 11.6 lbs for CO, and 1.29 lbs for ROG and for the hour that includes a shutdown 4.07 lbs for NOx, 4.15 for CO, and 1.27 lbs for ROG. For the purpose of defining an hour that includes a start-up, the period begins when natural gas is first introduced into the turbine and ends after 60 minutes. The worst case includes a full start-up sequence of 35 minutes, followed immediately by a turbine trip, a five minute purge period during which no fuel is burned, and the first 20 minutes of restart sequence.

The project owner shall maintain records in a manner approved by the District to demonstrate compliance with this condition and the records shall be made available to District personnel upon request.

For the purposes of this condition, start-up shall be defined as the start-up process to bring the turbine to full successful operation.

[RULE 1703(a)(2)–PSD-BACT, 10-7-1988; RULE 2005,5-6-2005; RULE 1303(a)(1)–BACT, 5-10-1996; RULE 1303(a)(1)–BACT, 12-6-2002] [Devices subject to this condition: D1, D7, D13, D19]

AQ-20 The project owner shall limit the operating time to no more than ~~200~~50 hour(s) in any one year, including~~. The 200 hours in any one year shall include no more than 50 hours for~~ maintenance and performance testing.

The duration of each test shall not exceed 38 minutes in any one hour.

[RULE 1110.2, 2-1-2008; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002; RULE 1401, 3-7-2008; RULE 1470, 6-1-2007; RULE 2012, 5- 6-2005; CA PRC CEQA, 11-23-1970; CA PRC CEQA, 11-23-1970]
[Devices subject to this condition: D25]

SECTION 5

Potential Effects on the Public and Property Owners

The proposed changes described in this amendment will have no effect on the public and property owners beyond what was originally approved by the CEC.

The proposed changes are expected to result in comparable impacts to the public and property owners as were analyzed during project licensing. Therefore, impacts to the public and property owners are expected to be the same as those analyzed during the license proceeding for the project.

SECTION 6

List of Property Owners

Consistent with Section 1769 (a)(1)(H) of the CEC Siting Regulations, this section lists the property owners affected by the proposed revision. The list of property owners within 1,000 feet of the CPP is provided as Attachment 2 to this amendment.

SECTION 7

References

Canyon Power Plant Final Commission Decision (07-AFC-9), March 2010, CEC-800-2010-001-CMF.

ATTACHMENT 1

South Coast Air Quality Management District
Title V Permit Modification Application

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

REVISED APPLICATION
TO MODIFY OPERATING CONDITIONS
FOR AN EXISTING PERMIT TO OPERATE
GAS TURBINE UNITS #1 THROUGH #4

FACILITY LOCATION:

Canyon Power Plant
3071 E. Miraloma Avenue
Anaheim, California 92806

FOR SUBMITTAL TO:

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

PREPARED BY:

SCEC
Air Quality Specialists
1582-1 N. Batavia Street
Orange, California 92867

June 2014

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SECTION 1.0

INTRODUCTION

1.1 General Introduction and Project Summary

The City of Anaheim Canyon Power Plant operates under a Title V and RECLAIM permit (SCAQMD facility ID No. 153922). In 2013 the City of Anaheim submitted an application to modify operating conditions related to gas turbine units #1 through #4 at the Canyon Power Plant. The initial application primarily was to increase allowable monthly operations to 176 hours per turbine.

During the application review process, the City of Anaheim discovered that it will require up to 335 monthly operating hours per turbine, rather than the 176 hours that were than envisioned at the time the initial application to modify the permit was submitted. Projected maximum monthly operations of 335 hours include 280 hours of normal operations, up to 60 start and stop sequences (45 hours) and 10 hours for maintenance operations per turbine. Increases in monthly and 30-day average emissions are to be offset using ERCs that were purchased and recorded with SCAQMD earlier this year.

Projected annual maximum operations include up to 540 start / stop sequences and 10 maintenance hours for each turbine. Maximum annual emissions reflect limits on total annual emissions of each criteria pollutant as discussed in Sections 2.0 and 3.0 of this report.

The changes in operating conditions reflect the following permit modifications:

- Add equipment descriptions to accurately reflect the use of internal combustion engines rated at or below 50 hp as reflected in past APEP submittals.
- Adjust the PM10 rate in Permit Condition A63.1 from 6.03 lbs. /mmcf to 3.357 lbs. /mmcf. This will result in a maximum emission rate of approximately 1.67 lbs. /hr. during normal full load operations and 0.75 pounds during a 35-minute startup sequence. The proposed PM10 emission rate has been consistently demonstrated through numerous emissions tests of LM6000 gas turbines throughout the South Coast AQMD and elsewhere in California, including tests at the Anaheim Canyon facility.
- Provide for prudent equipment maintenance operations that are allowed for other power generating facilities in the South Coast Basin by allowing for a 10 hour (per turbine)
- Reduce the allowable operations of the black start engine to 50 hours per year and reduce the annual NO_X RTC holding requirement.

1.2 Technical Project Contacts

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SECTION 2.0

FACILITY AND EQUIPMENT INFORMATION

2.1 Facility Description

The facility operates four General Electric LM6000 gas turbine generators, which are used for peak power generation. The facility also consists of ancillary equipment necessary for the operation of the gas turbine generators as well as one black start engine. The facility address is:

City of Anaheim
Canyon Power Plant
3071 E. Miraloma Avenue
Anaheim, California 92806

2.2 Equipment Description

The requested changes in operating conditions affect gas turbine units #1 through #4, which are currently listed in Section H of the facility permit (applications 476651, 476656, 476659 and 476661, respectively). The gas turbines are identical GE LM6000 PC Sprint models, with a rated fuel consumption capacity of 479 mmbtu/hr @ 46^{o} F. The gas turbines are operated as peaking units, and the permitted operation for each turbine is approximately 105 hours per month and approximately 1260 hours per year.

Table 2-1 clarifies changes in operations that will result from the modification. Table 2-2 summarizes the specific changes to existing permit conditions that are being requested, to reflect the monthly operating schedule of 335 hours for each of the gas turbines, an allowance for testing and maintenance hours for the gas turbines and reduced operation of the black start engine.

Table 2-1
Summary of Proposed Changes in Operations and Emission Rates

Existing Operating Parameter	Proposed Operating Parameter
Monthly emissions and default emission factors allow for the equivalent of 49.6 mmcf (approximately 105 hours per turbine with 20 starts).	Monthly operations will be increased to allow for the equivalent of 152.8 mmcf (approximately 335 hours per turbine with 60 starts).
30-day PM10 emissions reflect an assumed maximum PM10 emission rate of 6.03 lbs. /mmscf (approximately 3 lbs. /hr. at Maximum load) based upon EPA AP-42.	30-day PM10 emissions will reflect a lower emission factor of 3.357 lbs. /mmscf (approximately 1.67 lb. /hr.) based upon demonstrated actual emissions, with a reasonable compliance margin.
Annual NO_X RTC holding requirement is 6,866 lbs. /turbine.	The modification will result in the need for a total of 15,014 lbs. of NO_X RTCs per turbine.
The facility black start engine is limited to 200 hours of operation per year.	The engine will be limited to 50 hours per year. Annual NO_X RTC holding requirements for the device will be reduced to 603 lbs.
Unlike SCAQMD permits issued for similar peaking turbines, the permit for Canyon Power Plant includes no provisions for brief maintenance periods.	Permit conditions that exclude NO_X, CO and ROG concentration limits during startup and shutdown will be modified to also include up to 10 hours per year for maintenance operations for each turbine.
The existing permit reflects the assumption that annual operations are equal to the maximum monthly emissions for 12 months per year.	A new permit condition will be added to limit annual emissions as specified in Section 3.0 of this report.

Table 2-2
Requested Changes to Permit Conditions

Condition Number	Proposed Change of Condition
A63.1	The Operator Shall limit emissions from this equipment as follows: • VOC Less than ~~129~~ 412 LBS IN ANY CALENDARMONTH • PM10 Less than ~~299~~ 540 LBS IN ANY CALENDAR MONTH • SOX Less than ~~34~~ 108 LBS IN ANY CALENDAR MONTH ….The operator shall calculate the emission limit(s) by using monthly fuel use data and the following emission factors: PM10: ~~6.03~~ 3.357 lbs. /mmcf …..
A99.1	The 2.5 PPM NOX emission limit(s) shall not apply during ~~turbine commissioning,~~ start-up, ~~and~~ shutdown, and maintenance periods……The turbines shall be limited to a maximum of ~~240~~ 540 start-ups per turbine and up to 10 hours of maintenance operations per turbine annually.
A99.2	The 4.0 PPM CO emission limit(s) shall not apply during ~~turbine commissioning,~~ start-up, ~~and~~ shutdown, and maintenance periods……The turbines shall be limited to a maximum of ~~240~~ 540 start-ups per turbine and up to 10 hours of maintenance operations per turbine annually.
A99.3	The 2.0 PPM ROG emission limit(s) shall not apply during ~~turbine commissioning,~~ start-up, ~~and~~ shutdown, and maintenance periods……The turbines shall be limited to a maximum of ~~240~~ 540 start-ups per turbine and up to 10 hours of maintenance operations per turbine annually.
New Condition	The Operator Shall limit emissions from this equipment as follows: • VOC Less than 14,431 LBS IN ANY ONE YEAR • PM10 Less than 19,287 LBS IN ANY ONE YEAR • SOX Less than 3,884 LBS IN ANY ONE YEAR

SECTION 3.0

EMISSIONS INFORMATION

3.1 Criteria Pollutant Emissions Overview

Estimated criteria pollutant emissions are summarized in Tables 3-1 through 3-4. Appendix A contains more detailed emission calculation worksheets for the project. Emission factors reflect those values initially used to obtain a permit to construct the gas turbines, except for the revised PM10 factor (3.357 lb. /mmcf) which reflects actual measured emission rates, plus a reasonable compliance margin.

Monthly emissions from the turbines reflect a monthly operating schedule of 335 hours, including 60 start / stop sequences and 10 maintenance hours for each unit. Annual emissions reflect an analysis of two operating scenarios. The first profile includes 540 start /stop sequences, 10 maintenance hours and 2,200 normal operating hours for each turbine. Annual NO_x emissions for the first operating profile are 15,014 lbs. per turbine.

The second annual operating profile includes only 365 start / stop sequences and 10 maintenance hours per turbine. NO_x emissions were set at 15,014 lbs. per turbine (equal to annual emissions that would result from the first operating profile). Because emissions resulting from the reduced number of start / stop events in the second operating profile, the number of annual normal operating hours can be increased to 2,674 hours without exceeding the annual NOx emission limit of 15,014 lbs. per turbine.

The first operating profile results in higher annual CO emissions, while the second operating profile results in higher annual VOC, PM and SO_x emissions. The highest emissions from the two profiles are selected for each pollutant as annual emission limits and for dispersion modeling where applicable.

Tables 3-1 and 3-2 summarize maximum emissions resulting from the first and second operating profiles for all turbines combined. Table 3-3 reflects the highest emissions for each pollutant of the two operating profiles and summarizes increases and decreases in 30-day and annual emissions for VOC, SO_X, PM10, PM2.5, CO and NO_X . Although there will be an increase in potential VOC emissions on a 30-day average, total VOC emissions to be offset are calculated upon the increase above the offset threshold of four tons per year for the facility. SO_X emissions after the modification remain below the offset threshold of four tons per year and CO emissions are exempt from offset requirements. NO_X emissions must be offset to reflect the increase in annual emissions through the acquisition of additional RECLAIM Trading Credits (RTCs) and through the reduction in annual emissions from the black start engine.

Table 3-4 provides a summary of emissions decreases from the proposed modifications to operating conditions for the black start engine. This engine is currently permitted to operate 200 hours per year. The proposed modification will limit its operations to 50 hours per year, so

annual potential to emit all pollutants will decrease accordingly. The reduction in annual NO_X emissions will allow some of the NO_X RTCs that are currently allocated to black start engine operations to be used to offset emissions from the increase in gas turbine operations.

Table 3-1
Criteria Pollutant Emissions Summary
Four Turbines
(Operating Profile #1)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	Lb / Shutdown	No. of Maintenanc Operatin Hours per Month	Maintenanc Operatin Hour Emission Rat	Number of Startup per	Number of Norma Operatin Hours Yea	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs) (2,615 total hours, 540 starts per turbine)
NOx	1120	3.98	240	10.09	0.69	40	43.64	2160	8800	8790.40	293.01	60,054
CO	1120	4.24	240	11.6	0.62	40	14	2160	8800	8241.60	274.72	64,267
VOC	1120	1.20	240	0.79	0.27	40	1.20	2160	8800	1646.40	54.88	12,898
PM10/PM2.	1120	1.67	240	0.75	0.18	40	1.67	2160	8800	2160.40	72.01	16,772
SOx	1120	0.34	240	0.14	0.02	40	0.34	2160	8800	432.80	14.43	3,351

Table 3-2
Criteria Pollutant Emissions Summary
Four Turbines
(Operating Profile #2)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	Lb / Shutdown	No. of Maintenanc Operatin Hours per Month	Maintenanc Operatin Hour Emission Rat	Number of Startup per	Number of Norma Operatin Hours Yea	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs) (2,958total hours, 365 starts per turbine)
NOx	1120	3.98	240	10.09	0.69	40	43.64	1460	10696	8790.40	293.01	60,054
CO	1120	4.24	240	11.6	0.62	40	14	1460	10696	8241.60	274.72	63,752
VOC	1120	1.20	240	0.79	0.27	40	1.20	1460	10696	1646.40	54.88	14,431
PM10/PM2.	1120	1.67	240	0.75	0.18	40	1.67	1460	10696	2160.40	72.01	19,287
SOx	1120	0.34	240	0.14	0.02	40	0.34	1460	10696	432.80	14.43	3,884

Table 3-3
Criteria Pollutant Emissions Summary
Four Turbines
(Highest of two Operating Profiles)

Pre-Modification PTE (Four Turbines)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	Lb / Shutdown	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	360	3.98	80	10.09	0.69	960	4320	2295.20	76.51	27,542
CO	360	4.24	80	11.6	0.62	960	4320	2504.00	83.47	30,048
VOC	360	1.20	80	0.79	0.27	960	4320	516.80	17.23	6,202
M10/PM2.	360	3.00	80	1.29	0.18	960	4320	1197.60	39.92	14,371
SOx	360	0.34	80	0.14	0.02	960	4320	135.20	4.51	1,622

Post-Modification PTE (Four Turbines)
Annual emissions based upon highest operating scenario (#1 for CO and #2 for all other pollutants).

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	Lb / Shutdown	No. of Maintenance Operating Hours per Month	Maintenance Operating Hour Emission Rate	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	1120	3.98	240	10.09	0.69	40	43.64	1460	10696	8790.40	293.01	60,054
CO	1120	4.24	240	11.6	0.62	40	14	2160	8800	8241.60	274.72	64,267
VOC	1120	1.20	240	0.79	0.27	40	1.20	1460	10696	1646.40	54.88	14,431
M10/PM2.	1120	1.67	240	0.75	0.18	40	1.67	1460	10696	2160.40	72.01	19,287
SOx	1120	0.34	240	0.14	0.02	40	0.34	1460	10696	432.80	14.43	3,884

Increase (Decrease) in PTE (Four Turbines)

Pollutant	Normal Operating Hour Emission Rate	lb / Startup	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	0.00	0.00	0.00	6495.20	216.51	32,512
CO	0.00	0.00	0.00	5737.60	191.25	34,219
VOC	0.00	0.00	0.00	1129.60	37.65	8,229
M10/PM2.5	(1.33)	(0.54)	0.00	962.80	32.09	4,916
SOx	0.00	0.00	0.00	297.60	9.92	2,261

Table 3-4
Criteria Pollutant Emissions Summary
Black Start Engine

Pre-Modification PTE (Black Start Engine @ 200 hrs/yr)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	4.353	12.06	52.50	1.75	2,412
CO	4.353	6.53	28.43	0.95	1,306
VOC	4.353	0.05	0.22	0.01	10
PM10/PM2.5	4.353	0.05	0.22	0.01	10
SOx	4.353	0.01	0.04	0.00	2

Post-Modification PTE (Black Start Engine @ 50 Hrs/yr)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	4.353	12.06	52.50	1.75	603
CO	4.353	6.53	28.43	0.95	327
VOC	4.353	0.05	0.22	0.01	3
PM10/PM2.5	4.353	0.05	0.22	0.01	3
SOx	4.353	0.01	0.04	0.00	1

Increase (Decrease) in PTE (Black Start Engine @ 50 Hrs Yr)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx					(1,809)
CO					(980)
VOC					(8)
PM10/PM2.5					(8)
SOx					(2)

3.2 Toxic Pollutant Emissions Overview

Table 3-5 provides a summary post-modification of hourly and annual emissions from the four combustion gas turbines. Additional detailed emissions data are contained in Appendix A. Ammonia emissions reflect the permitted ammonia slip concentration limit of 5 ppmv at 15% O2 and the post-modification fuel rates, based upon the analysis conducted for the initial application to construct the project. PAH emissions reflect CATEF emission factors for controlled gas turbines burning natural gas. Remaining hazardous pollutant emission factors were taken from US EPA AP-42 tables.

Table 3-5 does not reflect the increase in annual emissions resulting from the proposed modification. Instead it summarizes the total post-modification potential to emit. Accordingly, the health risk assessment used to determine compliance with Rule 1401 reflects total emissions from a single combustion turbine, rather than the incremental increase in emissions resulting from the proposed modification.

Table 3-5
Toxic Pollutants Emissions Summary
Post-Modification
Potential to Emit

Equipment Information (per unit):

Unit	Rating MMBtu/hr	Load (%)	Annual Hours	MMBtu/Yr
Turbine	479 (permit)	100	2,958	1,416,882

Toxic Emissions Summary:

	Turbine Data						
Compound	**Factor (lbs / MMBtu)**	**Control Efficiency (%)**	**One Turbine (lbs/hr)**	**One Turbine (lbs/yr)**	**Four Turbines (lbs/hr)**	**Four Turbines (lbs/year)**	**Source**
Acetaldehyde	4.00E-05	0%	1.92E-02	5.67E+01	7.66E-02	2.27E+02	AP-42
Acrolein*	3.62E-06	0%	1.73E-03	5.13E+00	6.94E-03	2.05E+01	AP-42
Ammonia	From Prior App	0%	3.64E+00	1.08E+04	1.46E+01	4.31E+04	AP-42
Benzene*	3.26E-06	0%	1.56E-03	4.62E+00	6.25E-03	1.85E+01	AP-42
Butadiene (1,3)	4.30E-07	0%	2.06E-04	6.09E-01	8.24E-04	2.44E+00	AP-42
Ethylbenzene	3.20E-05	0%	1.53E-02	4.53E+01	6.13E-02	1.81E+02	AP-42
Formaldehyde*	3.60E-04	0%	1.72E-01	5.10E+02	6.90E-01	2.04E+03	AP-42
Hexane	2.56E-04	0%	1.23E-01	3.63E+02	4.91E-01	1.45E+03	CATEF (no AP-42 factor)
PAH	-	-	-		-	-	
Benzo(a)pyrene	1.37E-08	0%	6.56E-06	1.94E-02	2.62E-05	7.76E-02	CATEF
Benzo(a)anthracene	2.23E-08	0%	1.07E-05	3.16E-02	4.27E-05	1.26E-01	CATEF
Benzo(b)flouranthene	1.12E-08	0%	5.36E-06	1.59E-02	2.15E-05	6.35E-02	CATEF
Benzo(k)flouranthene	1.09E-08	0%	5.22E-06	1.54E-02	2.09E-05	6.18E-02	CATEF
Chrysene	2.49E-08	0%	1.19E-05	3.53E-02	4.77E-05	1.41E-01	CATEF
Dibenz(a,h)anthracene	2.32E-08	0%	1.11E-05	3.29E-02	4.45E-05	1.31E-01	CATEF
Indeno(1,2,3-cd)pryene	2.32E-08	0%	1.11E-05	3.29E-02	4.45E-05	1.31E-01	CATEF
Naphthalene	1.64E-06	0%	7.86E-04	2.32E+00	3.14E-03	9.29E+00	CATEF
Propylene	2.90E-05	0%	1.39E-02	4.11E+01	5.56E-02	1.64E+02	AP-42
Toluene	1.30E-04	0%	6.23E-02	1.84E+02	2.49E-01	7.37E+02	AP-42
Xylene	6.40E-05	0%	3.07E-02	9.07E+01	1.23E-01	3.63E+02	AP-42

Notes:

* Formaldehyde, Benzene and Acrolein emission factors taken from the Background document for AP-42 Section 3.1, Table 3..4-1 for a natural gas combustion turbine with a CO catlayst.

Hourly emission rates reflect reference Btu rating of 479 MMBtu in RECLAIM Facility permit

3.3 Greenhouse Gas Emissions Overview

Table 3-6 provides a summary of pre-modification and post-modification potential to emit greenhouse gases. The project has a pre-modification potential to emit greenhouse gas emissions in excess of 100,000 tons per year making it major source of greenhouse gases, and the proposed modification is also significant, based upon Regulation XVII – Prevention of Significant Deterioration (PSD). Additional details surrounding the greenhouse gas emissions inventory, including the increase from historic actual emissions, are included in Appendix A. Appendix D includes a PSD best available control technology (BACT) analysis for greenhouse gases.

Table 3-6
Greenhouse Gas Emissions Summary
Facility Totals

Device(s)	Operating Schedule	Units	Fuel Rate (units/yr)	CO2/yr (metric tons)	CO2equivalent (metric tons)	CO2equivalent (short tons)
Four Turbines	1,260 hrs / year / turbine	MMBtu/yr	2,414,160	127,999	128,124	141,233
Diesel Engine (53.5 gal/hr)	200 hrs yr em. Genset	Gal/yr	10,700	109	110	121
Total Annual from On-site Operations				128,108	128,234	141,354
	Post-Modification PTE GHG Emissions					
Device(s)	**Operating Schedule**	**Units**	**Fuel Rate (units/yr)**	**CO2/yr (metric tons)**	**CO2equivalent (metric tons)**	**CO2equivalent (short tons)**
Four Turbines (479 MMBTU/hr each)	2,958 hrs / year / turbine	MMBtu/yr	5,667,528	300,492	300,787	331,561
Diesel Engine (53.5 gal/hr)	50 hrs yr em. Genset	Gal/yr	2,675	27	27	30
Total Annual from On-site Operations				300,520	300,814	331,591
Project Increase (TPY) - Not for PSD				**172,412**	**172,581**	**190,238**

Emission Factor Source: 40 CFR 98

SECTION 4.0

REGULATORY COMPLIANCE INFORMATION

4.1 SCAQMD Regulatory Analysis

The following regulatory analysis provides a compliance review of applicable SCAQMD rules relevant to this project.

Rule 212: Standards for Approving Permits:
The proposed project is expected to be in conformance with the standards set forth in Rule 212 and public notification is not required pursuant to Rule 212 (although public notice will be required pursuant to Rule 1714). The project is not located within 1000 feet of a school and daily permitted emissions will not be increased above existing permitted levels.

Rule 401: Visible Emissions:
The proposed permit modification does not result from changes in turbine operation and opacity limits established in Rule 401 have not been exceeded. Compliance with Rule 401 is expected.

Rule 402: Nuisance:
The proposed permit modification does not result from changes in turbine operation and no nuisances have been created. Compliance with Rule 402 is expected.

Rule 404: Particulate Matter - Concentration:
The proposed permit modification does not result from changes in turbine operation and concentration limits established in Rule 404 have not been exceeded. Compliance with Rule 404 is expected.

Rule 407: Liquid and Gaseous Air Contaminants:
Based upon experience with similar equipment, operation of this system is not expected to emit air contaminants so as to exceed Rule 407 limits. Compliance with Rule 407 is expected.

Rule 409: Combustion Contaminants:
Based upon experience with similar equipment, operation of this system is not expected to emit air contaminants so as to exceed Rule 409 limits. Compliance with Rule 409 is expected.

Rules 1303 and 2005: Best Available Control Technology (BACT):
The change in conditions does not result in increases of daily CO, PM10, SO_X and VOC. BACT Requirements of Rule 1303 are not triggered. The modification does not result in an increase in hourly NO_X emissions. BACT Requirements of Rule 2005 are not triggered.

Rule 1303(b)(1) and Rule 2005: Modeling:

When the facility was initially permitted, modeling was done to show that extended operations with uncontrolled emissions will not result in significant ambient concentrations of criteria pollutants. The proposed changes will not result in increases in hourly or daily emission rates but emissions of all pollutants will increase on an annual basis.

An AERMOD dispersion analysis and air quality impact analysis will be completed for CO, NO_2, PM10, PM2.5 and SO_2 using the input files that were used at the time the facility was initially permitted but conducted with upgraded versions of AERMOD to be released in early July.

Rule 1303(b)(2) and Rule 2005: Emission Offsets:

Changes in potential emissions are summarized in Tables 3-3 and 3-4 and Appendix A includes detailed emissions data, including net emission increases and offset requirements for the project. The requested change in operations will result in increases of PM10, VOC, SO_X and CO emissions on a 30-day average. 39 pounds per day of PM10 offsets will be needed for all four turbines combined, based upon the project increase and an offset ratio of 1.2:1. Pre-modification VOC emissions are below the offset threshold of four tons per year, so post-modification offset values are based upon the increase over the offset threshold. Total VOC offset requirements are 36 pounds per day based upon an offset ratio of 1.2:1. Total facility SO_X emissions are below the SCAQMD offset threshold and are, therefore, exempt from offset requirements pursuant to Rule 1304. The basin is in attainment with CO standards, so offsets do not apply.

The proposed modification will result in an increase in annual NO_X emissions and an additional 30,703 RTCs must be retained at the time the revised permit is issued pursuant to Rule 2005. This offset requirement reflects the increase from all four turbines when maintenance emissions occur, and the decrease in annual NO_X emissions that will be attributed to the reduced operating schedule of the black start engine.

The City of Anaheim has purchased offsets to accommodate the proposed modification and SCAQMD has recorded the transfers. Table 4-1 includes a summary of PM10, ROG and NO_X offset credits that have been purchased for the project. Copies of transfer certificates are included in Appendix A.

Table 4-1
Emission Offset Acquisition

Pollutant	Certificate	Offset Value
PM10	AQ013820	4 lb./day (Coastal)
PM10	AQ013819	31 lb./day (Coastal)
PM10	AQ013747-AQ013752	2 lb./day (Coastal)
PM10	AQ013759-AQ013764	1 lb./day (Coastal)
PM10	AQ013753-AQ013758	1 lb./day (Coastal)
ROG	AQ013821	36 lb./day (Coastal)
NO_X		16,220 lb./yr. (2015+) (Coastal, Cycle 1)
NO_X		25,000 lb./yr. (2016+) (Coastal, Cycle 2)
NO_X		8,776 lb./yr. (2015+) (Coastal, Cycle 1)

Rule 1401: New Source Review of Toxic Air Contaminants:
The proposed modification will result in increases of toxic air contaminants on an annual basis, but not on an hourly basis. A Tier 3 health risk assessment will be conducted using 1-hour ambient concentrations from an AERMOD dispersion modeling exercise once the EPA model upgrades are released in late June. Modeled emissions will be normalized to 1.0 g/sec and the peak concentrations at residential and commercial receptor locations were applied to the post-modification emission rates summarized in Table 3-3.

Regulation XVII – Prevention of Significant Deterioration:
Criteria pollutant emission rates do not exceed the major modification or significant increase PSD thresholds.

Greenhouse gas emissions as calculated for PSD purposes are summarized in Appendix A. The project has a pre-modification potential to emit more than 100,000 tons of greenhouse gases per year and the proposed modification will also result in an increase of approximately 269,000 tons per year.

Rule 1704 defines the facility to be a major source of greenhouse gas emissions and also defines the proposed increase in emissions to be significant. Although federal GHG PSD provisions that would classify the facility as a major source have been invalidated, SCAQMDS Rule 1704 has been adopted into the State Implementation Plan and it is not fully clear if the same GHG PSD provisions that are included by reference into Rule 1704 are also invalidated. Due to the uncertainty surrounding the recent invalidation of certain GHG PSD provisions, a GHG BACT

analysis is included in Appendix D. The BACT analysis demonstrates that the existing gas turbines continue to meet BACT, given their combustion efficiency and operation as peaking units.

APPENDIX A

EMISSIONS INFORMATION

Canyon Power Plant Pre / Post Project Emissions (in Years with Maintenance Operations)

Pre Project Emissions (4 Turbines @ 105 hr/ month, Black Start Engne 200 hrs/yr)				Post Project Emissions Annual emissions based upon highest operating scenario (#1 for CO and #2 for all other pollutants)				Net Increase (Decrease)				Offset Needs			
Pollutant	**30 day Average (lbs)**	**Annual (Lbs)**	**(Annual Tons)**	**Pollutant**	**30 day Average (lbs)**	**Annual (Lbs)**	**(Annual Tons)**	**Pollutant**	**30 day Average (lbs)**	**Annual (Lbs)**	**(Annual Tons)**	**Increase X 1.2**	**Offset Amount (lbs)**	**Offsets Already Purchased**	**Remaining Offsets Needed (lbs)**
NOx	78.26	29,954	14.98	**NOx**	294.76	60,657	30.33	**NOx**	216.51	30,703	15.35	na	30,703	50,000	(19,297)
CO	84.41	31,354	15.68	**CO**	275.67	64,594	32.30	**CO**	191.25	33,240	16.62	na	na		
VOC	17.23	6,212	3.11	**VOC**	54.89	14,433	7.22	**VOC****	37.65	8,222	4.11	21.44	21	36	(15)
PM10	39.93	14,381	7.19	**PM10**	72.02	19,289	9.64	**PM10**	32.09	4,908	2.45	38.51	39	39	0
SOx	4.51	1,624	0.81	**SOx**	14.43	3,884	1.94	**SOx**	9.92	2,260	1.13	na	na		

*** CO Reflects 2,615 hours per year, including 540 starts.**

****Project PTE increased above 4 TPY, but modification date is greater than 2 years since since the existing PTE was established so offset are required down to 4 TPY VOC = 17.87 lb/day ((14,433 lb/yr - 8,000 lb/yr)/12 months/30 days))**

PM and VOC offsets exclude Blackstart

N:\1-SCEC Projects\City of Anaheim (2564)\Phase 2001 (permit mod)\2014 final June Submittal\2564.2001xls1e - Appendix A3 (June 2014) Criteria Emissions 335 hrs month 60 starts per month and highest annual operating scenario
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December 5, 2013

Monthly / Annual Emissions Summary with Allowance for Maintenance Operations
Anaheim Canyon Power Plant
Pre-Modification PTE (Four Turbines)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	360	3.98	80	10.09	80	0.69	960	4320	2295.20	76.51	27,542
CO	360	4.24	80	11.6	80	0.62	960	4320	2504.00	83.47	30,048
VOC	360	1.20	80	0.79	80	0.27	960	4320	516.80	17.23	6,202
PM10/PM2.5	360	3.00	80	1.29	80	0.18	960	4320	1197.60	39.92	14,371
SOx	360	0.34	80	0.14	80	0.02	960	4320	135.20	4.51	1,622

Post-Modification PTE (Four Turbines)
Annual emissions based upon highest operating scenario (#1 for CO and #2 for all other pollutants)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	No. of Maintenance Operating Hours per Month	Maintenance Operating Hour Emission Rate	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs) (3,815 total hours, 540 starts per turbine)
NOx	1120	3.98	240	10.09	240	0.69	40	43.64	1460	10696	8790.40	293.01	60,054
CO	1120	4.24	240	11.6	240	0.62	40	14	2160	8800	8241.60	274.72	64,267
VOC	1120	1.20	240	0.79	240	0.27	40	1.20	1460	10696	1646.40	54.88	14,431
PM10/PM2.5	1120	1.67	240	0.75	240	0.18	40	1.67	1460	10696	2160.40	72.01	19,287
SOx	1120	0.34	240	0.14	240	0.02	40	0.34	1460	10696	432.80	14.43	3,884

Increase (Decrease) in PTE (Four Turbines)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx		0.00		0.00		0.00	6495.20	216.51	32,512
CO		0.00		0.00		0.00	5737.60	191.25	34,219
VOC		0.00		0.00		0.00	1129.60	37.65	8,229
PM10/PM2.5		(1.33)		(0.54)		0.00	962.80	32.09	4,916
SOx		0.00		0.00		0.00	297.60	9.92	2,261

60 starts and stops equal 45 hrs of run time per turbine.

Monthly / Annual Emissions Summary with Allowance for Maintenance Operations
Anaheim Canyon Power Plant
Pre-Modification PTE (Four Turbines)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	360	3.98	80	10.09	80	0.69	960	4320	2295.20	76.51	27,542
CO	360	4.24	80	11.6	80	0.62	960	4320	2504.00	83.47	30,048
VOC	360	1.20	80	0.79	80	0.27	960	4320	516.80	17.23	6,202
PM10/PM2.5	360	3.00	80	1.29	80	0.18	960	4320	1197.60	39.92	14,371
SOx	360	0.34	80	0.14	80	0.02	960	4320	135.20	4.51	1,622

Post-Modification PTE (Four Turbines)
Profile #1 - 2,615 total hours per year, per turbine, including 540 starts

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	No. of Maintenance Operating Hours per Month	Maintenance Operating Hour Emission Rate	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs) (2,615 total hours, 540 starts per turbine)
NOx	1120	3.98	240	10.09	240	0.69	40	43.64	2160	8800	8790.40	293.01	60,054
CO	1120	4.24	240	11.6	240	0.62	40	14	2160	8800	8241.60	274.72	64,267
VOC	1120	1.20	240	0.79	240	0.27	40	1.20	2160	8800	1646.40	54.88	12,898
PM10/PM2.5	1120	1.67	240	0.75	240	0.18	40	1.67	2160	8800	2160.40	72.01	16,772
SOx	1120	0.34	240	0.14	240	0.02	40	0.34	2160	8800	432.80	14.43	3,351

Increase (Decrease) in PTE (Four Turbines)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx		0.00		0.00		0.00	6495.20	216.51	32,512
CO		0.00		0.00		0.00	5737.60	191.25	34,219
VOC		0.00		0.00		0.00	1129.60	37.65	6,696
PM10/PM2.5		(1.33)		(0.54)		0.00	962.80	32.09	2,400
SOx		0.00		0.00		0.00	297.60	9.92	1,729

60 starts and stops equal 45 hrs of run time per turbine. 540 starts and stops equal 405 hrs of run time per turbine.

N:\1-SCEC Projects\City of Anaheim (2564)\Phase 2001 (permit mod)\2014 final June Submittal\2564.2001xls1e - Appendix A1 (June 2014) Criteria Emissions 335 hrs month 60 starts per month and 540 starts pe
year with 2615 hr annual limit
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Monthly / Annual Emissions Summary with Allowance for Maintenance Operations
Anaheim Canyon Power Plant
Pre-Modification PTE (Four Turbines)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	lb / Shutdown	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	360	3.98	80	10.09	80	0.69	960	4320	2295.20	76.51	27,542
CO	360	4.24	80	11.6	80	0.62	960	4320	2504.00	83.47	30,048
VOC	360	1.20	80	0.79	80	0.27	960	4320	516.80	17.23	6,202
PM10/PM2.5	360	3.00	80	1.29	80	0.18	960	4320	1197.60	39.92	14,371
SOx	360	0.34	80	0.14	80	0.02	960	4320	135.20	4.51	1,622

Post-Modification PTE (Four Turbines)
Profile #2 - 2,958 total hours per year, per turbine, including 365 starts

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	lb / Shutdown	No. of Maintenance Operating Hours per Month	Maintenance Operating Hour Emission Rate	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs) (2,958 total hours, 365 starts per turbine)
NOx	1120	3.98	240	10.09	240	0.69	40	43.64	1460	10696	8790.40	293.01	60,054
CO	1120	4.24	240	11.6	240	0.62	40	14	1460	10696	8241.60	274.72	63,752
VOC	1120	1.20	240	0.79	240	0.27	40	1.20	1460	10696	1646.40	54.88	14,431
PM10/PM2.5	1120	1.67	240	0.75	240	0.18	40	1.67	1460	10696	2160.40	72.01	19,287
SOx	1120	0.34	240	0.14	240	0.02	40	0.34	1460	10696	432.80	14.43	3,884

Increase (Decrease) in PTE (Four Turbines)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx		0.00		0.00		0.00	6495.20	216.51	32,512
CO		0.00		0.00		0.00	5737.60	191.25	33,704
VOC		0.00		0.00		0.00	1129.60	37.65	8,229
PM10/PM2.5		(1.33)		(0.54)		0.00	962.80	32.09	4,916
SOx		0.00		0.00		0.00	297.60	9.92	2,261

60 starts and stops equal 45 hrs of run time per turbine. 540 starts and stops equal 405 hrs of run time per turbine.

N:\1-SCEC Projects\City of Anaheim (2564)\Phase 2001 (permit mod)\2014 final June Submittal\2564.2001xls1e - Appendix A2 (June 2014) Criteria Emissions 335 hrs month 60 starts per month and 365 starts pe
year with 3089 hr annual operations
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Anaheim Canyon Power Plant

Pre-Modification PTE (Black Start Engine @ 200 hrs/yr)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	4.353	12.06	52.50	1.75	2,412
CO	4.353	6.53	28.43	0.95	1,306
VOC	4.353	0.05	0.22	0.01	10
PM10/PM2.5	4.353	0.05	0.22	0.01	10
SOx	4.353	0.01	0.04	0.00	2

Post-Modification PTE (Black Start Engine @ 50 Hrs/yr)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	4.353	12.06	52.50	1.75	603
CO	4.353	6.53	28.43	0.95	327
VOC	4.353	0.05	0.22	0.01	3
PM10/PM2.5	4.353	0.05	0.22	0.01	3
SOx	4.353	0.01	0.04	0.00	1

Increase (Decrease) in PTE (Black Start Engine @ 50 Hrs Yr)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx					(1,809)
CO					(980)
VOC					(8)
PM10/PM2.5					(8)
SOx					(2)

Monthly / Annual Emissions Summary with Allowance for Maintenance Operations

Anaheim Canyon Power Plant

Pre-Modification PTE (Single Turbine)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	90	3.98	20	10.09	20	0.69	573.80	19.13	6,886
CO	90	4.24	20	11.6	20	0.62	626.00	20.87	7,512
VOC	90	1.20	20	0.79	20	0.27	129.20	4.31	1,550
PM10/PM2.5	90	3.00	20	1.29	20	0.18	299.40	9.98	3,593
SOx	90	0.34	20	0.14	20	0.02	33.80	1.13	406

Post-Modification PTE (Single Turbine)

2,958 total hours per year, per turbine, including 365 starts (2615 hours, including 540 starts for CO)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	No. of Maintenance Operating Hours per Month	Maintenance Operating Hour Emission Rate	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	280	3.98	60	10.09	60	0.69	10	43.64	365	2674	2197.60	73.25	15,014
CO	280	4.24	60	11.6	60	0.62	10	14	540	2200	2060.40	68.68	16,067
VOC	280	1.20	60	0.79	60	0.27	10	1.20	365	2674	411.60	13.72	3,608
PM10/PM2.5	280	1.67	60	0.75	60	0.18	10	1.67	365	2674	540.10	18.00	4,822
SOx	280	0.34	60	0.14	60	0.02	10	0.34	365	2674	108.20	3.61	971

Increase (Decrease) in PTE (Single Turbine)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx		0.00		0.00		0.00	1623.80	54.13	8,128
CO		0.00		0.00		0.00	1434.40	47.81	8,555
VOC		0.00		0.00		0.00	282.40	9.41	2,057
PM10/PM2.5		(1.33)		(0.54)		0.00	240.70	8.02	1,229
SOx		0.00		0.00		0.00	74.40	2.48	565

60 starts and stops equal 45 hrs of run time (35 min/start, 10 min/stop).

Monthly / Annual Emissions Summary with Allowance for Maintenance Operations

Anaheim Canyon Power Plant

Pre-Modification PTE (Single Turbine)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	90	3.98	20	10.09	20	0.69	573.80	19.13	6,886
CO	90	4.24	20	11.6	20	0.62	626.00	20.87	7,512
VOC	90	1.20	20	0.79	20	0.27	129.20	4.31	1,550
PM10/PM2.5	90	3.00	20	1.29	20	0.18	299.40	9.98	3,593
SOx	90	0.34	20	0.14	20	0.02	33.80	1.13	406

Post-Modification PTE (Single Turbine)

Profile #1 - 2,615 total hours per year, per turbine, including 540 starts

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	No. of Maintenance Operating Hours per Month	Maintenance Operating Hour Emission Rate	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	280	3.98	60	10.09	60	0.69	10	43.64	540	2200	2197.60	73.25	15,014
CO	280	4.24	60	11.6	60	0.62	10	14	540	2200	2060.40	68.68	16,067
VOC	280	1.20	60	0.79	60	0.27	10	1.20	540	2200	411.60	13.72	3,224
PM10/PM2.5	280	1.67	60	0.75	60	0.18	10	1.67	540	2200	540.10	18.00	4,193
SOx	280	0.34	60	0.14	60	0.02	10	0.34	540	2200	108.20	3.61	838

Starts/stops = 45 hours/month per turbine 405 Hours / year per turbine 10 Maintenance 2615 Total Hours per year

335 Total Hours per Month

Increase (Decrease) in PTE (Single Turbine)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx		0.00		0.00		0.00	1623.80	54.13	8,128
CO		0.00		0.00		0.00	1434.40	47.81	8,555
VOC		0.00		0.00		0.00	282.40	9.41	1,674
PM10/PM2.5		(1.33)		(0.54)		0.00	240.70	8.02	600
SOx		0.00		0.00		0.00	74.40	2.48	432

60 starts and stops equal 45 hrs of run time (35 min/start, 10 min/stop).

N:\1-SCEC Projects\City of Anaheim (2564)\Phase 2001 (permit mod)\2014 final June Submittal\2564.2001xls1e - Appendix A1 (June 2014) Criteria Emissions 335 hrs month 60 starts per month and 540 starts per year with 2615 hr annual limit

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Monthly / Annual Emissions Summary with Allowance for Maintenance Operations

Anaheim Canyon Power Plant

Pre-Modification PTE (Single Turbine)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	90	3.98	20	10.09	20	0.69	573.80	19.13	6,886
CO	90	4.24	20	11.6	20	0.62	626.00	20.87	7,512
VOC	90	1.20	20	0.79	20	0.27	129.20	4.31	1,550
PM10/PM2.5	90	3.00	20	1.29	20	0.18	299.40	9.98	3,593
SOx	90	0.34	20	0.14	20	0.02	33.80	1.13	406

Post-Modification PTE (Single Turbine)

Profile #2 - 2,958 total hours per year, per turbine, including 365 starts

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	No. of Maintenance Operating Hours per Month	Maintenance Operating Hour Emission Rate	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	280	3.98	60	10.09	60	0.69	10	43.64	365	2674	2197.60	73.25	15,014
CO	280	4.24	60	11.6	60	0.62	10	14	365	2674	2060.40	68.68	15,938
VOC	280	1.20	60	0.79	60	0.27	10	1.20	365	2674	411.60	13.72	3,608
PM10/PM2.5	280	1.67	60	0.75	60	0.18	10	1.67	365	2674	540.10	18.00	4,822
SOx	280	0.34	60	0.14	60	0.02	10	0.34	365	2674	108.20	3.61	971

Starts/stops = 45 hours/month per turbine 274 Hours / year per turbine 10 Maintenance 2958 Total Hours per year

335 Total Hours per Month

Increase (Decrease) in PTE (Single Turbine)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx		0.00		0.00		0.00	1623.80	54.13	8,128
CO		0.00		0.00		0.00	1434.40	47.81	8,426
VOC		0.00		0.00		0.00	282.40	9.41	2,057
PM10/PM2.5		(1.33)		(0.54)		0.00	240.70	8.02	1,229
SOx		0.00		0.00		0.00	74.40	2.48	565

60 starts and stops equal 45 hrs of run time (35 min/start, 10 min/stop).

N:\1-SCEC Projects\City of Anaheim (2564)\Phase 2001 (permit mod)\2014 final June Submittal\2564.2001xls1e - Appendix A2 (June 2014) Criteria Emissions 335 hrs month 60 starts per month and 365 starts per year with 3089 hr annual operations

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Anaheim Canyon Power Plant

Pre-Modification PTE GHG Emissions (not for PSD)

Device(s)	Operating Schedule	Units	Fuel Rate (units/yr)	CO_2 rate (kg/fuel unit)	CO_2/yr (metric tons)	CH_4 rate (kg/fuel unit)	CH_4/yr (metric tons)	N_2O rate (kg/fuel unit)	N_2O/yr (metric tons)	CO_2equivalent (metric tons)	CO_2equivalent (short tons)
Four Turbines	1,260 hrs / year / turbine	MMBtu/yr	2,414,160	53.02	127,999	0.0010	2.4	0.0001	0.24	128,124	141,233
Diesel Engine (53.5 gal/hr)	200 hrs yr em. Genset	Gal/yr	10,700	10.21	109	0.0004	0.0	0.0001	0.00	110	121
Total Annual from On-site Operations					128,108		2.42		0.24	128,234	141,354

Post-Modification PTE GHG Emissions

Device(s)	Operating Schedule	Units	Fuel Rate (units/yr)	CO_2 rate (kg/fuel unit)	CO_2/yr (metric tons)	CH_4 rate (kg/fuel unit)	CH_4/yr (metric tons)	N_2O rate (kg/fuel unit)	N_2O/yr (metric tons)	CO_2equivalent (metric tons)	CO_2equivalent (short tons)
Four Turbines (479 MMBTU/hr each)	2,958 hrs / year / turbine	MMBtu/yr	5,667,528	53.02	300,492	0.0010	5.7	0.0001	1	300,787	331,561
Diesel Engine (53.5 gal/hr)	50 hrs yr em. Genset	Gal/yr	2,675	10.21	27	0.0004	0.0	0.0001	0	27	30
Total Annual from On-site Operations					300,520		5.67		0.57	300,814	331,591
Project Increase (TPY) - *Not for PSD*					**172,412**					**172,581**	**190,238**

Emission Factor Source: 40 CFR 98

2012 Actual GHG Emissions (Calculated based upon fuel use due to delayed federal data acquisition

Device(s)	Operating Schedule	Units	Fuel Rate (units/yr)	CO_2 rate (kg/fuel unit)	CO_2/yr (metric tons)	CH_4 rate (kg/fuel unit)	CH_4/yr (metric tons)	N_2O rate (kg/fuel unit)	N_2O/yr (metric tons)	CO_2equivalent (metric tons)	CO_2equivalent (short tons)
Four Turbines 1018.39 mmcf consumed)		***As Reported per CFR 75 Appendix G***								55,948	61,672
Diesel Engine (53.5 gal/hr)		Gal/yr	10	10.21	0	0.0004	0	0.0001	0.00	0	1
Total Annual from On-site Operations					0		0.00		0.00	55,948	61,673

2013 Actual GHG Emissions (Part 75 reported for turbines, plus calculated for black start)

Device(s)	Operating Schedule	Units	Fuel Rate (units/yr)	CO_2 rate (kg/fuel unit)	CO_2/yr (metric tons)	CH_4 rate (kg/fuel unit)	CH_4/yr (metric tons)	N_2O rate (kg/fuel unit)	N_2O/yr (metric tons)	CO_2equivalent (metric tons)	CO_2equivalent (short tons)
Four Turbines - Ar Reported CFR 75		MMBtu/yr	1,079,590		57,298		1		0.11	57,354	63,222
Diesel Engine (53.5 gal/hr)		Gal/yr	360	10.21	4	0.0004	0	0.0001	0.00	4	4
Total Annual from On-site Operations					57,302		1.08		0.11	57,358	63,226

2011 Actual GHG Emissions (Calculated based upon fuel use due to delayed federal data acquisition

Device(s)	Operating Schedule	Units	Fuel Rate (units/yr)	CO_2 rate (kg/fuel unit)	CO_2/yr (metric tons)	CH_4 rate (kg/fuel unit)	CH_4/yr (metric tons)	N_2O rate (kg/fuel unit)	N_2O/yr (metric tons)	CO_2equivalent (metric tons)	CO_2equivalent (short tons)
Four Turbines (577.89 mmcf consumed)		MMBtu/yr	589,448	53.02	31,253	0.0010	0	0.0001	0.00	31,253	34,450
Diesel Engine (53.5 gal/hr)		Gal/yr	510	10.21	5	0.0004	0	0.0001	0.00	5	6

Attachment A

City of Anaheim - PSD Emission Summary

2,958 total hours per year, per turbine, including 365 starts (Except CO = 2,615 hrs, including 540 starts)

	NOx (NO2)	CO	PM	PM10 (Pending Attainment)	PM2.5	SOx (SO2)	VOC	GHG (CO2e) - Metric**	GHG (CO2e) - Short**	Turbine Fuel (mmcf)	Diesel Engine Fuel (mgal)	
2011 Actual Emissions (TPY)*	10.57	5.67	1.22	1.22	1.22	0.18	0.61					
2012 Actual Emissions*	**4.58**	**6.82**	**3.76**	**3.76**	**3.76**	**0.35**	**1.34**	55,948	61,673	1018.39	0.01	
2013 Actual Emissions (TPY)*	4.51	7.74	3.09	3.09	3.09	0.35	1.32	57,358	63,226	1025.24	0.36	
Average Actual Emissions (TPY)	**6.55**	**6.74**	**2.69**	**2.69**	**2.69**	**0.29**	**1.09**	**56,653**	**62,449**	**1021.82**	**0.19**	
Post Project Potential to Emit (TPY)	**30.33**	**32.30**	**9.64**	**9.64**	**9.64**	**1.94**	**7.22**	**300,814**	**331,591**			
PSD Increase (Post Project PTE - Average Actual)	**23.78**	**25.55**	**6.95**	**6.95**	**6.95**	**1.65**	**6.13**	**244,161**	**269,142**	*Increase / Net Increase - Including Black Start Engine****		
								244,136	**269,114**	*Increase / Net Increase - Turbines Only****		
PSD Major Source Threshold (TPY)	250	250	250	250	250	250	250		100,000			
Major Source?	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**Y**			
PSD Significance Threshold (TPY)	40	100	25	15	10	40	40		75,000			
Significant Increase?	**N**	**N**	**N**	**N**	**N**	**N**	**N**		**Y**			

* AER Forms C & CU

** 2011 GHG reports to EPA exclude emissions prior to CEMS certification
so emissions are recalculated using EPA protocol to include all fuel combusted

*** Although proposed modification presents a reduction in Black Start Engine PTE, Actual historic emissions are below proposed PTE. Therefore project Increase and Net increase are equal

Modeling Emission Rates (g/sec)
Gas Turbine - 3,089 Operating Hours per Year

Pollutant	Max Hourly, 3 hr and 8 hr	Average 24 hour *(10 hrs maint, plus 14 hrs normal)*	Average Annual (8,760 hrs)	Selected Annual Operating Schedule
NOx	5.49852	2.58357	0.21594	2,958 hrs / 365 starts
CO	1.76396	1.04662	0.23109	2,615 hrs / 540 starts
VOC	0.15120	0.15120	0.05189	2,958 hrs / 365 starts
PM10/PM2.5	0.21042	0.21042	0.06935	2,958 hrs / 365 starts
SOx	0.04284	0.04284	0.01397	2,958 hrs / 365 starts

Modeling Emission Rates (g/sec)
Black Start Engine

Pollutant	Max Hourly*	Average 24 hour**	Average Annual (8,760 hrs)
NOx	1.52133	1.52133	0.00867
CO	0.82406	0.82406	0.00470
VOC	0.00630	0.00630	0.00004
PM10/PM2.5	0.00713	0.00713	0.00004
SOx	0.00158	0.00158	0.00001

Toxic Emission Estimates
Anaheim Canyon Power Plant
100% Load, 2958 hrs/yr

Equipment Information (per unit)

Unit	Rating MMBtu/hr	Load (%)	Annual Hours	MMBtu/Yr
Turbine	479 (permit)	100	2,958	1,416,882

Toxic Emissions Summary:

			Turbine Data				
Compound	**Factor (lbs / MMBtu)**	**Control Efficiency (%)**	**One Turbine (lbs/hr)**	**One Turbine (lbs/yr)**	**Four Turbines (lbs/hr)**	**Four Turbines (lbs/year)**	**Source**
Acetaldehyde	4.00E-05	0%	1.92E-02	5.67E+01	7.66E-02	2.27E+02	AP-42
Acrolein*	3.62E-06	0%	1.73E-03	5.13E+00	6.94E-03	2.05E+01	AP-42
Ammonia	From Prior App	0%	3.64E+00	1.08E+04	1.46E+01	4.31E+04	AP-42
Benzene*	3.26E-06	0%	1.56E-03	4.62E+00	6.25E-03	1.85E+01	AP-42
Butadiene (1,3)	4.30E-07	0%	2.06E-04	6.09E-01	8.24E-04	2.44E+00	AP-42
Ethylbenzene	3.20E-05	0%	1.53E-02	4.53E+01	6.13E-02	1.81E+02	AP-42
Formaldehyde*	3.60E-04	0%	1.72E-01	5.10E+02	6.90E-01	2.04E+03	AP-42
Hexane	2.56E-04	0%	1.23E-01	3.63E+02	4.91E-01	1.45E+03	CATEF (no AP-42 factor)
PAH	-	-	-		-	-	
Benzo(a)pyrene	1.37E-08	0%	6.56E-06	1.94E-02	2.62E-05	7.76E-02	CATEF
Benzo(a)anthracene	2.23E-08	0%	1.07E-05	3.16E-02	4.27E-05	1.26E-01	CATEF
Benzo(b)flouranthene	1.12E-08	0%	5.36E-06	1.59E-02	2.15E-05	6.35E-02	CATEF
Benzo(k)flouranthene	1.09E-08	0%	5.22E-06	1.54E-02	2.09E-05	6.18E-02	CATEF
Chrysene	2.49E-08	0%	1.19E-05	3.53E-02	4.77E-05	1.41E-01	CATEF
Dibenz(a,h)anthracene	2.32E-08	0%	1.11E-05	3.29E-02	4.45E-05	1.31E-01	CATEF
Indeno(1,2,3-cd)pryene	2.32E-08	0%	1.11E-05	3.29E-02	4.45E-05	1.31E-01	CATEF
Naphthalene	1.64E-06	0%	7.86E-04	2.32E+00	3.14E-03	9.29E+00	CATEF
Propylene	2.90E-05	0%	1.39E-02	4.11E+01	5.56E-02	1.64E+02	AP-42
Toluene	1.30E-04	0%	6.23E-02	1.84E+02	2.49E-01	7.37E+02	AP-42
Xylene	6.40E-05	0%	3.07E-02	9.07E+01	1.23E-01	3.63E+02	AP-42

Notes:

* Formaldehyde, Benzene and Acrolein emission factors taken from the Background document for AP-42 Section 3.1, Table 3..4-1 for a natural gas combustion turbine with a CO catlayst.

Hourly emission rates reflect reference Btu rating of 479 MMBtu in RECLAIM Facility permit

APPENDIX B

AMBIENT AIR QUALITY IMPACT ANALYSIS

Air Quality Impact Analysis (AQIA)
City of Anaheim – Canyon Power Plant

This report describes the air quality modeling results of estimated ground level concentrations resulting from the proposed modified Canyon Power Plant emissions profile. Maximum modeled concentrations were added to the maximum background concentrations to calculate total impacts for the proposed increase to annual operations at the facility for comparison to the applicable and most stringent of state and national ambient air quality standards (AAQS).

Potential air quality impacts were evaluated based on air quality dispersion modeling using the Breeze AERMOD software as described herein. All input and output modeling files are contained on a CD-ROM disk provided with this modification application.

For the purposes of determining the potential impacts on ambient air quality from the proposed modified combustion gas turbines (CTGs), SCEC requisitioned the original modeling files from SCAQMD's modeling group. This includes the original surface and upper air meteorological files, input files, and other AERMOD files (terrain, sources, building locations and dimensions, etc.). Because there was surface and upper air meteorological data available for 2006 to 2009 (plus 2012; 5 years total) from a nearby SCAQMD monitoring station located in Anaheim (AQS ID 060590007), this newer and more representative data was used instead of the meteorological files from the original modeling project.

Using the original modeling input files, along with the appropriate meteorological data, SCEC was able to update emission rates and run the dispersion analysis in Breeze AERMOD (executable version 14134), accounting for the proposed increased operating schedule for the facility to quantify the associated impacts to the ambient air quality.

The models were run for various criteria pollutants and averaging periods. NO_2, PM_{10} and $PM_{2.5}$ were modeled for comparison to the respective annual average AAQS. Short term air quality impacts were also evaluated, including 1-hour and 8-hour CO; 1-hour NO_2; 1-hour, 3-hour and 24-hour SO_2; and 24-hour PM_{10} and $PM_{2.5}$. Table B-1 presents the applicable and most stringent AAQS for each of these pollutants, for each averaging period.

Table B-1
Most Stringent Applicable Ambient Air Quality Standards
Canyon Power Plant Modification Project

Pollutants	Averaging Periods	Most Stringent AAQS	Form	National or State Standard?
NO_2	1-Hour	100 ppb	98th Percentile of one-hour daily maximum concentrations, averaged over three years. [A]	National
	Annual	0.03 ppm	Annual Arithmetic Mean.	California
CO	1-Hour	20 ppm	Not to be exceeded more than once per year.	California
	8-Hour	9 ppm	Not to be exceeded more than once per year.	National
SO_2	1-Hour	75 ppb	99th Percentile of one-hour daily maximum concentrations, averaged over three years. [B]	National
	3-Hour	0.5 ppm	Not to be exceeded more than once per year.	National
	24-Hour	0.04 ppm	Not to be exceeded.	California
PM_{10}	24-Hour	50 $\mu g/m^3$	Not to be exceeded more than once per year, averaged over three years.	California
	Annual	20 $\mu g/m^3$	Annual Arithmetic Mean.	California
$PM_{2.5}$	24-Hour	35 $\mu g/m^3$	98th Percentile of 24-hour maximum concentrations, averaged over three years. [A]	California
	Annual	12 $\mu g/m^3$	Annual Arithmetic Mean.	California

A.) 8th highest of 1-hour maximum concentrations (NO_2) or 24-hour maximum concentrations ($PM_{2.5}$), averaged over a 5-year period for modeling.
B.) 4th highest of 1-hour maximum concentrations, averaged over a 5-year period for modeling.

In each modeling run, the regulatory default options were used. Additionally, the urban modeling option was selected to allow the model to incorporate the effects of increased surface heating from the surrounding urban area on pollutant dispersion under stable atmospheric conditions. The urban area population was updated to reflect current approximate density in Orange County (3,010,759 based on 2008 estimates from the U.S. Census Bureau). The Cartesian coordinate receptor grids incorporated into the original modeling files were retained for simplicity and effects of nearby building downwash on emissions were accounted for by retaining the information from the original modeling files for each point source at the facility. Furthermore, each of the combustion turbines was flagged as an urban source to ensure that the model correctly incorporated the effects of

increased surface heating from the surrounding urban area. For NO_2 modeling, the Ozone Limiting Method (OLM) option was not used, conservatively assuming that all NO_X was NO_2.

The applicable emission rates for each pollutant and averaging period were incorporated into the model for each of the combustion turbines at the facility. Table B-2 shows the modeling emission rates used for each pollutant and averaging period for the turbines. Attachment 1 to this Appendix includes a summary of maximum hourly, daily, monthly and annual emissions that were used to determine modeling emission rates. Maximum hourly emissions of NO2 and CO are expected during the ten maintenance hours per year that are requested for each turbine. Due to changes in assumed hourly maintenance emissions, potential emissions used for the AQIA are slightly higher than what was reflected in the permit application (approximately 0.8% maximum hourly and 0.01% annual average for NO2, and 39% maximum hourly for CO).

Table B-2
Modeling Emission Rates (grams/second)
Canyon Power Plant Modification Project

Pollutant	Maximum 1-, 3- and 8-hour	Average 24-hour	Average Annual
NO_2	5.54388	-	0.21600
CO	2.44435	-	-
PM_{10}	-	0.21042	0.06935
$PM_{2.5}$	-	0.21042	0.06935
SO_2	0.04284	0.04284	-

Other turbine characteristics were retained from the original modeling files and validated, such as stack height and diameter, exhaust temperature and exit velocity, and elevation.

Using the meteorological data, receptor grids, source characteristics, and model options described above, the AERMOD model was used to determine the magnitude and location of the maximum impacts for each pollutant of interest for the annual averaging period.

Background pollutant concentration data for NO_2, CO, PM_{10} and $PM_{2.5}$ was gathered for the years of 2010 through 2012 (as available) at the SCAQMD Anaheim (Pampas Lane) meteorological station. Located within five miles of the Canyon Power Plant facility, the concentration measurements from this station are representative of the local air quality for the proposed project. For SO_2, background concentration data was gathered for the same time period (as available) at the SCAQMD Costa Mesa meteorological station. While this station is situated in a more coastal location and farther from the facility, it is the only station in the area that measures SO_2 concentrations; therefore, it is the most representative data for this pollutant. The highest concentrations for each averaging period were selected from the three years' worth of data (as available) and added to the highest modeled maximum concentrations for each pollutant.

In cases where the combined background and modeled concentrations are lower than the applicable AAQS, no further analysis is required – it is determined that the project will not cause an exceedance of the relevant standard. If the air basin background concentrations of a particular pollutant are alone higher than the relevant AAQS, then it must be determined that the project impacts do not cause a significant change in air quality based on the thresholds listed in SCAQMD Rule 1303, as applicable.

Modeling Results

After modeling the ground-level concentrations of each pollutant and averaging period, for each source, it was determined that CTG 1 had the highest modeled concentrations on an annual basis. For the other averaging periods, however, different turbines were predicted to have the highest concentrations in most cases.

The modeled highest concentration values were then added to the relative pollutant background concentrations. For NO_2, CO, SO_2 and $PM_{2.5}$, the maximum modeled concentrations plus the applicable background concentrations did not result in an exceedance of the most stringent AAQS. No further analysis is required for these pollutants and the project will comply with SCAQMD requirements. For PM_{10}, the annual and 24-hour background concentrations of the pollutant are higher than the respective AAQS; however, the modeled maximum concentration of PM_{10} from the project will not cause a significant change in air quality, based on the applicable Rule 1303 significance thresholds.

Overall, the project will comply with the SCAQMD Rule 1303(1) requirements for all pollutants affected by the modification, and will neither cause an exceedance of a relevant AAQS, nor significantly increase air basin concentrations of any pollutant already exceeding a relevant AAQS. Table B-3 presents the complete AQIA results.

Table B-3
Ambient Air Quality Impact Analysis Results
Canyon Power Plant Modification Project

Pollutant	Averaging Period	Maximum Predicted Concentration (µg/m³)				Background Concentration (µg/m³)	Highest Predicted CTG Concentration Plus Background Concentration (µg/m³)	Most Stringent Air Quality Standard (µg/m³)	Significant Change in Air Quality Concentration (µg/m³)	Comply (Yes/No)
		CTG1	CTG2	CTG3	CTG4					
NO_2	Annual	**0.01955**	0.01938	0.01948	0.01947	32.93	32.95	56	1	YES
	1-Hour	4.67182	**4.76275**	4.73611	4.72387	114.98	119.74	188	20	YES
CO	8-Hour	**1.89034**	1.87458	1.86652	1.85499	2634.89	2636.78	13310	500	YES
	1-Hour	**3.47287**	3.35480	3.30056	3.32417	3436.81	3440.28	22912	1100	YES
SO_2	24-Hour	0.01177	0.01177	**0.01181**	0.01177	5.50	5.51	105	-	YES
	3-Hour	0.04742	0.04619	0.04611	**0.04759**	156.94	156.99	1310	-	YES
	1-Hour	0.04310	**0.04345**	0.04317	0.04276	24.89	24.93	196.5	-	YES
PM_{10}	Annual	**0.00628**	0.00622	0.00625	0.00625	24.80	24.81	20	1	YES
	24-Hour	**0.06218**	0.06190	0.06207	0.06207	53.00	53.06	50	2.5	YES
$PM_{2.5}$	Annual	**0.00628**	0.00622	0.00625	0.00625	11.00	11.01	12	-	YES
	24-Hour	0.04236	**0.04264**	0.04246	0.04201	28.10	28.14	35	-	YES

AQIA Results - Normal Operation (Individual Turbine)
City of Anaheim - Canyon Power Plant Modification

Pollutant	Averaging Period	Maximum Predicted Concentration ($\mu g/m^3$)				Background Concentration ($\mu g/m^3$) [8]	Highest Predicted CTG Concentration Plus Background Concentration ($\mu g/m^3$)	Most Stringent Air Quality Standard ($\mu g/m^3$)	Significant Change in Air Quality Concentration ($\mu g/m^3$) [17]	Comply (Yes/No)
		CTG 1	CTG 2	CTG 3	CTG 4					
NO_2	Annual [1]	**0.01955**	0.01938	0.01948	0.01947	32.93	32.95	56 [9]	1	**YES**
	1-hour [2]	4.67182	**4.76275**	4.73611	4.72387	114.98	119.74	188 [10]	20	**YES**
CO	8-hour [3]	**1.89034**	1.87458	1.86652	1.85499	2634.89	2636.78	10310 [11]	500	**YES**
	1-hour [3]	**3.47287**	3.3548	3.30056	3.32417	3436.81	3440.28	22912 [12]	1100	**YES**
SO_2	24-hour [4]	0.01177	0.01177	**0.01181**	0.01177	5.50	5.51	105 [13]	- [18]	**YES**
	3-hour [3]	0.04742	0.04619	0.04611	**0.04759**	156.94	156.99	1310 [14]	- [18]	**YES**
	1-hour [5]	0.0431	**0.04345**	0.04317	0.04276	24.89	24.93	196.5 [15]	- [18]	**YES**
PM_{10}	Annual [1]	**0.00628**	0.00622	0.00625	0.00625	24.80	24.81	20 [16]	1	**YES**
	24-hour [6]	**0.06218**	0.0619	0.06207	0.06207	53.00	53.06	50 [16]	2.5	**YES**
$PM_{2.5}$	Annual [1]	**0.00628**	0.00622	0.00625	0.00625	11.00	11.01	12 [16]	- [18]	**YES**
	24-hour [7]	0.04236	**0.04264**	0.04246	0.04201	28.10	28.14	35 [16]	- [18]	**YES**

1. Annual Arithmetic Mean
2. 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
3. Not to be exceeded more than once per year
4. Not to be exceeded
5. 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
6. Not to be exceeded more an once per year, averaged over 3 years
7. 98th percentile of 24-hour maximum concentrations, averaged over 3 years
8. The highest background concentration from the last three years of data was selected (as available)
9. CAAQS of 0.03 ppm
10. NAAQS of 100 ppb
11. NAAQS of 9 ppm
12. CAAQS of 20 ppm
13. CAAQS of 0.04 ppm
14. NAAQS of 0.5 ppm
15. NAAQS of 75 ppb
16. CAAQS
17. Per SCAQMD Rule 1303, Table A-2
18. No corresponding threshold in Rule 1303, Table A-2

AVERAGING PERIOD >		*Annual Avg. Emissions*			*1-Hr Emissions*			*3-Hr Avg. Emissions*	*8-Hr Avg. Emissions*	*24-Hr Avg Emissions*		
POLLUTANT >		**NO_2**	**PM_{10}***	**$PM_{2.5}$***	**NO_2 (98th percentile)**	**SO_2 (Max)**	**CO (Max)**	**SO_2 (Max)**	**CO (Max)**	**PM_{10}***	**$PM_{2.5}$***	**SO_2 (Max)**
BACKGROUND CONCENTRATION DATA (BASED ON YEAR)	2013											
	2012	14.6 ppb [19]	22.4 [19]	10.8 [19]	53.5 ppb [19]	6.2 ppb [22]	- [25]	1.6 ppb [26]	2.3 ppm [19]	48 [19]	24.9 [19]	- [25]
	2011	16.8 ppb [20]	**24.8** [20]	**11** [20]	60.8 ppb [20]	7.7 ppb [23]	- [25]	5.5 ppb [26]	2.1 ppm [20]	**53** [20]	**28.1** [20]	- [25]
	2010	17.5 ppb [21]	22.4 [21]	10.2 [21]	61.1 ppb [21]	9.5 ppb [24]	3 ppm [21]	59.9 ppb [26]	2 ppm [21]	43 [21]	25.2 [21]	2.1 ppb [24]
*PM values in terms of µg/m^3												
CONVERSION TO µg/m^3	2013											
	2012	27.47			100.68	16.24	- [25]	4.19	**2635**			- [25]
	2011	31.61			114.41	20.17	- [25]	14.4	2406			- [25]
	2010	**32.93**			**114.98**	**24.89**	**3437**	**156.94**	2291			**5.50**

< SCAQMD Air Quality Data Not Yet Available

< SCAQMD Air Quality Data Not Yet Available

Pollutant	M.W.	Units
NO_2	46.01	g/mol
CO	28.01	g/mol
SO_2	64.06	g/mol

convert ppb to µg/m^3: µg/m^3 = (ppb)*(m.w.)/R
convert ppm to µg/m^3: µg/m^3 = [(ppm)*(m.w.)/R]*1000

R = Constant of 24.45, which represents 77°F and 1 ATM

19. SCAQMD 2012 Air Quality Table - Central Orange Co.
20. SCAQMD 2011 Air Quality Table - Central Orange Co.
21. SCAQMD 2010 Air Quality Table - Central Orange Co.
22. SCAQMD 2012 Air Quality Table - North Coastal Orange Co.
23. SCAQMD 2011 Air Quality Table - North Coastal Orange Co.
24. SCAQMD 2010 Air Quality Table - North Coastal Orange Co.
25. No data published
26. SCAQMD Source Testing Division Data Set (RWu1@aqmd.gov) - North Coastal Orange Co.

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***
                                        ** CONC OF NO2      IN MICROGRAMS/M**3
                    **

       X-COORD (M)   Y-COORD (M)        CONC                        X-COORD (M)
Y-COORD (M)        CONC
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - -
         427000.00    3756000.00        0.00023                      428000.00
3756000.00        0.00022
         429000.00    3756000.00        0.00020                      430000.00
3756000.00        0.00019
         431000.00    3756000.00        0.00018                      410000.00
3757000.00        0.00007
         411000.00    3757000.00        0.00008                      412000.00
3757000.00        0.00008
         413000.00    3757000.00        0.00009                      414000.00
3757000.00        0.00010
         415000.00    3757000.00        0.00009                      416000.00
3757000.00        0.00010
         417000.00    3757000.00        0.00012                      418000.00
3757000.00        0.00015
         419000.00    3757000.00        0.00018                      420000.00
3757000.00        0.00026
         421000.00    3757000.00        0.00024                      422000.00
3757000.00        0.00024
         423000.00    3757000.00        0.00025                      424000.00
3757000.00        0.00021
         425000.00    3757000.00        0.00019                      426000.00
3757000.00        0.00020
         427000.00    3757000.00        0.00021                      428000.00
3757000.00        0.00021
         429000.00    3757000.00        0.00020                      430000.00
3757000.00        0.00018
         431000.00    3757000.00        0.00017

♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_NO2_ANNUAL
                         ***         08/08/14
 *** AERMET - VERSION  14134 ***    ***
                         ***        14:17:02

                                    PAGE 211
 **MODELOPTs:    RegDFAULT CONC      ELEV

                                    *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS
AVERAGED OVER   5 YEARS ***


                                     ** CONC OF NO2      IN MICROGRAMS/M**3
               **

                      NETWORK
GROUP ID                    AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       0.09344 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          2ND HIGHEST VALUE IS       0.09304 AT (  420525.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
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             3RD HIGHEST VALUE IS       0.09301 AT (  420525.00,  3746775.00,    66.45,
   66.45,     0.00)  DC
             4TH HIGHEST VALUE IS       0.09280 AT (  420550.00,  3746825.00,    66.75,
   66.75,     0.00)  DC
             5TH HIGHEST VALUE IS       0.09238 AT (  420500.00,  3746775.00,    66.45,
   66.45,     0.00)  DC
             6TH HIGHEST VALUE IS       0.09179 AT (  420550.00,  3746775.00,    66.60,
   66.60,     0.00)  DC
             7TH HIGHEST VALUE IS       0.09140 AT (  420500.00,  3746750.00,    66.45,
   66.45,     0.00)  DC
             8TH HIGHEST VALUE IS       0.09130 AT (  420525.00,  3746825.00,    66.60,
   66.60,     0.00)  DC
             9TH HIGHEST VALUE IS       0.09084 AT (  420500.00,  3746800.00,    66.45,
   66.45,     0.00)  DC
            10TH HIGHEST VALUE IS       0.09040 AT (  420525.00,  3746750.00,    66.45,
   66.45,     0.00)  DC

 TURBINES    1ST HIGHEST VALUE IS       0.07596 AT (  420550.00,  3746825.00,    66.75,
   66.75,     0.00)  DC
             2ND HIGHEST VALUE IS       0.07579 AT (  420550.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
             3RD HIGHEST VALUE IS       0.07500 AT (  420600.00,  3746900.00,    67.06,
   67.06,     0.00)  DC
             4TH HIGHEST VALUE IS       0.07450 AT (  420600.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
             5TH HIGHEST VALUE IS       0.07365 AT (  420550.00,  3746775.00,    66.60,
   66.60,     0.00)  DC
             6TH HIGHEST VALUE IS       0.07359 AT (  420525.00,  3746800.00,    66.45,
   66.45,     0.00)  DC
             7TH HIGHEST VALUE IS       0.07313 AT (  420525.00,  3746825.00,    66.60,
   66.60,     0.00)  DC
             8TH HIGHEST VALUE IS       0.07250 AT (  420525.00,  3746775.00,    66.45,
   66.45,     0.00)  DC
             9TH HIGHEST VALUE IS       0.07228 AT (  420700.00,  3746900.00,    67.36,
   67.36,     0.00)  DC
            10TH HIGHEST VALUE IS       0.06961 AT (  420500.00,  3746800.00,    66.45,
   66.45,     0.00)  DC

 BLKST       1ST HIGHEST VALUE IS       0.05377 AT (  420399.80,  3746674.00,    65.84,
   65.84,     0.00)  DC
             2ND HIGHEST VALUE IS       0.05364 AT (  420400.00,  3746675.00,    65.84,
   65.84,     0.00)  DC
             3RD HIGHEST VALUE IS       0.05058 AT (  420393.20,  3746696.40,    65.84,
   65.84,     0.00)  DC
             4TH HIGHEST VALUE IS       0.04860 AT (  420400.00,  3746700.00,    65.84,
   65.84,     0.00)  DC
             5TH HIGHEST VALUE IS       0.04816 AT (  420406.40,  3746651.50,    65.84,
   65.84,     0.00)  DC
             6TH HIGHEST VALUE IS       0.04463 AT (  420425.00,  3746675.00,    66.14,
   66.14,     0.00)  DC
             7TH HIGHEST VALUE IS       0.04336 AT (  420425.00,  3746700.00,    66.14,
   66.14,     0.00)  DC
             8TH HIGHEST VALUE IS       0.04281 AT (  420386.60,  3746718.90,    66.13,
   66.13,     0.00)  DC
             9TH HIGHEST VALUE IS       0.04108 AT (  420363.20,  3746712.00,    65.84,
   65.84,     0.00)  DC
            10TH HIGHEST VALUE IS       0.04096 AT (  420400.00,  3746725.00,    66.14,
   66.14,     0.00)  DC

 TURB1       1ST HIGHEST VALUE IS       0.01955 AT (  420600.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
             2ND HIGHEST VALUE IS       0.01916 AT (  420550.00,  3746775.00,    66.60,
   66.60,     0.00)  DC
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          3RD HIGHEST VALUE IS       0.01909 AT (  420550.00,  3746750.00,    66.45,
   66.45,    0.00)  DC
          4TH HIGHEST VALUE IS       0.01883 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          5TH HIGHEST VALUE IS       0.01854 AT (  420550.00,  3746725.00,    66.45,
   66.45,    0.00)  DC
          6TH HIGHEST VALUE IS       0.01847 AT (  420525.00,  3746750.00,    66.45,
   66.45,    0.00)  DC
          7TH HIGHEST VALUE IS       0.01827 AT (  420700.00,  3746900.00,    67.36,
   67.36,    0.00)  DC
          8TH HIGHEST VALUE IS       0.01824 AT (  420525.00,  3746775.00,    66.45,
   66.45,    0.00)  DC
          9TH HIGHEST VALUE IS       0.01820 AT (  420525.00,  3746725.00,    66.45,
   66.45,    0.00)  DC
         10TH HIGHEST VALUE IS       0.01820 AT (  420550.00,  3746825.00,    66.75,
   66.75,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_NO2_ANNUAL
                        ***         08/08/14
 *** AERMET - VERSION  14134 ***   ***
                        ***        14:17:02

                                   PAGE 212
 **MODELOPTs:   RegDFAULT CONC      ELEV

                                    *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS
AVERAGED OVER   5 YEARS ***

                                     ** CONC OF NO2      IN MICROGRAMS/M**3
              **

                      NETWORK
GROUP ID                     AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

TURB2     1ST HIGHEST VALUE IS       0.01938 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          2ND HIGHEST VALUE IS       0.01934 AT (  420600.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          3RD HIGHEST VALUE IS       0.01920 AT (  420550.00,  3746775.00,    66.60,
   66.60,    0.00)  DC
          4TH HIGHEST VALUE IS       0.01909 AT (  420550.00,  3746825.00,    66.75,
   66.75,    0.00)  DC
          5TH HIGHEST VALUE IS       0.01872 AT (  420525.00,  3746775.00,    66.45,
   66.45,    0.00)  DC
          6TH HIGHEST VALUE IS       0.01859 AT (  420525.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
          7TH HIGHEST VALUE IS       0.01859 AT (  420600.00,  3746900.00,    67.06,
   67.06,    0.00)  DC
          8TH HIGHEST VALUE IS       0.01849 AT (  420550.00,  3746750.00,    66.45,
   66.45,    0.00)  DC
          9TH HIGHEST VALUE IS       0.01834 AT (  420525.00,  3746750.00,    66.45,
   66.45,    0.00)  DC
         10TH HIGHEST VALUE IS       0.01833 AT (  420700.00,  3746900.00,    67.36,
   67.36,    0.00)  DC

TURB3     1ST HIGHEST VALUE IS       0.01948 AT (  420550.00,  3746825.00,    66.75,
   66.75,    0.00)  DC
          2ND HIGHEST VALUE IS       0.01925 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
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          3RD HIGHEST VALUE IS       0.01919 AT (  420600.00,  3746900.00,    67.06,
   67.06,    0.00)  DC
          4TH HIGHEST VALUE IS       0.01893 AT (  420525.00,  3746825.00,    66.60,
   66.60,    0.00)  DC
          5TH HIGHEST VALUE IS       0.01891 AT (  420525.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
          6TH HIGHEST VALUE IS       0.01851 AT (  420600.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          7TH HIGHEST VALUE IS       0.01843 AT (  420550.00,  3746775.00,    66.60,
   66.60,    0.00)  DC
          8TH HIGHEST VALUE IS       0.01840 AT (  420525.00,  3746775.00,    66.45,
   66.45,    0.00)  DC
          9TH HIGHEST VALUE IS       0.01810 AT (  420700.00,  3746900.00,    67.36,
   67.36,    0.00)  DC
         10TH HIGHEST VALUE IS       0.01807 AT (  420500.00,  3746800.00,    66.45,
   66.45,    0.00)  DC

TURB4     1ST HIGHEST VALUE IS       0.01947 AT (  420600.00,  3746900.00,    67.06,
   67.06,    0.00)  DC
          2ND HIGHEST VALUE IS       0.01920 AT (  420550.00,  3746825.00,    66.75,
   66.75,    0.00)  DC
          3RD HIGHEST VALUE IS       0.01907 AT (  420525.00,  3746825.00,    66.60,
   66.60,    0.00)  DC
          4TH HIGHEST VALUE IS       0.01840 AT (  420525.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
          5TH HIGHEST VALUE IS       0.01840 AT (  420500.00,  3746825.00,    66.45,
   66.45,    0.00)  DC
          6TH HIGHEST VALUE IS       0.01833 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          7TH HIGHEST VALUE IS       0.01805 AT (  420500.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
          8TH HIGHEST VALUE IS       0.01782 AT (  420700.00,  3747000.00,    67.36,
   67.36,    0.00)  DC
          9TH HIGHEST VALUE IS       0.01757 AT (  420700.00,  3746900.00,    67.36,
   67.36,    0.00)  DC
         10TH HIGHEST VALUE IS       0.01754 AT (  420600.00,  3747000.00,    67.06,
   67.06,    0.00)  DC

BLKSGENS  1ST HIGHEST VALUE IS       0.05377 AT (  420399.80,  3746674.00,    65.84,
   65.84,    0.00)  DC
          2ND HIGHEST VALUE IS       0.05364 AT (  420400.00,  3746675.00,    65.84,
   65.84,    0.00)  DC
          3RD HIGHEST VALUE IS       0.05058 AT (  420393.20,  3746696.40,    65.84,
   65.84,    0.00)  DC
          4TH HIGHEST VALUE IS       0.04860 AT (  420400.00,  3746700.00,    65.84,
   65.84,    0.00)  DC
          5TH HIGHEST VALUE IS       0.04816 AT (  420406.40,  3746651.50,    65.84,
   65.84,    0.00)  DC
          6TH HIGHEST VALUE IS       0.04463 AT (  420425.00,  3746675.00,    66.14,
   66.14,    0.00)  DC
          7TH HIGHEST VALUE IS       0.04336 AT (  420425.00,  3746700.00,    66.14,
   66.14,    0.00)  DC
          8TH HIGHEST VALUE IS       0.04281 AT (  420386.60,  3746718.90,    66.13,
   66.13,    0.00)  DC
          9TH HIGHEST VALUE IS       0.04108 AT (  420363.20,  3746712.00,    65.84,
   65.84,    0.00)  DC
         10TH HIGHEST VALUE IS       0.04096 AT (  420400.00,  3746725.00,    66.14,
   66.14,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
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65.23, 0.00) DC
♀ *** AERMOD - VERSION 14134 *** *** SCEC_CPPMOD2014_NO2_1HR
*** 08/08/14
*** AERMET - VERSION 14134 *** ***
*** 10:42:11

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM 8TH-HIGHEST MAX DAILY 1-HR RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	94.42152	AT (420225.90, 3746574.10, 65.23, 65.23, 0.00)	DC	
	2ND HIGHEST VALUE IS	94.10874	AT (420225.00, 3746575.00, 65.23, 65.23, 0.00)	DC	
	3RD HIGHEST VALUE IS	89.95799	AT (420232.40, 3746551.60, 65.23, 65.23, 0.00)	DC	
	4TH HIGHEST VALUE IS	88.06508	AT (420225.00, 3746550.00, 65.23, 65.23, 0.00)	DC	
	5TH HIGHEST VALUE IS	79.19995	AT (420219.30, 3746596.50, 65.23, 65.23, 0.00)	DC	
	6TH HIGHEST VALUE IS	75.36612	AT (420200.00, 3746575.00, 65.23, 65.23, 0.00)	DC	
	7TH HIGHEST VALUE IS	73.23037	AT (420200.00, 3746550.00, 65.23, 65.23, 0.00)	DC	
	8TH HIGHEST VALUE IS	71.23353	AT (420225.00, 3746525.00, 65.23, 65.23, 0.00)	DC	
	9TH HIGHEST VALUE IS	69.84499	AT (420239.00, 3746529.10, 65.23, 65.23, 0.00)	DC	
	10TH HIGHEST VALUE IS	66.20324	AT (420200.00, 3746525.00, 65.23, 65.23, 0.00)	DC	
TURBINES	1ST HIGHEST VALUE IS	18.04210	AT (420600.00, 3746800.00, 66.75, 66.75, 0.00)	DC	
	2ND HIGHEST VALUE IS	17.69255	AT (420550.00, 3746800.00, 66.75, 66.75, 0.00)	DC	
	3RD HIGHEST VALUE IS	17.68533	AT (420550.00, 3746825.00, 66.75, 66.75, 0.00)	DC	
	4TH HIGHEST VALUE IS	17.64348	AT (420500.00, 3746900.00, 66.75, 66.75, 0.00)	DC	
	5TH HIGHEST VALUE IS	17.62376	AT (420600.00, 3746900.00, 67.06, 67.06, 0.00)	DC	
	6TH HIGHEST VALUE IS	17.41650	AT (420525.00, 3746825.00, 66.60, 66.60, 0.00)	DC	
	7TH HIGHEST VALUE IS	17.33418	AT (420550.00, 3746775.00, 66.60, 66.60, 0.00)	DC	
	8TH HIGHEST VALUE IS	17.25119	AT (420525.00, 3746800.00, 66.45, 66.45, 0.00)	DC	
	9TH HIGHEST VALUE IS	17.21947	AT (420500.00, 3746825.00, 66.45, 66.45, 0.00)	DC	
	10TH HIGHEST VALUE IS	17.20517	AT (420700.00, 3746800.00, 67.06,		

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   67.06,    0.00)  DC

BLKST     1ST HIGHEST VALUE IS      93.87467 AT (  420225.90,  3746574.10,    65.23,
   65.23,    0.00)  DC
          2ND HIGHEST VALUE IS      93.51919 AT (  420225.00,  3746575.00,    65.23,
   65.23,    0.00)  DC
          3RD HIGHEST VALUE IS      89.95259 AT (  420232.40,  3746551.60,    65.23,
   65.23,    0.00)  DC
          4TH HIGHEST VALUE IS      88.05904 AT (  420225.00,  3746550.00,    65.23,
   65.23,    0.00)  DC
          5TH HIGHEST VALUE IS      78.64793 AT (  420219.30,  3746596.50,    65.23,
   65.23,    0.00)  DC
          6TH HIGHEST VALUE IS      74.14321 AT (  420200.00,  3746575.00,    65.23,
   65.23,    0.00)  DC
          7TH HIGHEST VALUE IS      72.98656 AT (  420200.00,  3746550.00,    65.23,
   65.23,    0.00)  DC
          8TH HIGHEST VALUE IS      71.22428 AT (  420225.00,  3746525.00,    65.23,
   65.23,    0.00)  DC
          9TH HIGHEST VALUE IS      69.83984 AT (  420239.00,  3746529.10,    65.23,
   65.23,    0.00)  DC
         10TH HIGHEST VALUE IS      66.18889 AT (  420200.00,  3746525.00,    65.23,
   65.23,    0.00)  DC

TURB1     1ST HIGHEST VALUE IS       4.67182 AT (  420600.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          2ND HIGHEST VALUE IS       4.62509 AT (  420550.00,  3746825.00,    66.75,
   66.75,    0.00)  DC
          3RD HIGHEST VALUE IS       4.62217 AT (  420525.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
          4TH HIGHEST VALUE IS       4.62204 AT (  420525.00,  3746825.00,    66.60,
   66.60,    0.00)  DC
          5TH HIGHEST VALUE IS       4.62042 AT (  420550.00,  3746775.00,    66.60,
   66.60,    0.00)  DC
          6TH HIGHEST VALUE IS       4.61925 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          7TH HIGHEST VALUE IS       4.59436 AT (  420600.00,  3746700.00,    66.45,
   66.45,    0.00)  DC
          8TH HIGHEST VALUE IS       4.59396 AT (  420550.00,  3746750.00,    66.45,
   66.45,    0.00)  DC
          9TH HIGHEST VALUE IS       4.57444 AT (  420500.00,  3746825.00,    66.45,
   66.45,    0.00)  DC
         10TH HIGHEST VALUE IS       4.56465 AT (  420500.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_NO2_1HR
                        ***         08/08/14
 *** AERMET - VERSION  14134 ***   ***
                        ***        10:42:11

                                   PAGE 398
 **MODELOPTs:   RegDFAULT CONC      ELEV

                     *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST MAX DAILY  1-HR
RESULTS AVERAGED OVER   5 YEARS ***

                                   ** CONC OF NO2      IN MICROGRAMS/M**3
             **

                       NETWORK
GROUP ID                      AVERAGE CONC               RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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TURB2      1ST HIGHEST VALUE IS      4.76275 AT (  420600.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
           2ND HIGHEST VALUE IS      4.65254 AT (  420550.00,  3746775.00,    66.60,
   66.60,     0.00)  DC
           3RD HIGHEST VALUE IS      4.64576 AT (  420550.00,  3746825.00,    66.75,
   66.75,     0.00)  DC
           4TH HIGHEST VALUE IS      4.63074 AT (  420550.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
           5TH HIGHEST VALUE IS      4.62285 AT (  420525.00,  3746825.00,    66.60,
   66.60,     0.00)  DC
           6TH HIGHEST VALUE IS      4.60370 AT (  420550.00,  3746750.00,    66.45,
   66.45,     0.00)  DC
           7TH HIGHEST VALUE IS      4.56689 AT (  420000.00,  3746500.00,    64.62,
   64.62,     0.00)  DC
           8TH HIGHEST VALUE IS      4.56455 AT (  420500.00,  3746825.00,    66.45,
   66.45,     0.00)  DC
           9TH HIGHEST VALUE IS      4.55586 AT (  420100.00,  3746450.00,    64.92,
   64.92,     0.00)  DC
          10TH HIGHEST VALUE IS      4.54415 AT (  420525.00,  3746800.00,    66.45,
   66.45,     0.00)  DC

TURB3      1ST HIGHEST VALUE IS      4.73611 AT (  420600.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
           2ND HIGHEST VALUE IS      4.69772 AT (  420550.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
           3RD HIGHEST VALUE IS      4.67860 AT (  420550.00,  3746825.00,    66.75,
   66.75,     0.00)  DC
           4TH HIGHEST VALUE IS      4.64343 AT (  420000.00,  3746500.00,    64.62,
   64.62,     0.00)  DC
           5TH HIGHEST VALUE IS      4.60804 AT (  420550.00,  3746775.00,    66.60,
   66.60,     0.00)  DC
           6TH HIGHEST VALUE IS      4.59599 AT (  420500.00,  3746900.00,    66.75,
   66.75,     0.00)  DC
           7TH HIGHEST VALUE IS      4.59592 AT (  420525.00,  3746825.00,    66.60,
   66.60,     0.00)  DC
           8TH HIGHEST VALUE IS      4.53103 AT (  420075.00,  3746475.00,    64.77,
   64.77,     0.00)  DC
           9TH HIGHEST VALUE IS      4.53096 AT (  420600.00,  3746900.00,    67.06,
   67.06,     0.00)  DC
          10TH HIGHEST VALUE IS      4.52267 AT (  420500.00,  3746825.00,    66.45,
   66.45,     0.00)  DC

TURB4      1ST HIGHEST VALUE IS      4.72387 AT (  420550.00,  3746825.00,    66.75,
   66.75,     0.00)  DC
           2ND HIGHEST VALUE IS      4.66506 AT (  420600.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
           3RD HIGHEST VALUE IS      4.63927 AT (  420550.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
           4TH HIGHEST VALUE IS      4.63733 AT (  420500.00,  3746900.00,    66.75,
   66.75,     0.00)  DC
           5TH HIGHEST VALUE IS      4.63222 AT (  420600.00,  3746900.00,    67.06,
   67.06,     0.00)  DC
           6TH HIGHEST VALUE IS      4.59250 AT (  420525.00,  3746825.00,    66.60,
   66.60,     0.00)  DC
           7TH HIGHEST VALUE IS      4.58243 AT (  419900.00,  3746500.00,    64.01,
   64.01,     0.00)  DC
           8TH HIGHEST VALUE IS      4.53090 AT (  420525.00,  3746800.00,    66.45,
   66.45,     0.00)  DC
           9TH HIGHEST VALUE IS      4.52756 AT (  420550.00,  3746775.00,    66.60,
   66.60,     0.00)  DC
          10TH HIGHEST VALUE IS      4.51715 AT (  420075.00,  3746500.00,    64.77,
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   64.77,    0.00)  DC

BLKSGENS  1ST HIGHEST VALUE IS      93.87467 AT (  420225.90,  3746574.10,    65.23,
   65.23,    0.00)  DC
          2ND HIGHEST VALUE IS      93.51919 AT (  420225.00,  3746575.00,    65.23,
   65.23,    0.00)  DC
          3RD HIGHEST VALUE IS      89.95259 AT (  420232.40,  3746551.60,    65.23,
   65.23,    0.00)  DC
          4TH HIGHEST VALUE IS      88.05904 AT (  420225.00,  3746550.00,    65.23,
   65.23,    0.00)  DC
          5TH HIGHEST VALUE IS      78.64793 AT (  420219.30,  3746596.50,    65.23,
   65.23,    0.00)  DC
          6TH HIGHEST VALUE IS      74.14321 AT (  420200.00,  3746575.00,    65.23,
   65.23,    0.00)  DC
          7TH HIGHEST VALUE IS      72.98656 AT (  420200.00,  3746550.00,    65.23,
   65.23,    0.00)  DC
          8TH HIGHEST VALUE IS      71.22428 AT (  420225.00,  3746525.00,    65.23,
   65.23,    0.00)  DC
          9TH HIGHEST VALUE IS      69.83984 AT (  420239.00,  3746529.10,    65.23,
   65.23,    0.00)  DC
         10TH HIGHEST VALUE IS      66.18889 AT (  420200.00,  3746525.00,    65.23,
   65.23,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_NO2_1HR
                         ***        08/08/14
 *** AERMET - VERSION  14134 ***   ***
                         ***       10:42:11

                                   PAGE 399
 **MODELOPTs:   RegDFAULT CONC      ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            3 Warning Message(s)
 A Total of          814 Informational Message(s)

 A Total of        43848 Hours Were Processed

 A Total of           61 Calm Hours Identified

 A Total of          753 Missing Hours Identified (  1.72 Percent)


    ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


    ********   WARNING MESSAGES   ********
 SO W320      25        PPARM: Input Parameter May Be Out-of-Range for Parameter
       VS
 MX W450   35065       CHKDAT: Record Out of Sequence in Meteorological File at:
 12010101
 MX W450   35065       CHKDAT: Record Out of Sequence in Meteorological File at:
2 year gap
```

** CONC OF CO IN MICROGRAMS/M**3
**

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
427000.00	3756000.00	0.23782m	(12090908)	428000.00	3756000.00	0.20226m	(12081708)
429000.00	3756000.00	0.22006	(06070508)	430000.00	3756000.00	0.20183	(08012924)
431000.00	3756000.00	0.20616	(09072508)	410000.00	3757000.00	0.17495	(12122324)
411000.00	3757000.00	0.18547	(07020508)	412000.00	3757000.00	0.21865	(12021208)
413000.00	3757000.00	0.21240	(06031508)	414000.00	3757000.00	0.25541m	(12091808)
415000.00	3757000.00	0.18986	(07021124)	416000.00	3757000.00	0.20280	(06061508)
417000.00	3757000.00	0.18238	(12073008)	418000.00	3757000.00	0.25341	(12092724)
419000.00	3757000.00	0.27834	(12081924)	420000.00	3757000.00	0.31599	(06101008)
421000.00	3757000.00	0.30383	(06022324)	422000.00	3757000.00	0.31652	(09070908)
423000.00	3757000.00	0.37005	(09070908)	424000.00	3757000.00	0.20117	(08072208)
425000.00	3757000.00	0.22493m	(12072008)	426000.00	3757000.00	0.24423	(07071608)
427000.00	3757000.00	0.23240m	(12090908)	428000.00	3757000.00	0.21961m	(12090908)
429000.00	3757000.00	0.17811m	(12082924)	430000.00	3757000.00	0.19304	(06070508)
431000.00	3757000.00	0.17728	(08012924)				

♀ *** AERMOD - VERSION 14134 *** *** SCEC_CPPMOD2014_CO_1HR_8HR
*** *** 08/08/14
*** AERMET - VERSION 14134 *** ***
*** 10:06:37

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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3
**

GROUP ID	AVERAGE	CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH	1ST HIGH VALUE IS	69.86197	ON 07122504: AT (420293.00, 3746691.40, 65.54, 65.54, 0.00)	DC	
TURBINES	HIGH	1ST HIGH VALUE IS	12.49977	ON 12081011: AT (420425.00, 3746825.00, 66.29, 66.29, 0.00)	DC	

BLKST HIGH 1ST HIGH VALUE IS 69.86083 ON 07122504: AT (420293.00, 3746691.40, 65.54, 65.54, 0.00) DC

TURB1 HIGH 1ST HIGH VALUE IS 3.47287 ON 12081011: AT (420450.00, 3746825.00, 66.45, 66.45, 0.00) DC

TURB2 HIGH 1ST HIGH VALUE IS 3.35480 ON 12081011: AT (420450.00, 3746825.00, 66.45, 66.45, 0.00) DC

TURB3 HIGH 1ST HIGH VALUE IS 3.30056 ON 09062911: AT (420525.00, 3746775.00, 66.45, 66.45, 0.00) DC

TURB4 HIGH 1ST HIGH VALUE IS 3.32417 ON 09062911: AT (420500.00, 3746800.00, 66.45, 66.45, 0.00) DC

BLKSGENS HIGH 1ST HIGH VALUE IS 69.86083 ON 07122504: AT (420293.00, 3746691.40, 65.54, 65.54, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** SCEC_CPPMOD2014_CO_1HR_8HR
*** *** 08/08/14

*** AERMET - VERSION 14134 *** *** 10:06:37

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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

GROUP ID (XR, YR, ZELEV, ZHILL, ZFLAG)	AVERAGE CONC OF TYPE	DATE (YYMMDDHH) NETWORK GRID-ID	RECEPTOR
ALL HIGH 1ST HIGH VALUE IS	57.45270	ON 06120324: AT (	420225.90, 3746574.10, 65.23, 65.23, 0.00) DC
TURBINES HIGH 1ST HIGH VALUE IS	7.04164	ON 06020616: AT (	420000.00, 3746400.00, 64.31, 64.31, 0.00) DC
BLKST HIGH 1ST HIGH VALUE IS	57.45083	ON 06120324: AT (	420225.90, 3746574.10, 65.23, 65.23, 0.00) DC
TURB1 HIGH 1ST HIGH VALUE IS	1.89034	ON 06020616: AT (	420075.00, 3746375.00, 64.62, 64.62, 0.00) DC
TURB2 HIGH 1ST HIGH VALUE IS	1.87458	ON 06020616: AT (	420075.00, 3746400.00, 64.62, 64.62, 0.00) DC
TURB3 HIGH 1ST HIGH VALUE IS	1.86652	ON 06020616: AT (	420000.00, 3746400.00, 64.31, 64.31, 0.00) DC

TURB4 HIGH 1ST HIGH VALUE IS 1.85499 ON 06020616: AT (420075.00, 3746475.00, 64.77, 64.77, 0.00) DC

BLKSGENS HIGH 1ST HIGH VALUE IS 57.45083 ON 06120324: AT (420225.90, 3746574.10, 65.23, 65.23, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** SCEC_CPPMOD2014_CO_1HR_8HR
*** *** 08/08/14
*** AERMET - VERSION 14134 *** *** *** 10:06:37

**MODELOPTs: RegDFAULT CONC ELEV

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 3 Warning Message(s)
A Total of 814 Informational Message(s)

A Total of 43848 Hours Were Processed

A Total of 61 Calm Hours Identified

A Total of 753 Missing Hours Identified (1.72 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
SO W320 26 PPARM: Input Parameter May Be Out-of-Range for Parameter VS
MX W450 35065 CHKDAT: Record Out of Sequence in Meteorological File at: 12010101
MX W450 35065 CHKDAT: Record Out of Sequence in Meteorological File at: 2 year gap

****
*** AERMOD Finishes Successfully ***
****

** CONC OF SO2 IN MICROGRAMS/M**3
**

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
427000.00	3756000.00	0.00017m	(12090924)	428000.00	3756000.00	0.00017	(06071024)
429000.00	3756000.00	0.00019	(06051824)	430000.00	3756000.00	0.00016	(06051824)
431000.00	3756000.00	0.00014	(09072524)	410000.00	3757000.00	0.00010	(08021424)
411000.00	3757000.00	0.00011m	(12021024)	412000.00	3757000.00	0.00013	(07041524)
413000.00	3757000.00	0.00013	(08031424)	414000.00	3757000.00	0.00013	(12011624)
415000.00	3757000.00	0.00013	(07021124)	416000.00	3757000.00	0.00012	(08110424)
417000.00	3757000.00	0.00013	(07013124)	418000.00	3757000.00	0.00020	(12053024)
419000.00	3757000.00	0.00022	(08081024)	420000.00	3757000.00	0.00023	(08060224)
421000.00	3757000.00	0.00025	(09070624)	422000.00	3757000.00	0.00023	(09070924)
423000.00	3757000.00	0.00022	(09070924)	424000.00	3757000.00	0.00017m	(12090824)
425000.00	3757000.00	0.00021	(06050324)	426000.00	3757000.00	0.00017	(07071624)
427000.00	3757000.00	0.00018m	(12090924)	428000.00	3757000.00	0.00016	(06071024)
429000.00	3757000.00	0.00014	(06071024)	430000.00	3757000.00	0.00016	(06051824)
431000.00	3757000.00	0.00014	(06051824)				

♀ *** AERMOD - VERSION 14134 *** *** SCEC_CPPMOD2014_SO2_24HR
07/25/14
*** AERMET - VERSION 14134 *** ***
12:08:53

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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3
**

GROUP ID	AVERAGE	CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE	GRID-ID
ALL	HIGH	1ST HIGH VALUE IS	0.09438	ON 06120324: AT (420225.90, 3746574.10, 65.23, 65.23, 0.00)	DC	
TURBINES	HIGH	1ST HIGH VALUE IS	0.04702m	ON 08020624: AT (419600.00, 3746000.00, 62.79, 62.79, 0.00)	DC	

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BLKST    HIGH   1ST HIGH VALUE IS       0.09202  ON 06120324: AT (  420225.90,
3746574.10,    65.23,    65.23,    0.00)  DC

TURB1    HIGH   1ST HIGH VALUE IS       0.01177m ON 08020624: AT (  419600.00,
3745900.00,    62.79,    62.79,    0.00)  DC

TURB2    HIGH   1ST HIGH VALUE IS       0.01177  ON 06061524: AT (  420550.00,
3746800.00,    66.75,    66.75,    0.00)  DC

TURB3    HIGH   1ST HIGH VALUE IS       0.01181  ON 06061524: AT (  420550.00,
3746825.00,    66.75,    66.75,    0.00)  DC

TURB4    HIGH   1ST HIGH VALUE IS       0.01177m ON 08020624: AT (  419600.00,
3746000.00,    62.79,    62.79,    0.00)  DC

BLKSGENS HIGH   1ST HIGH VALUE IS       0.09202  ON 06120324: AT (  420225.90,
3746574.10,    65.23,    65.23,    0.00)  DC
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 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_SO2_24HR
                         ***         07/25/14
 *** AERMET - VERSION  14134 ***   ***
                       ***         12:08:53

                                   PAGE 212
 **MODELOPTs:   RegDFAULT CONC      ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            3 Warning Message(s)
 A Total of          814 Informational Message(s)

 A Total of        43848 Hours Were Processed

 A Total of           61 Calm Hours Identified

 A Total of          753 Missing Hours Identified (  1.72 Percent)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 SO W320      25        PPARM: Input Parameter May Be Out-of-Range for Parameter
       VS
 MX W450   35065       CHKDAT: Record Out of Sequence in Meteorological File at:
 12010101
 MX W450   35065       CHKDAT: Record Out of Sequence in Meteorological File at:
2 year gap

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
427000.00	3756000.00	0.00072	(09050303)	428000.00	3756000.00	0.00067	(06061703)
429000.00	3756000.00	0.00056	(09072424)	430000.00	3756000.00	0.00060	(08012924)
431000.00	3756000.00	0.00054	(06090503)	410000.00	3757000.00	0.00074	(12122324)
411000.00	3757000.00	0.00077	(06013103)	412000.00	3757000.00	0.00067	(12021203)
413000.00	3757000.00	0.00079	(08031424)	414000.00	3757000.00	0.00073	(12011621)
415000.00	3757000.00	0.00064	(08012824)	416000.00	3757000.00	0.00058	(12090603)
417000.00	3757000.00	0.00061	(12073003)	418000.00	3757000.00	0.00082	(12053024)
419000.00	3757000.00	0.00086	(09081224)	420000.00	3757000.00	0.00107	(07062724)
421000.00	3757000.00	0.00094	(08052121)	422000.00	3757000.00	0.00093	(08070424)
423000.00	3757000.00	0.00096	(12072103)	424000.00	3757000.00	0.00076	(12080206)
425000.00	3757000.00	0.00065	(06071106)	426000.00	3757000.00	0.00063	(12080324)
427000.00	3757000.00	0.00062	(09050303)	428000.00	3757000.00	0.00070	(06061703)
429000.00	3757000.00	0.00059	(09072424)	430000.00	3757000.00	0.00046	(09072424)
431000.00	3757000.00	0.00051	(08012924)				

♀ *** AERMOD - VERSION 14134 *** *** SCEC_CPPMOD2014_SO2_3HR *** 07/25/14
*** AERMET - VERSION 14134 *** *** 11:35:59

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.19110	ON 08091612: AT (420425.00, 3746800.00, 66.14, 66.14, 0.00)	DC	

```
TURBINES HIGH   1ST HIGH VALUE IS       0.17673  ON 08091612: AT (  420450.00,
3746825.00,    66.45,    66.45,    0.00)  DC

BLKST    HIGH   1ST HIGH VALUE IS       0.12523  ON 08010424: AT (  420316.40,
3746698.30,    65.84,    65.84,    0.00)  DC

TURB1    HIGH   1ST HIGH VALUE IS       0.04742  ON 06012412: AT (  420000.00,
3746500.00,    64.62,    64.62,    0.00)  DC

TURB2    HIGH   1ST HIGH VALUE IS       0.04619  ON 08091612: AT (  420450.00,
3746800.00,    66.45,    66.45,    0.00)  DC

TURB3    HIGH   1ST HIGH VALUE IS       0.04611  ON 06010512: AT (  420100.00,
3746475.00,    64.92,    64.92,    0.00)  DC

TURB4    HIGH   1ST HIGH VALUE IS       0.04759  ON 06012412: AT (  420000.00,
3746600.00,    64.62,    64.62,    0.00)  DC

BLKSGENS HIGH   1ST HIGH VALUE IS       0.12523  ON 08010424: AT (  420316.40,
3746698.30,    65.84,    65.84,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_SO2_3HR
                        ***         07/25/14
 *** AERMET - VERSION  14134 ***   ***
                        ***        11:35:59

                                   PAGE 212
 **MODELOPTs:   RegDFAULT CONC      ELEV

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            3 Warning Message(s)
 A Total of          814 Informational Message(s)

 A Total of        43848 Hours Were Processed

 A Total of           61 Calm Hours Identified

 A Total of          753 Missing Hours Identified (  1.72 Percent)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 SO W320      25        PPARM: Input Parameter May Be Out-of-Range for Parameter
       VS
 MX W450   35065       CHKDAT: Record Out of Sequence in Meteorological File at:
 12010101
 MX W450   35065       CHKDAT: Record Out of Sequence in Meteorological File at:
2 year gap

    ***********************************
    *** AERMOD Finishes Successfully ***
```

*** THE SUMMARY OF MAXIMUM 4TH-HIGHEST MAX DAILY 1-HR RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	0.17570 AT (420075.00, 3746475.00, 64.77, 64.77, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.17403 AT (420000.00, 3746500.00, 64.62, 64.62, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.17172 AT (420075.00, 3746450.00, 64.62, 64.62, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.17145 AT (420100.00, 3746475.00, 64.92, 64.92, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.17089 AT (420075.00, 3746525.00, 64.77, 64.77, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.16888 AT (420125.00, 3746500.00, 64.92, 64.92, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.16870 AT (420100.00, 3746500.00, 64.92, 64.92, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.16662 AT (420125.00, 3746475.00, 64.92, 64.92, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.16593 AT (420100.00, 3746450.00, 64.92, 64.92, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.16526 AT (420075.00, 3746500.00, 64.77, 64.77, 0.00)	DC	
TURBINES	1ST HIGHEST VALUE IS	0.16437 AT (420000.00, 3746500.00, 64.62, 64.62, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.16083 AT (420075.00, 3746475.00, 64.77, 64.77, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.15882 AT (420075.00, 3746450.00, 64.62, 64.62, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.15600 AT (420100.00, 3746475.00, 64.92, 64.92, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.15456 AT (420075.00, 3746525.00, 64.77, 64.77, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.15372 AT (419900.00, 3746500.00, 64.01, 64.01, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.15363 AT (420000.00, 3746400.00, 64.31, 64.31, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.15331 AT (420075.00, 3746425.00, 64.62, 64.62, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.15184 AT (420100.00, 3746450.00, 64.92, 64.92, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.15108 AT (420100.00, 3746500.00, 64.92, 64.92, 0.00)	DC	

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BLKST     1ST HIGHEST VALUE IS       0.10679 AT (  420232.40,  3746551.60,    65.23,
   65.23,    0.00)  DC
          2ND HIGHEST VALUE IS       0.10489 AT (  420225.90,  3746574.10,    65.23,
   65.23,    0.00)  DC
          3RD HIGHEST VALUE IS       0.10400 AT (  420225.00,  3746575.00,    65.23,
   65.23,    0.00)  DC
          4TH HIGHEST VALUE IS       0.10071 AT (  420225.00,  3746550.00,    65.23,
   65.23,    0.00)  DC
          5TH HIGHEST VALUE IS       0.09605 AT (  420219.30,  3746596.50,    65.23,
   65.23,    0.00)  DC
          6TH HIGHEST VALUE IS       0.09148 AT (  420239.00,  3746529.10,    65.23,
   65.23,    0.00)  DC
          7TH HIGHEST VALUE IS       0.08490 AT (  420225.00,  3746525.00,    65.23,
   65.23,    0.00)  DC
          8TH HIGHEST VALUE IS       0.08447 AT (  420200.00,  3746575.00,    65.23,
   65.23,    0.00)  DC
          9TH HIGHEST VALUE IS       0.08419 AT (  420200.00,  3746550.00,    65.23,
   65.23,    0.00)  DC
         10TH HIGHEST VALUE IS       0.07983 AT (  420200.00,  3746600.00,    65.23,
   65.23,    0.00)  DC

TURB1     1ST HIGHEST VALUE IS       0.04310 AT (  420075.00,  3746425.00,    64.62,
   64.62,    0.00)  DC
          2ND HIGHEST VALUE IS       0.04306 AT (  420100.00,  3746425.00,    64.92,
   64.92,    0.00)  DC
          3RD HIGHEST VALUE IS       0.04285 AT (  420075.00,  3746475.00,    64.77,
   64.77,    0.00)  DC
          4TH HIGHEST VALUE IS       0.04214 AT (  420100.00,  3746450.00,    64.92,
   64.92,    0.00)  DC
          5TH HIGHEST VALUE IS       0.04204 AT (  420075.00,  3746500.00,    64.77,
   64.77,    0.00)  DC
          6TH HIGHEST VALUE IS       0.04200 AT (  420125.00,  3746450.00,    64.92,
   64.92,    0.00)  DC
          7TH HIGHEST VALUE IS       0.04181 AT (  420075.00,  3746400.00,    64.62,
   64.62,    0.00)  DC
          8TH HIGHEST VALUE IS       0.04178 AT (  420075.00,  3746450.00,    64.62,
   64.62,    0.00)  DC
          9TH HIGHEST VALUE IS       0.04126 AT (  420000.00,  3746400.00,    64.31,
   64.31,    0.00)  DC
         10TH HIGHEST VALUE IS       0.04122 AT (  420100.00,  3746400.00,    64.92,
   64.92,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_SO2_1HR
                        ***          07/25/14
 *** AERMET - VERSION  14134 ***   ***
                        ***         11:10:56
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 **MODELOPTs:   RegDFAULT CONC      ELEV

                    *** THE SUMMARY OF MAXIMUM   4TH-HIGHEST MAX DAILY  1-HR
RESULTS AVERAGED OVER   5 YEARS ***

                                    ** CONC OF SO2      IN MICROGRAMS/M**3
             **

                      NETWORK
GROUP ID                    AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
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TURB2      1ST HIGHEST VALUE IS      0.04345 AT (  420000.00,  3746500.00,    64.62,
   64.62,     0.00)  DC
           2ND HIGHEST VALUE IS      0.04309 AT (  420075.00,  3746450.00,    64.62,
   64.62,     0.00)  DC
           3RD HIGHEST VALUE IS      0.04244 AT (  420100.00,  3746475.00,    64.92,
   64.92,     0.00)  DC
           4TH HIGHEST VALUE IS      0.04230 AT (  420100.00,  3746450.00,    64.92,
   64.92,     0.00)  DC
           5TH HIGHEST VALUE IS      0.04227 AT (  420075.00,  3746475.00,    64.77,
   64.77,     0.00)  DC
           6TH HIGHEST VALUE IS      0.04225 AT (  420075.00,  3746500.00,    64.77,
   64.77,     0.00)  DC
           7TH HIGHEST VALUE IS      0.04168 AT (  420075.00,  3746525.00,    64.77,
   64.77,     0.00)  DC
           8TH HIGHEST VALUE IS      0.04159 AT (  420075.00,  3746425.00,    64.62,
   64.62,     0.00)  DC
           9TH HIGHEST VALUE IS      0.04083 AT (  420125.00,  3746475.00,    64.92,
   64.92,     0.00)  DC
          10TH HIGHEST VALUE IS      0.04071 AT (  420000.00,  3746400.00,    64.31,
   64.31,     0.00)  DC

TURB3      1ST HIGHEST VALUE IS      0.04317 AT (  420075.00,  3746475.00,    64.77,
   64.77,     0.00)  DC
           2ND HIGHEST VALUE IS      0.04290 AT (  420000.00,  3746500.00,    64.62,
   64.62,     0.00)  DC
           3RD HIGHEST VALUE IS      0.04257 AT (  420100.00,  3746500.00,    64.92,
   64.92,     0.00)  DC
           4TH HIGHEST VALUE IS      0.04208 AT (  420075.00,  3746500.00,    64.77,
   64.77,     0.00)  DC
           5TH HIGHEST VALUE IS      0.04163 AT (  420075.00,  3746525.00,    64.77,
   64.77,     0.00)  DC
           6TH HIGHEST VALUE IS      0.04157 AT (  420075.00,  3746450.00,    64.62,
   64.62,     0.00)  DC
           7TH HIGHEST VALUE IS      0.04132 AT (  420100.00,  3746475.00,    64.92,
   64.92,     0.00)  DC
           8TH HIGHEST VALUE IS      0.04128 AT (  420075.00,  3746550.00,    64.92,
   64.92,     0.00)  DC
           9TH HIGHEST VALUE IS      0.04054 AT (  419900.00,  3746500.00,    64.01,
   64.01,     0.00)  DC
          10TH HIGHEST VALUE IS      0.04031 AT (  420100.00,  3746450.00,    64.92,
   64.92,     0.00)  DC

TURB4      1ST HIGHEST VALUE IS      0.04276 AT (  420075.00,  3746500.00,    64.77,
   64.77,     0.00)  DC
           2ND HIGHEST VALUE IS      0.04230 AT (  420075.00,  3746525.00,    64.77,
   64.77,     0.00)  DC
           3RD HIGHEST VALUE IS      0.04213 AT (  420000.00,  3746500.00,    64.62,
   64.62,     0.00)  DC
           4TH HIGHEST VALUE IS      0.04183 AT (  420100.00,  3746525.00,    64.92,
   64.92,     0.00)  DC
           5TH HIGHEST VALUE IS      0.04088 AT (  420075.00,  3746475.00,    64.77,
   64.77,     0.00)  DC
           6TH HIGHEST VALUE IS      0.04086 AT (  420075.00,  3746575.00,    64.92,
   64.92,     0.00)  DC
           7TH HIGHEST VALUE IS      0.04070 AT (  420075.00,  3746550.00,    64.92,
   64.92,     0.00)  DC
           8TH HIGHEST VALUE IS      0.04062 AT (  420100.00,  3746500.00,    64.92,
   64.92,     0.00)  DC
           9TH HIGHEST VALUE IS      0.04002 AT (  420100.00,  3746475.00,    64.92,
   64.92,     0.00)  DC
          10TH HIGHEST VALUE IS      0.03960 AT (  420125.00,  3746500.00,    64.92,
   64.92,     0.00)  DC
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   66.14,     0.00)  DC
          8TH HIGHEST VALUE IS       0.00382 AT (  420400.00,  3746775.00,    66.14,
   66.14,     0.00)  DC
          9TH HIGHEST VALUE IS       0.00379 AT (  420475.00,  3746775.00,    66.45,
   66.45,     0.00)  DC
         10TH HIGHEST VALUE IS       0.00378 AT (  420425.00,  3746825.00,    66.29,
   66.29,     0.00)  DC

BLKST     1ST HIGHEST VALUE IS       0.00025 AT (  420399.80,  3746674.00,    65.84,
   65.84,     0.00)  DC
          2ND HIGHEST VALUE IS       0.00025 AT (  420400.00,  3746675.00,    65.84,
   65.84,     0.00)  DC
          3RD HIGHEST VALUE IS       0.00023 AT (  420393.20,  3746696.40,    65.84,
   65.84,     0.00)  DC
          4TH HIGHEST VALUE IS       0.00022 AT (  420400.00,  3746700.00,    65.84,
   65.84,     0.00)  DC
          5TH HIGHEST VALUE IS       0.00022 AT (  420406.40,  3746651.50,    65.84,
   65.84,     0.00)  DC
          6TH HIGHEST VALUE IS       0.00021 AT (  420425.00,  3746675.00,    66.14,
   66.14,     0.00)  DC
          7TH HIGHEST VALUE IS       0.00020 AT (  420425.00,  3746700.00,    66.14,
   66.14,     0.00)  DC
          8TH HIGHEST VALUE IS       0.00020 AT (  420386.60,  3746718.90,    66.13,
   66.13,     0.00)  DC
          9TH HIGHEST VALUE IS       0.00019 AT (  420363.20,  3746712.00,    65.84,
   65.84,     0.00)  DC
         10TH HIGHEST VALUE IS       0.00019 AT (  420400.00,  3746725.00,    66.14,
   66.14,     0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_PM10_ANNUAL
                        ***         07/25/14
 *** AERMET - VERSION  14134 ***   ***
                        ***        13:32:21

                                   PAGE 327
 **MODELOPTs:   RegDFAULT CONC      ELEV

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS
AVERAGED OVER   5 YEARS ***


                                  ** CONC OF PM10     IN MICROGRAMS/M**3
             **


                       NETWORK
GROUP ID                     AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

TURB1     1ST HIGHEST VALUE IS       0.00628 AT (  420600.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
          2ND HIGHEST VALUE IS       0.00615 AT (  420550.00,  3746775.00,    66.60,
   66.60,     0.00)  DC
          3RD HIGHEST VALUE IS       0.00613 AT (  420550.00,  3746750.00,    66.45,
   66.45,     0.00)  DC
          4TH HIGHEST VALUE IS       0.00605 AT (  420550.00,  3746800.00,    66.75,
   66.75,     0.00)  DC
          5TH HIGHEST VALUE IS       0.00595 AT (  420550.00,  3746725.00,    66.45,
   66.45,     0.00)  DC
          6TH HIGHEST VALUE IS       0.00593 AT (  420525.00,  3746750.00,    66.45,
   66.45,     0.00)  DC
          7TH HIGHEST VALUE IS       0.00587 AT (  420700.00,  3746900.00,    67.36,
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67.36, 0.00) DC
8TH HIGHEST VALUE IS 0.00586 AT (420525.00, 3746775.00, 66.45,
66.45, 0.00) DC
9TH HIGHEST VALUE IS 0.00584 AT (420525.00, 3746725.00, 66.45,
66.45, 0.00) DC
10TH HIGHEST VALUE IS 0.00584 AT (420550.00, 3746825.00, 66.75,
66.75, 0.00) DC

TURB2 1ST HIGHEST VALUE IS 0.00622 AT (420550.00, 3746800.00, 66.75,
66.75, 0.00) DC
2ND HIGHEST VALUE IS 0.00621 AT (420600.00, 3746800.00, 66.75,
66.75, 0.00) DC
3RD HIGHEST VALUE IS 0.00617 AT (420550.00, 3746775.00, 66.60,
66.60, 0.00) DC
4TH HIGHEST VALUE IS 0.00613 AT (420550.00, 3746825.00, 66.75,
66.75, 0.00) DC
5TH HIGHEST VALUE IS 0.00601 AT (420525.00, 3746775.00, 66.45,
66.45, 0.00) DC
6TH HIGHEST VALUE IS 0.00597 AT (420525.00, 3746800.00, 66.45,
66.45, 0.00) DC
7TH HIGHEST VALUE IS 0.00597 AT (420600.00, 3746900.00, 67.06,
67.06, 0.00) DC
8TH HIGHEST VALUE IS 0.00594 AT (420550.00, 3746750.00, 66.45,
66.45, 0.00) DC
9TH HIGHEST VALUE IS 0.00589 AT (420525.00, 3746750.00, 66.45,
66.45, 0.00) DC
10TH HIGHEST VALUE IS 0.00589 AT (420700.00, 3746900.00, 67.36,
67.36, 0.00) DC

TURB3 1ST HIGHEST VALUE IS 0.00625 AT (420550.00, 3746825.00, 66.75,
66.75, 0.00) DC
2ND HIGHEST VALUE IS 0.00618 AT (420550.00, 3746800.00, 66.75,
66.75, 0.00) DC
3RD HIGHEST VALUE IS 0.00616 AT (420600.00, 3746900.00, 67.06,
67.06, 0.00) DC
4TH HIGHEST VALUE IS 0.00608 AT (420525.00, 3746825.00, 66.60,
66.60, 0.00) DC
5TH HIGHEST VALUE IS 0.00607 AT (420525.00, 3746800.00, 66.45,
66.45, 0.00) DC
6TH HIGHEST VALUE IS 0.00594 AT (420600.00, 3746800.00, 66.75,
66.75, 0.00) DC
7TH HIGHEST VALUE IS 0.00592 AT (420550.00, 3746775.00, 66.60,
66.60, 0.00) DC
8TH HIGHEST VALUE IS 0.00591 AT (420525.00, 3746775.00, 66.45,
66.45, 0.00) DC
9TH HIGHEST VALUE IS 0.00581 AT (420700.00, 3746900.00, 67.36,
67.36, 0.00) DC
10TH HIGHEST VALUE IS 0.00580 AT (420500.00, 3746800.00, 66.45,
66.45, 0.00) DC

TURB4 1ST HIGHEST VALUE IS 0.00625 AT (420600.00, 3746900.00, 67.06,
67.06, 0.00) DC
2ND HIGHEST VALUE IS 0.00616 AT (420550.00, 3746825.00, 66.75,
66.75, 0.00) DC
3RD HIGHEST VALUE IS 0.00612 AT (420525.00, 3746825.00, 66.60,
66.60, 0.00) DC
4TH HIGHEST VALUE IS 0.00591 AT (420525.00, 3746800.00, 66.45,
66.45, 0.00) DC
5TH HIGHEST VALUE IS 0.00591 AT (420500.00, 3746825.00, 66.45,
66.45, 0.00) DC
6TH HIGHEST VALUE IS 0.00589 AT (420550.00, 3746800.00, 66.75,
66.75, 0.00) DC
7TH HIGHEST VALUE IS 0.00580 AT (420500.00, 3746800.00, 66.45,

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        423000.00   3756000.00         0.00111m (12090924)                424000.00
3756000.00         0.00092  (07111624)
        425000.00   3756000.00         0.00111  (06050324)                426000.00
3756000.00         0.00102m (12090924)
♀ *** AERMOD - VERSION  14134 ***    ***  SCEC_CPPMOD2014_PM10_24HR
                        ***          07/25/14
 *** AERMET - VERSION  14134 ***    ***
                        ***          14:10:11

                                     PAGE 325
 **MODELOPTs:    RegDFAULT CONC       ELEV

                                *** THE   1ST HIGHEST 24-HR AVERAGE CONCENTRATION
VALUES FOR SOURCE GROUP:  BLKSGENS ***
                                     INCLUDING SOURCE(S):     BLKSGENS    ,

                                                *** DISCRETE CARTESIAN RECEPTOR POINTS
***

                                               ** CONC OF PM10     IN MICROGRAMS/M**3
                    **

      X-COORD (M)  Y-COORD (M)         CONC     (YYMMDDHH)              X-COORD (M)
Y-COORD (M)         CONC     (YYMMDDHH)
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
        427000.00   3756000.00         0.00098m (12090924)                428000.00
3756000.00         0.00090  (06071024)
        429000.00   3756000.00         0.00100  (06051824)                430000.00
3756000.00         0.00090  (06051824)
        431000.00   3756000.00         0.00082  (09072524)                410000.00
3757000.00         0.00058  (08021424)
        411000.00   3757000.00         0.00060  (07041524)                412000.00
3757000.00         0.00071  (08021124)
        413000.00   3757000.00         0.00065  (08031424)                414000.00
3757000.00         0.00070  (08052224)
        415000.00   3757000.00         0.00076  (08052224)                416000.00
3757000.00         0.00071  (08052224)
        417000.00   3757000.00         0.00079  (07013124)                418000.00
3757000.00         0.00102  (12053024)
        419000.00   3757000.00         0.00120  (08081024)                420000.00
3757000.00         0.00120  (06082524)
        421000.00   3757000.00         0.00128  (09070624)                422000.00
3757000.00         0.00128  (09070924)
        423000.00   3757000.00         0.00120  (09070924)                424000.00
3757000.00         0.00101m (12090824)
        425000.00   3757000.00         0.00111  (06050324)                426000.00
3757000.00         0.00087  (07071624)
        427000.00   3757000.00         0.00104m (12090924)                428000.00
3757000.00         0.00083  (06071024)
        429000.00   3757000.00         0.00077  (06051824)                430000.00
3757000.00         0.00088  (06051824)
        431000.00   3757000.00         0.00080  (06051824)

♀ *** AERMOD - VERSION  14134 ***    ***  SCEC_CPPMOD2014_PM10_24HR
                        ***          07/25/14
 *** AERMET - VERSION  14134 ***    ***
                        ***          14:10:11

                                     PAGE 326
 **MODELOPTs:    RegDFAULT CONC       ELEV

                                                *** THE SUMMARY OF HIGHEST 24-HR
```

RESULTS ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

GROUP ID (XR, YR, ZELEV, ZHILL, ZFLAG)	AVERAGE OF TYPE	NETWORK CONC GRID-ID	DATE (YYMMDDHH)	RECEPTOR
ALL HIGH 1ST HIGH VALUE IS		0.43814	ON 06120324:	AT (420225.90, 3746574.10, 65.23, 65.23, 0.00) DC
TURBINES HIGH 1ST HIGH VALUE IS		0.24753m	ON 08020624:	AT (419600.00, 3746000.00, 62.79, 62.79, 0.00) DC
CHILL HIGH 1ST HIGH VALUE IS		0.08623	ON 07102224:	AT (420206.10, 3746641.40, 65.23, 65.23, 0.00) DC
BLKST HIGH 1ST HIGH VALUE IS		0.41574	ON 06120324:	AT (420225.90, 3746574.10, 65.23, 65.23, 0.00) DC
TURB1 HIGH 1ST HIGH VALUE IS		0.06218m	ON 08020624:	AT (419600.00, 3745900.00, 62.79, 62.79, 0.00) DC
TURB2 HIGH 1ST HIGH VALUE IS		0.06190m	ON 08020624:	AT (419600.00, 3746000.00, 62.79, 62.79, 0.00) DC
TURB3 HIGH 1ST HIGH VALUE IS		0.06207m	ON 08020624:	AT (419600.00, 3746000.00, 62.79, 62.79, 0.00) DC
TURB4 HIGH 1ST HIGH VALUE IS		0.06207m	ON 08020624:	AT (419500.00, 3746000.00, 62.48, 62.48, 0.00) DC
CHILLER1 HIGH 1ST HIGH VALUE IS		0.02217	ON 07102224:	AT (420206.10, 3746641.40, 65.23, 65.23, 0.00) DC
CHILLER2 HIGH 1ST HIGH VALUE IS		0.02164	ON 07102224:	AT (420206.10, 3746641.40, 65.23, 65.23, 0.00) DC
CHILLER3 HIGH 1ST HIGH VALUE IS		0.02131	ON 07102224:	AT (420212.70, 3746619.00, 65.23, 65.23, 0.00) DC
CHILLER4 HIGH 1ST HIGH VALUE IS		0.02190	ON 07102224:	AT (420212.70, 3746619.00, 65.23, 65.23, 0.00) DC
BLKSGENS HIGH 1ST HIGH VALUE IS		0.41574	ON 06120324:	AT (420225.90, 3746574.10, 65.23, 65.23, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

```
   66.14,    0.00)  DC
         4TH HIGHEST VALUE IS       0.00405 AT (  420425.00,  3746800.00,    66.14,
   66.14,    0.00)  DC
         5TH HIGHEST VALUE IS       0.00387 AT (  420450.00,  3746825.00,    66.45,
   66.45,    0.00)  DC
         6TH HIGHEST VALUE IS       0.00386 AT (  420475.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
         7TH HIGHEST VALUE IS       0.00385 AT (  420425.00,  3746750.00,    66.14,
   66.14,    0.00)  DC
         8TH HIGHEST VALUE IS       0.00382 AT (  420400.00,  3746775.00,    66.14,
   66.14,    0.00)  DC
         9TH HIGHEST VALUE IS       0.00379 AT (  420475.00,  3746775.00,    66.45,
   66.45,    0.00)  DC
        10TH HIGHEST VALUE IS       0.00378 AT (  420425.00,  3746825.00,    66.29,
   66.29,    0.00)  DC

BLKST    1ST HIGHEST VALUE IS       0.00025 AT (  420399.80,  3746674.00,    65.84,
   65.84,    0.00)  DC
         2ND HIGHEST VALUE IS       0.00025 AT (  420400.00,  3746675.00,    65.84,
   65.84,    0.00)  DC
         3RD HIGHEST VALUE IS       0.00023 AT (  420393.20,  3746696.40,    65.84,
   65.84,    0.00)  DC
         4TH HIGHEST VALUE IS       0.00022 AT (  420400.00,  3746700.00,    65.84,
   65.84,    0.00)  DC
         5TH HIGHEST VALUE IS       0.00022 AT (  420406.40,  3746651.50,    65.84,
   65.84,    0.00)  DC
         6TH HIGHEST VALUE IS       0.00021 AT (  420425.00,  3746675.00,    66.14,
   66.14,    0.00)  DC
         7TH HIGHEST VALUE IS       0.00020 AT (  420425.00,  3746700.00,    66.14,
   66.14,    0.00)  DC
         8TH HIGHEST VALUE IS       0.00020 AT (  420386.60,  3746718.90,    66.13,
   66.13,    0.00)  DC
         9TH HIGHEST VALUE IS       0.00019 AT (  420363.20,  3746712.00,    65.84,
   65.84,    0.00)  DC
        10TH HIGHEST VALUE IS       0.00019 AT (  420400.00,  3746725.00,    66.14,
   66.14,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_PM2.5_ANNUAL
                        ***         07/25/14
 *** AERMET - VERSION  14134 ***   ***
                        ***        14:59:08

                                   PAGE 327
 **MODELOPTs:   RegDFAULT CONC      ELEV

                                   *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS
AVERAGED OVER   5 YEARS ***

                                   ** CONC OF PM25     IN MICROGRAMS/M**3
             **

                      NETWORK
GROUP ID                    AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

TURB1    1ST HIGHEST VALUE IS       0.00628 AT (  420600.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
         2ND HIGHEST VALUE IS       0.00615 AT (  420550.00,  3746775.00,    66.60,
   66.60,    0.00)  DC
         3RD HIGHEST VALUE IS       0.00613 AT (  420550.00,  3746750.00,    66.45,
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66.45, 0.00) DC
4TH HIGHEST VALUE IS 0.00605 AT (420550.00, 3746800.00, 66.75,
66.75, 0.00) DC
5TH HIGHEST VALUE IS 0.00595 AT (420550.00, 3746725.00, 66.45,
66.45, 0.00) DC
6TH HIGHEST VALUE IS 0.00593 AT (420525.00, 3746750.00, 66.45,
66.45, 0.00) DC
7TH HIGHEST VALUE IS 0.00587 AT (420700.00, 3746900.00, 67.36,
67.36, 0.00) DC
8TH HIGHEST VALUE IS 0.00586 AT (420525.00, 3746775.00, 66.45,
66.45, 0.00) DC
9TH HIGHEST VALUE IS 0.00584 AT (420525.00, 3746725.00, 66.45,
66.45, 0.00) DC
10TH HIGHEST VALUE IS 0.00584 AT (420550.00, 3746825.00, 66.75,
66.75, 0.00) DC

TURB2 1ST HIGHEST VALUE IS 0.00622 AT (420550.00, 3746800.00, 66.75,
66.75, 0.00) DC
2ND HIGHEST VALUE IS 0.00621 AT (420600.00, 3746800.00, 66.75,
66.75, 0.00) DC
3RD HIGHEST VALUE IS 0.00617 AT (420550.00, 3746775.00, 66.60,
66.60, 0.00) DC
4TH HIGHEST VALUE IS 0.00613 AT (420550.00, 3746825.00, 66.75,
66.75, 0.00) DC
5TH HIGHEST VALUE IS 0.00601 AT (420525.00, 3746775.00, 66.45,
66.45, 0.00) DC
6TH HIGHEST VALUE IS 0.00597 AT (420525.00, 3746800.00, 66.45,
66.45, 0.00) DC
7TH HIGHEST VALUE IS 0.00597 AT (420600.00, 3746900.00, 67.06,
67.06, 0.00) DC
8TH HIGHEST VALUE IS 0.00594 AT (420550.00, 3746750.00, 66.45,
66.45, 0.00) DC
9TH HIGHEST VALUE IS 0.00589 AT (420525.00, 3746750.00, 66.45,
66.45, 0.00) DC
10TH HIGHEST VALUE IS 0.00589 AT (420700.00, 3746900.00, 67.36,
67.36, 0.00) DC

TURB3 1ST HIGHEST VALUE IS 0.00625 AT (420550.00, 3746825.00, 66.75,
66.75, 0.00) DC
2ND HIGHEST VALUE IS 0.00618 AT (420550.00, 3746800.00, 66.75,
66.75, 0.00) DC
3RD HIGHEST VALUE IS 0.00616 AT (420600.00, 3746900.00, 67.06,
67.06, 0.00) DC
4TH HIGHEST VALUE IS 0.00608 AT (420525.00, 3746825.00, 66.60,
66.60, 0.00) DC
5TH HIGHEST VALUE IS 0.00607 AT (420525.00, 3746800.00, 66.45,
66.45, 0.00) DC
6TH HIGHEST VALUE IS 0.00594 AT (420600.00, 3746800.00, 66.75,
66.75, 0.00) DC
7TH HIGHEST VALUE IS 0.00592 AT (420550.00, 3746775.00, 66.60,
66.60, 0.00) DC
8TH HIGHEST VALUE IS 0.00591 AT (420525.00, 3746775.00, 66.45,
66.45, 0.00) DC
9TH HIGHEST VALUE IS 0.00581 AT (420700.00, 3746900.00, 67.36,
67.36, 0.00) DC
10TH HIGHEST VALUE IS 0.00580 AT (420500.00, 3746800.00, 66.45,
66.45, 0.00) DC

TURB4 1ST HIGHEST VALUE IS 0.00625 AT (420600.00, 3746900.00, 67.06,
67.06, 0.00) DC
2ND HIGHEST VALUE IS 0.00616 AT (420550.00, 3746825.00, 66.75,
66.75, 0.00) DC
3RD HIGHEST VALUE IS 0.00612 AT (420525.00, 3746825.00, 66.60,

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         8TH HIGHEST VALUE IS       0.08079 AT (  420200.00,  3746575.00,    65.23,
   65.23,    0.00)  DC
         9TH HIGHEST VALUE IS       0.07939 AT (  420219.30,  3746596.50,    65.23,
   65.23,    0.00)  DC
        10TH HIGHEST VALUE IS       0.07831 AT (  420200.00,  3746550.00,    65.23,
   65.23,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_PM2.5_24HR
                        ***        07/25/14
 *** AERMET - VERSION  14134 ***   ***
                       ***        15:35:24

                                  PAGE 630
 **MODELOPTs:   RegDFAULT CONC      ELEV

                          *** THE SUMMARY OF MAXIMUM   8TH-HIGHEST 24-HR RESULTS
AVERAGED OVER   5 YEARS ***

                                        ** CONC OF PM25     IN MICROGRAMS/M**3
             **

                        NETWORK
GROUP ID                      AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

TURB1     1ST HIGHEST VALUE IS       0.04236 AT (  420550.00,  3746775.00,    66.60,
   66.60,    0.00)  DC
         2ND HIGHEST VALUE IS       0.04203 AT (  420600.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
         3RD HIGHEST VALUE IS       0.04186 AT (  420550.00,  3746750.00,    66.45,
   66.45,    0.00)  DC
         4TH HIGHEST VALUE IS       0.04168 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
         5TH HIGHEST VALUE IS       0.04153 AT (  420525.00,  3746750.00,    66.45,
   66.45,    0.00)  DC
         6TH HIGHEST VALUE IS       0.04124 AT (  420525.00,  3746775.00,    66.45,
   66.45,    0.00)  DC
         7TH HIGHEST VALUE IS       0.04118 AT (  420550.00,  3746725.00,    66.45,
   66.45,    0.00)  DC
         8TH HIGHEST VALUE IS       0.04108 AT (  420550.00,  3746825.00,    66.75,
   66.75,    0.00)  DC
         9TH HIGHEST VALUE IS       0.04074 AT (  420525.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
        10TH HIGHEST VALUE IS       0.04063 AT (  420525.00,  3746725.00,    66.45,
   66.45,    0.00)  DC

TURB2     1ST HIGHEST VALUE IS       0.04264 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
         2ND HIGHEST VALUE IS       0.04217 AT (  420550.00,  3746775.00,    66.60,
   66.60,    0.00)  DC
         3RD HIGHEST VALUE IS       0.04197 AT (  420550.00,  3746825.00,    66.75,
   66.75,    0.00)  DC
         4TH HIGHEST VALUE IS       0.04191 AT (  420525.00,  3746775.00,    66.45,
   66.45,    0.00)  DC
         5TH HIGHEST VALUE IS       0.04160 AT (  420525.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
         6TH HIGHEST VALUE IS       0.04159 AT (  420525.00,  3746825.00,    66.60,
   66.60,    0.00)  DC
         7TH HIGHEST VALUE IS       0.04156 AT (  420600.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
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          8TH HIGHEST VALUE IS       0.04090 AT (  420550.00,  3746750.00,    66.45,
   66.45,    0.00)  DC
          9TH HIGHEST VALUE IS       0.04071 AT (  420525.00,  3746750.00,    66.45,
   66.45,    0.00)  DC
         10TH HIGHEST VALUE IS       0.04028 AT (  420500.00,  3746775.00,    66.45,
   66.45,    0.00)  DC

TURB3     1ST HIGHEST VALUE IS       0.04246 AT (  420550.00,  3746825.00,    66.75,
   66.75,    0.00)  DC
          2ND HIGHEST VALUE IS       0.04224 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          3RD HIGHEST VALUE IS       0.04211 AT (  420525.00,  3746825.00,    66.60,
   66.60,    0.00)  DC
          4TH HIGHEST VALUE IS       0.04173 AT (  420525.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
          5TH HIGHEST VALUE IS       0.04117 AT (  420600.00,  3746900.00,    67.06,
   67.06,    0.00)  DC
          6TH HIGHEST VALUE IS       0.04107 AT (  420500.00,  3746825.00,    66.45,
   66.45,    0.00)  DC
          7TH HIGHEST VALUE IS       0.04093 AT (  420500.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
          8TH HIGHEST VALUE IS       0.04090 AT (  420525.00,  3746775.00,    66.45,
   66.45,    0.00)  DC
          9TH HIGHEST VALUE IS       0.04053 AT (  420550.00,  3746775.00,    66.60,
   66.60,    0.00)  DC
         10TH HIGHEST VALUE IS       0.04014 AT (  420500.00,  3746775.00,    66.45,
   66.45,    0.00)  DC

TURB4     1ST HIGHEST VALUE IS       0.04201 AT (  420550.00,  3746825.00,    66.75,
   66.75,    0.00)  DC
          2ND HIGHEST VALUE IS       0.04185 AT (  420525.00,  3746825.00,    66.60,
   66.60,    0.00)  DC
          3RD HIGHEST VALUE IS       0.04145 AT (  420600.00,  3746900.00,    67.06,
   67.06,    0.00)  DC
          4TH HIGHEST VALUE IS       0.04143 AT (  420500.00,  3746825.00,    66.45,
   66.45,    0.00)  DC
          5TH HIGHEST VALUE IS       0.04092 AT (  420525.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
          6TH HIGHEST VALUE IS       0.04035 AT (  420500.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
          7TH HIGHEST VALUE IS       0.04014 AT (  420550.00,  3746800.00,    66.75,
   66.75,    0.00)  DC
          8TH HIGHEST VALUE IS       0.03949 AT (  420475.00,  3746825.00,    66.45,
   66.45,    0.00)  DC
          9TH HIGHEST VALUE IS       0.03933 AT (  420500.00,  3746900.00,    66.75,
   66.75,    0.00)  DC
         10TH HIGHEST VALUE IS       0.03905 AT (  420475.00,  3746800.00,    66.45,
   66.45,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_PM2.5_24HR
                        ***         07/25/14
 *** AERMET - VERSION  14134 ***   ***
                        ***        15:35:24
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**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM 8TH-HIGHEST 24-HR RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM25 IN MICROGRAMS/M**3 **

ATTACHMENT 1
(TO APPENDIX B)

CRITERIA POLLUTANT EMISSIONS
(REVISED AUGUST 2014)

Monthly / Annual Emissions Summary with Allowance for Maintenance Operations

Anaheim Canyon Power Plant

Pre-Modification PTE (Single Turbine)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	90	3.98	20	10.09	20	0.69	573.80	19.13	6,886
CO	90	4.24	20	11.6	20	0.62	626.00	20.87	7,512
VOC	90	1.20	20	0.79	20	0.27	129.20	4.31	1,550
PM10/PM2.5	90	3.00	20	1.29	20	0.18	299.40	9.98	3,593
SOx	90	0.34	20	0.14	20	0.02	33.80	1.13	406

Post-Modification PTE (Single Turbine)

2,958 total hours per year, per turbine, including 365 starts (2615 hours, including 540 starts for CO)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	No. of Maintenance Operating Hours per Month	Maintenance Operating Hour Emission Rate	Number of Startups per Year	Number of Normal Operating Hours Per Year	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx	280	3.98	60	10.09	60	0.69	10	44 *	365	2674	2201.20	73.37	15,017
CO	280	4.24	60	11.6	60	0.62	10	19.4 *	540	2200	2114.40	70.48	16,121
VOC	280	1.20	60	0.79	60	0.27	10	1.25 *	365	2674	412.10	13.74	3,608
PM10/PM2.5	280	1.67	60	0.75	60	0.18	10	1.67	365	2674	540.10	18.00	4,822
SOx	280	0.34	60	0.14	60	0.02	10	0.34	365	2674	108.20	3.61	971

Increase (Decrease) in PTE (Single Turbine)

Pollutant	No. of Normal Operating Hours per Month	Normal Operating Hour Emission Rate	No. of Startups Per Month	lb / Startup	No. of shutdowns per Month	Lb / Shutdown	Monthly Maximum Emissions (Lbs)	30-Day Average Emissions (lbs)	Annual PTE (Lbs)
NOx		0.00		0.00		0.00	1627.40	54.25	8,132
CO		0.00		0.00		0.00	1488.40	49.61	8,609
VOC		0.00		0.00		0.00	282.90	9.43	2,058
PM10/PM2.5		(1.33)		(0.54)		0.00	240.70	8.02	1,229
SOx		0.00		0.00		0.00	74.40	2.48	565

- 60 starts and stops equal 45 hrs of run time (35 min/start, 10 min/stop).
- This emissions inventory supersedes the inventory submitted in the July 2014 revised application.
  - Hourly NOx, CO, and VOC emissions for maintenance operations have increased slightly.

*Please note that these values reflect uncontrolled emissions for the turbine(s) during maintenance operations, as guaranteed by the turbine manufacturer GE.

Modeling Emission Rates (g/sec)

Pollutant	Max Hourly, 3 hr and 8 hr	Average 24 hour *(10 hrs maint, plus 14 hrs normal)*	Average Annual (8,760 hrs)	Selected Annual Operating Schedule
NOx	5.54388	2.60247	0.21600	2,958 hrs / 365 starts
CO	2.44435	1.33011	0.23187	2,615 hrs / 540 starts
VOC	0.15750	0.15382	0.05190	2,958 hrs / 365 starts
PM10/PM2.5	0.21042	0.21042	0.06935	2,958 hrs / 365 starts
SOx	0.04284	0.04284	0.01397	2,958 hrs / 365 starts

Modeling Emission Rates (g/sec)
Black Start Engine

Pollutant	Max Hourly*	Average 24 hour**	Average Annual (8,760 hrs)
NOx	1.52133	1.52133	0.00867
CO	0.82406	0.82406	0.00470
VOC	0.00630	0.00630	0.00004
PM10/PM2.5	0.00713	0.00713	0.00004
SOx	0.00158	0.00158	0.00001

APPENDIX C

HEALTH RISK ASSESSMENT

Anaheim Canyon Power Plant
Health Risk Assessment

A Tier 3 screening level risk assessment was conducted using the Rule 1401 assessment tool provided by SCAQMD. The maximum 1-hour ambient concentrations derived from an AERMOD dispersion model were used for the input in combination with hourly and annual toxic pollutant emissions rates. The AERMOD analysis was normalized to complement the Rule 1401 screening tool by utilizing an emission rate of 1.0 gram per second for each turbine.

The AERMOD results indicate that a maximum ambient concentration of **1.42077 µg/m^3** exists from **Turbine No. 1** at a discrete receptor location (420450, 3746825), which is the highest modeled concentration from any single turbine and reflects the point of maximum exposure. This concentration value was used to determine the maximum acute hazard index (HIA) and chronic hazard index (HIC) for a receptor from a single turbine. The value was also used to determine the maximum individual cancer risk (MICR) for the closest commercial receptor location, approximately 161 meters north of the exhaust stack.

The AERMOD results also indicate that an ambient concentration of **0.85414 µg/m^3** exists from **Turbine No. 4** at a discrete receptor location (420300, 3747300), which is the highest modeled concentration from any single turbine nearest a residential receptor. This concentration value was used to determine MICR for the closest residential receptor location, approximately 630 meters north of the exhaust stack.

The risk assessment results indicate that based upon a maximum concentration of **1.42077 µg/m^3**, the HIA and HIC at the point of maximum exposure are **both less than 1.0** for a single turbine. For commercial receptors, the MICR is **6.60 x 10^{-9}**, based upon a single turbine. For residential receptors, the MICR is **9.86 x 10^{-9}**, based upon a single turbine.

All health risk results reflect the potential post-modification potential to emit, rather than the incremental increase in emissions from the proposed project. Although these results reflect a Tier 3 screening level assessment, they complement the results of the initial complex assessment that was done at the time the project was initially permitted, and indicate that the proposed increase in operations would not result health risks that would exceed Rule 1401 thresholds.

```
        421500.00   3747100.00         0.56241  (12091201)                419100.00
3747200.00         0.54567  (12071205)
        419200.00   3747200.00         0.54803  (08100722)                419300.00
3747200.00         0.54926  (08100722)
        419400.00   3747200.00         0.55601  (12101620)                419500.00
3747200.00         0.55661  (08042722)
        419600.00   3747200.00         0.54170  (08110720)                419700.00
3747200.00         0.56509  (12012715)
        419800.00   3747200.00         0.58144  (12012311)                419900.00
3747200.00         0.59811  (12012311)
        420000.00   3747200.00         0.62295  (12032511)                420100.00
3747200.00         0.80077  (12032511)
        420200.00   3747200.00         0.75460  (12031709)                420300.00
3747200.00         0.95779  (12031710)
        420400.00   3747200.00         0.88153  (12030614)                420500.00
3747200.00         0.94257  (09102610)
        420600.00   3747200.00         0.83408  (12051014)                420700.00
3747200.00         0.74781  (12031713)
        420800.00   3747200.00         0.67894  (09062114)                420900.00
3747200.00         0.63531  (09060715)
        421000.00   3747200.00         0.57981  (09060715)                421100.00
3747200.00         0.55089  (12091504)
♀ *** AERMOD - VERSION  14134 ***   ***  SCEC_CPPMOD2014_HRA_1HR
                        ***          07/25/14
 *** AERMET - VERSION  14134 ***   ***
                       ***         16:18:16

                                   PAGE 175
 **MODELOPTs:   RegDFAULT CONC      ELEV

                                *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION
VALUES FOR SOURCE GROUP:  TURB4    ***
                                   INCLUDING SOURCE(S):     TURB4       ,

                                                *** DISCRETE CARTESIAN RECEPTOR POINTS
***

                                              ** CONC OF OTHER    IN MICROGRAMS/M**3
                  **

      X-COORD (M)  Y-COORD (M)        CONC     (YYMMDDHH)              X-COORD (M)
Y-COORD (M)        CONC     (YYMMDDHH)
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
        421200.00   3747200.00         0.56216  (12100122)                421300.00
3747200.00         0.56422  (12091003)
        421400.00   3747200.00         0.56191  (12091003)                421500.00
3747200.00         0.55738  (12091003)
        419100.00   3747300.00         0.53737  (08100722)                419200.00
3747300.00         0.54962  (12100804)
        419300.00   3747300.00         0.55629  (12100804)                419400.00
3747300.00         0.55877  (09052202)
        419500.00   3747300.00         0.55907  (08102203)                419600.00
3747300.00         0.55512  (12101420)
        419700.00   3747300.00         0.54050  (12102722)                419800.00
3747300.00         0.52488  (06110619)
        419900.00   3747300.00         0.50020  (07031223)                420000.00
3747300.00         0.67256  (12032511)
        420100.00   3747300.00         0.70447  (12032511)                420200.00
3747300.00         0.70682  (06010210)
        420300.00   3747300.00         0.85414  (12031710)                420400.00
3747300.00         0.79903  (06010211)
        420500.00   3747300.00         0.78066  (09102610)                420600.00
                                   Page 305
```

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

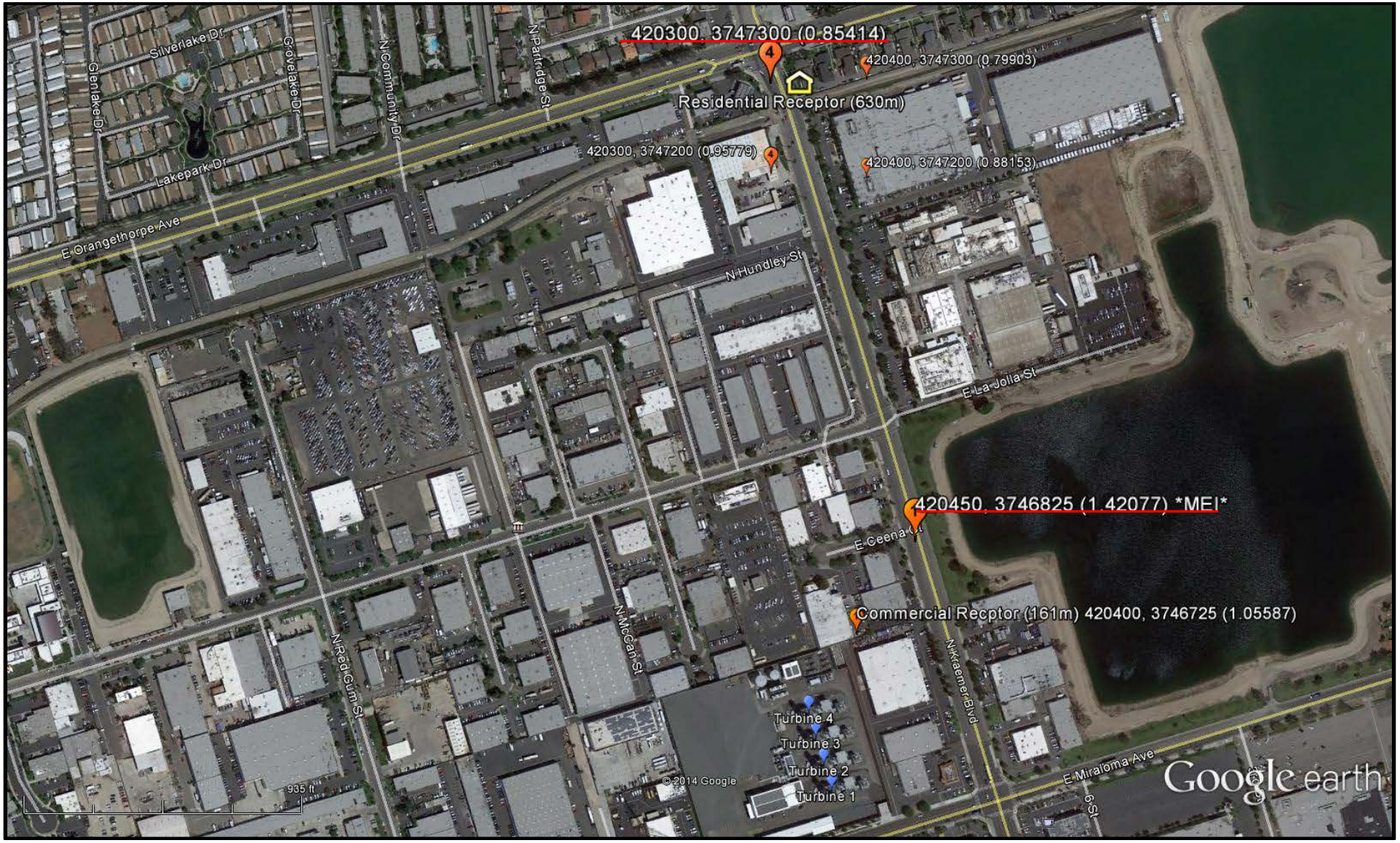
GROUP ID (XR, YR, ZELEV, ZHILL, ZFLAG)		AVERAGE CONC OF TYPE	DATE (YYMMDDHH)	NETWORK GRID-ID	RECEPTOR
ALL	HIGH 1ST HIGH VALUE IS	84.77685	ON 07122504:		AT (420293.00, 3746691.40, 65.54, 65.54, 0.00) DC
TURBINES	HIGH 1ST HIGH VALUE IS	5.11374	ON 12081011:		AT (420425.00, 3746825.00, 66.29, 66.29, 0.00) DC
BLKST	HIGH 1ST HIGH VALUE IS	84.77638	ON 07122504:		AT (420293.00, 3746691.40, 65.54, 65.54, 0.00) DC
TURB1	HIGH 1ST HIGH VALUE IS	1.42077	ON 12081011:		AT (420450.00, 3746825.00, 66.45, 66.45, 0.00) DC
TURB2	HIGH 1ST HIGH VALUE IS	1.37247	ON 12081011:		AT (420450.00, 3746825.00, 66.45, 66.45, 0.00) DC
TURB3	HIGH 1ST HIGH VALUE IS	1.35028	ON 09062911:		AT (420525.00, 3746775.00, 66.45, 66.45, 0.00) DC
TURB4	HIGH 1ST HIGH VALUE IS	1.35994	ON 09062911:		AT (420500.00, 3746800.00, 66.45, 66.45, 0.00) DC
BLKSGENS	HIGH 1ST HIGH VALUE IS	84.77638	ON 07122504:		AT (420293.00, 3746691.40, 65.54, 65.54, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)



- For the maximum concentration at a **residential receptor**, SCEC used the concentration of **0.85414 µg/m^3** (420300, 3747300), and conservatively assumed this concentration at the nearest residential receptor location (@ 630 meters from **Turbine 4**).
- For the maximum concentration at a **commercial receptor**, SCEC used the highest 1-hour concentration of **1.42077 µg/m^3** (420450, 3746825), and conservatively assumed this concentration at the nearby commercial receptor location (@161 meters from **Turbine 1**).

TIER 3 SCREENING RISK ASSESSMENT DATA INPUT

Application deemed complete date:	08/01/13
A/N:	555827-555832
Fac:	153992

Stack Data		Units
Hour/Day	8.126373626	hr/day
Day/Week	7	day/wk
Week/Year	52	wk/yr
Emission Units	lb/hr	
		0
Control Efficiency	0.00	fraction range 0-1
Does source have TBACT?	YES	
Point or Volume Source ?	P	P or V
Stack Height or Building Height	86	feet
Area (For Volume Source Only)	900	ft^2
Distance-Residential	630	meters
Distance-Commercial	161	meters
Meteorological Station	Anaheim	

Source Type:	O - Other
Screening Mode (**NO** = Tier 1 or Tier 2; **YES** = Tier 3)	YES

Emission Units	lb/hr	
Source output capacity	n/a	n/a

FOR USER-DEFINED CHEMICALS AND EMISSIONS, FILL IN THE TABLE BELOW

USER DEFINED CHEMICALS AND EMISSIONS				R1 - Uncontrolled	Efficiency Factor	R2 - Controlled
Cmpound Code	Compound	lb/hr	Molecular Weight	lbs/hr	Fraction range 0-1	lbs/hr
A1	Acetaldehyde	1.92E-02	44.06	0.0192	0.00000	0.0192
A3	Acrolein	1.73E-03	56.06	0.00173	0.00000	0.00173
B1	Benzene (including benzene from gasoline)	1.56E-03	78.11	0.00156	0.00000	0.00156
B9	Butadiene, 1,3-	2.06E-04	54.09	0.000206	0.00000	0.000206
E4	Ethyl benzene	1.53E-02	106.16	0.0153	0.00000	0.0153
F3	Formaldehyde	1.72E-01	30.03	0.172	0.00000	0.172
H8	Hexane (n-)	1.23E-01	86.18	0.123	0.00000	0.123
P9	PolyCyclic Aromatic Hydrocarbon (PAHs)	6.20E-05	252.3	0.000062	0.00000	0.000062
P30	Naphthalene	7.86E-04	128.1732	0.000786	0.00000	0.000786
T3	Toluene (methyl benzene)	6.23E-02	92.13	0.0623	0.00000	0.0623
X1	Xylenes (isomers and mixtures)	3.07E-02	106.2	0.0307	0.00000	0.0307
P80	Propylene oxide (or 1,2-epoxy propane)	1.39E-02	58.08	0.0139	0.00000	0.0139
A9	Ammonia	3.64E+00	17.03	3.64	0.00000	3.64
				0		
				0		
				0		
				0		
				0		
				0		
				0		
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				0		
				0		
				0		
				0		
				0		
				0		
				0		
				0		
				0		

Table A

Modeling emissions rate	1.000000	gr/sec
Modeling emissions rate	7.93	lb/hr
Modeling emissions rate	34.73	tons/yr
Max hr/dy	8.126373626	hr/day
Day per week	7	dy/wk
Week per year	52	wk/yr
MODELING RESULTS -MAX ONE HOUR		
Distance residence	630.00	meter
Max. 1-hour Conc. Residence	0.854140	ug/m3
Annualized Conc. Residence	0.068331	ug/m3
Distance Commerical	161.00	meter
Max. 1-hour Conc. Commerical	1.420770	ug/m3
Annualized Conc. Commercial	0.113662	ug/m3

Annualized X/Q

X/Q Residential	0.001967425	(ug/m^3)/(tons/yr)
X/Q Commercial	0.003272601	(ug/m^3)/(tons/yr)

Max. X/Q

X/Q Residential	0.107716544	(ug/m^3)/(lbs/hr)
X/Q Commercial	0.179174883	(ug/m^3)/(lbs/hr)

Table B (These values are needed to calculate cancer burden)

	Interpolation								
	Stack Height (ft):		86	Row:	3				
	Residential			Industrial			X/Q for one-in-a-million		
	near	actual	far	near	actual	far	near	actual	far
Distance	600.00	630.00	650.00	50.00	161.00	220.00	600.00	1386.13	220.00
X/Q - 1 hr conc ug/m3	0.96	0.85	0.80	1.06	1.42	1.42	0.96		1.42
X/Q Annualized (ug/m^3)/(tons/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00

CONVERSION CALCULATOR FOR SCREEN MODELING INPUT (British to Metric Units)

SCREEN INPUT DATA - BRITISH UNITS

Actual exhausted rate	593241.00	acfm
Temperature	838.00	degree F
Stack diameter	140.00	in
Stack height	86.00	ft
Modeling emissions rate	7.93	lb/hr

SCREEN INPUT DATA - METRIC UNITS

Temperature	720.778	degrees K
Stack diameter	3.556	meter
Stack area	9.927	square meter
Stack height	26.213	meter
Stack velocity	28.206	m/s
Modeling emissions rate	1.00006	gr/s

TIER 3 SCREENING RISK ASSESSMENT REPORT

A/N:	555827-555832
Fac:	153992

Application deemed complete date: 08/01/13

2. Tier 2 Data

MET Factor	1.00
4 hr	0.93
6 or 7 hrs	0.77

Dispersion Factors tables

2	For Chronic X/Q
6	For Acute X/Q

Dilution Factors (ug/m3)/(tons/yr)

Receptor	X/Q	X/Qmax
Residential	0.001967425	0.107716544
Commercial	0.003272601	0.179174883

Adjustment and Intake Factors

	AFann	DBR	EVF
Residential	1	302	0.96
Worker	3	149	0.38

3. Rule 1401 Compound Data

Compound	R1 - uncontrolled (lbs/hr)	R2 - controlled (lbs/hr)	CP	MP MICR Resident	MP MICR Worker	MP Chronic Resident	MP Chronic Worker	REL Chronic	REL Acute
Acetaldehyde	1.92E-02	1.92E-02	1.00E-02	1.0000	1.0000	1.0000	1.0000	140	470
Acrolein	1.73E-03	1.73E-03		1	1	1	1	0.35	2.5
Benzene (including benzene from gasoline)	1.56E-03	1.56E-03	1.00E-01	1	1	1	1.0000	60	1300
Butadiene, 1,3-	2.06E-04	2.06E-04	6.00E-01	1	1	1	1	20	
Ethyl benzene	1.53E-02	1.53E-02	8.70E-03	1.0000	1.0000	1	1	2000	
Formaldehyde	1.72E-01	1.72E-01	2.10E-02	1.0000	1.0000	1	1	9	55
Hexane (n-)	1.23E-01	1.23E-01		1	1	1	1	7000	
PolyCyclic Aromatic Hydrocarbon (PAHs)	6.20E-05	6.20E-05	3.90E+00	29.76	14.62107209	1	1		
Naphthalene	7.86E-04	7.86E-04	1.20E-01	1.0000	1.0000	1	1	9	
Toluene (methyl benzene)	6.23E-02	6.23E-02		1	1	1	1	300	37000
Xylenes (isomers and mixtures)	3.07E-02	3.07E-02		1	1	1.0000	1.0000	700	22000
Propylene oxide (or 1,2-epoxy propane)	1.39E-02	1.39E-02	1.30E-02	1	1.0000	1	1	30	3100
Ammonia	3.64E+00	3.64E+00		1	1	1	1	200	3200

4. Emission Calculations

Compound	uncontrolled R1 (lb/hr)	controlled R2 (lb/hr)	R2 (lb/yr)	R2 (ton/yr)
Acetaldehyde	1.92E-02	1.92E-02	56.7936	0.0283968
Acrolein	1.73E-03	1.73E-03	5.11734	0.00255867
Benzene (including benzene from gasoline)	1.56E-03	1.56E-03	4.61448	0.00230724
Butadiene, 1,3-	2.06E-04	2.06E-04	0.609348	0.000304674
Ethyl benzene	1.53E-02	1.53E-02	45.2574	0.0226287
Formaldehyde	1.72E-01	1.72E-01	508.776	0.254388
Hexane (n-)	1.23E-01	1.23E-01	363.834	0.181917
PolyCyclic Aromatic Hydrocarbon (PAHs)	6.20E-05	6.20E-05	0.183396	0.000091698
Naphthalene	7.86E-04	7.86E-04	2.324988	0.001162494
Toluene (methyl benzene)	6.23E-02	6.23E-02	184.2834	0.0921417
Xylenes (isomers and mixtures)	3.07E-02	3.07E-02	90.8106	0.0454053
Propylene oxide (or 1,2-epoxy propane)	1.39E-02	1.39E-02	41.1162	0.0205581
Ammonia	3.64E+00	3.64E+00	10767.12	5.38356
Total	4.08E+00	4.08E+00	1.21E+04	6.04E+00

A/N: 555827-555832 **Application deemed complete date:** 08/01/13

TIER 3 RESULTS

5a. MICR

MICR = CP (mg/(kg-day))^-1 * Q (ton/yr) * (X/Q) * AFann * MET * DBR * EVF * 1E-6* MP

Compound	Residential	Commercial
Acetaldehyde	1.62E-10	1.58E-10
Acrolein		
Benzene (including benzene from gasoline)	1.32E-10	1.28E-10
Butadiene, 1,3-	1.04E-10	1.02E-10
Ethyl benzene	1.12E-10	1.09E-10
Formaldehyde	3.05E-09	2.97E-09
Hexane (n-)		
PolyCyclic Aromatic Hydrocarbon (PAHs)	6.07E-09	2.91E-09
Naphthalene	7.96E-11	7.75E-11
Toluene (methyl benzene)		
Xylenes (isomers and mixtures)		
Propylene oxide (or 1,2-epoxy propane)	1.52E-10	1.49E-10
Ammonia		
Total	**9.86E-09**	**6.60E-09**
	PASS	**PASS**

No Cancer Burden, MICR<1.0E-6

5b. Cancer Burden	**NO**
X/Q for one-in-a-million:	
Distance (meter)	1386.13
Area (km2):	6.03E+00
Population:	42,231
Cancer Burden:	**4.16E-04**

6. Hazard Index

HIA = [Q(lb/hr) * (X/Q)max] * AF / Acute REL

HIC = [Q(ton/yr) * (X/Q) * MET * MP] / Chronic REL

Target Organs	Acute	Chronic	Acute Pass/Fail	Chronic Pass/Fail
Alimentary system (liver) - AL		3.70E-08	Pass	Pass
Bones and teeth - BN			Pass	Pass
Cardiovascular system - CV			Pass	Pass
Developmental - DEV	1.32E-06	1.17E-06	Pass	Pass
Endocrine system - END		3.70E-08	Pass	Pass
Eye	8.97E-04		Pass	Pass
Hematopoietic system - HEM	2.15E-07	1.26E-07	Pass	Pass
Immune system - IMM	2.15E-07		Pass	Pass
Kidney - KID		3.70E-08	Pass	Pass
Nervous system - NS	3.02E-07	1.43E-06	Pass	Pass
Reproductive system - REP	1.32E-06	4.99E-08	Pass	Pass
Respiratory system - RES	3.36E-04	2.09E-04	Pass	Pass
Skin			Pass	Pass

A/N: 555827-555832 **Application deemed complete date:** 08/01/13

6a. Hazard Index Acute HIA = [Q(lb/hr) * (X/Q)max] *AF/ Acute REL

	HIA - Residential									
Compound	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Acetaldehyde				4.40E-06					4.40E-06	
Acrolein				7.45E-05					7.45E-05	
Benzene (including benzene from gasoline)			1.29E-07		1.29E-07	1.29E-07		1.29E-07		
Butadiene, 1,3-										
Ethyl benzene										
Formaldehyde				3.37E-04						
Hexane (n-)										
PolyCyclic Aromatic Hydrocarbon (PAHs)										
Naphthalene										
Toluene (methyl benzene)			1.81E-07	1.81E-07			1.81E-07	1.81E-07	1.81E-07	
Xylenes (isomers and mixtures)				1.50E-07					1.50E-07	
Propylene oxide (or 1,2-epoxy propane)			4.83E-07	4.83E-07				4.83E-07	4.83E-07	
Ammonia				1.23E-04					1.23E-04	
Total			7.94E-07	5.39E-04	1.29E-07	1.29E-07	1.81E-07	7.94E-07	2.02E-04	

	HIA - Commercial									
Compound	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Acetaldehyde				7.32E-06					7.32E-06	
Acrolein				1.24E-04					1.24E-04	
Benzene (including benzene from gasoline)			2.15E-07		2.15E-07	2.15E-07		2.15E-07		
Butadiene, 1,3-										
Ethyl benzene										
Formaldehyde				5.60E-04						
Hexane (n-)										
PolyCyclic Aromatic Hydrocarbon (PAHs)										
Naphthalene										
Toluene (methyl benzene)			3.02E-07	3.02E-07			3.02E-07	3.02E-07	3.02E-07	
Xylenes (isomers and mixtures)				2.50E-07					2.50E-07	
Propylene oxide (or 1,2-epoxy propane)			8.03E-07	8.03E-07				8.03E-07	8.03E-07	
Ammonia				2.04E-04					2.04E-04	
Total			1.32E-06	8.97E-04	2.15E-07	2.15E-07	3.02E-07	1.32E-06	3.36E-04	

6b. Hazard Index Chronic

HIC = [Q(ton/yr) * (X/Q) * MET * MP] / Chronic REL

	HIC - Residential												
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Acetaldehyde												3.99E-07	
Acrolein												1.44E-05	
Benzene (including benzene from gasoline)				7.57E-08			7.57E-08			7.57E-08			
Butadiene, 1,3-											3.00E-08		
Ethyl benzene	2.23E-08			2.23E-08	2.23E-08				2.23E-08				
Formaldehyde												5.56E-05	
Hexane (n-)										5.11E-08			
PolyCyclic Aromatic Hydrocarbon (PAHs)													
Naphthalene												2.54E-07	
Toluene (methyl benzene)				6.04E-07						6.04E-07		6.04E-07	
Xylenes (isomers and mixtures)										1.28E-07		1.28E-07	
Propylene oxide (or 1,2-epoxy propane)												1.35E-06	
Ammonia												5.30E-05	
Total	2.23E-08			7.02E-07	2.23E-08		7.57E-08		2.23E-08	8.59E-07	3.00E-08	1.26E-04	

A/N: 555827-555832 Application deemed complete date: 08/01/13

6b. Hazard Index Chronic (cont.)

	HIC - Commercial												
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Acetaldehyde												6.64E-07	
Acrolein												2.39E-05	
Benzene (including benzene from gasoline)				1.26E-07			1.26E-07			1.26E-07			
Butadiene, 1,3-											4.99E-08		
Ethyl benzene	3.70E-08			3.70E-08	3.70E-08				3.70E-08				
Formaldehyde												9.25E-05	
Hexane (n-)										8.50E-08			
PolyCyclic Aromatic Hydrocarbon (PAHs)													
Naphthalene												4.23E-07	
Toluene (methyl benzene)				1.01E-06						1.01E-06		1.01E-06	
Xylenes (isomers and mixtures)										2.12E-07		2.12E-07	
Propylene oxide (or 1,2-epoxy propane)												2.24E-06	
Ammonia												8.81E-05	
Total	3.70E-08			1.17E-06	3.70E-08		1.26E-07		3.70E-08	1.43E-06	4.99E-08	2.09E-04	

APPENDIX D

GREENHOUSE GAS PSD AND BACT ANALYSIS

City of Anaheim
Canyon Power Plant
Greenhouse Gas Prevention of Significant Deterioration

Introduction

Annual potential emissions of greenhouse gasses (GHG) resulting from operation of the Canyon Power Plant exceed 100,000 tons per year, making the facility a major source of GHGs under the Prevention of Significant Deterioration (PSD) regulations. Furthermore, the proposed permit modification to allow an increase in annual operations would result in a net increase of more than 75,000 tons per year of CO_2e. This increase is considered "significant" and triggers a PSD analysis pursuant to South Coast Air Quality Management District (SCAQMD) Rule 1714 and 40 CFR 52.21. The facility is not considered a PSD major source for NO_X, CO, SO_X, PM, PM10, PM2.5 or VOC; and increases of these other criteria pollutants are not considered to be significant pursuant to SCAQMD Rule 1702. Any PSD analysis required for the project would be limited to greenhouse gases. Attachment A includes a summary of actual emissions of CO_2e from the facility during the two fiscal years preceding the application submittal, the proposed potential to emit (PTE), and the net emission increase.

Pursuant to US EPA permitting guidelines for GHG, a PSD analysis must include consideration of Best Available Control Technology (BACT), but does not require an ambient air quality impact analysis. Because the proposed modification is not a major modification for other criteria pollutants, PSD analyses for impacts on air quality, vegetation, visibility, etc. are also not required.

US EPA generally requires that available control technologies be considered, and those technologies that are not technologically feasible for the specific project be eliminated before ranking remaining feasible technologies for effectiveness and ultimately selecting the technology that best reflects BACT for the specific source. When evaluating BACT for GHG, applicants and permitting authorities are encouraged to consider both add-on control technology such as carbon capture and sequestration and combustion efficiency (mmBtu/MW-hr). Because CO_2e emissions from combustion sources are dependent upon the amount of fuel combusted, improvements in heat transfer efficiency would result in direct reductions in resulting GHG emissions. BACT should also not generally be less stringent or effective than applicable new source performance standards (NSPS) for new sources. Proposed 40 CFR 60, TTTT includes an efficiency-based standard of 1,100 lb. CO_2 / MW-hr for units with a heat input below 850 mmBtu/hr, but EPA does not propose to apply the standard to simple cycle gas turbine peaking units that sell less than one third of potential electric output and less than 219,000 MW-hours/year of electricity or to units undergoing modification. The LM6000 units however, meet the standard for new gas turbines.

A review of available technologies to reduce GHG emissions (primarily CO_2) for a peaking power plant lead to three possible strategies:

1. Carbon capture and storage (CCS)
2. Alternative fuels
3. Optimal heat transfer efficiency

Carbon Capture and Storage

Due to the costs associated with CCS, technology development has generally been focused on only large combined cycle base load power plants where capture rates exceed 1 million tons per year and primarily those plants that are new. Most focus has also been placed on solid fuel systems. The Global Carbon Capture Institute (GCCI) 2013 Status Report clarifies that only eight CCS projects for power generation are actually in operation; none of which are natural gas-fired turbines. Another eight projects are in the development stage, with only four being considered for natural gas power plants. Again, these projects are for plants with possible capture rates in excess of 1 million tons (http://www.globalccinstitute.com/publications/global-status-ccs-update-january-2013). The proposed modification to the Canyon Power Plant would result in an increase of approximately 269,000 metric tons of GHG emissions per year, compared with currently permitted rates and total potential facility emissions would be approximately 388,000 metric tons per year.

The GCCI study complements recent analysis conducted by US EPA in support of its national emission standards for new electric generating units. In its September 20, 2013 rulemaking technical report, EPA stated "We do not consider full or partial capture CCS to be the best system of emission reductions (for natural gas turbines) because of insufficient information to determine technical feasibility and because of the adverse impacts on electricity prices and the structure of the electric power sector." US EPA further clarified that it is still unclear how turbine cycling and multiple turbine startups associated with many natural gas units (especially peaking units) will affect the efficiency and reliability of CCS and that no pilot scale CCS projects have operated in a cycling mode. Finally, EPA cautions that because natural gas combustion turbines have relatively low cooling requirements, utilization of CCS technology is expected to have a large impact on water use requirements, relative to solid fuel combustion units ([EPA-HQ-OAR-2013-0495; FRL-9839-4]RIN 2060-AQ91 pp. 286-289).

The CCSI Status Report and US EPA Technical Report complement yet another analysis that was commissioned by the National Renewable Energy Laboratory (NREL). In its 2012 report Cost and Performance Data for Power Generation Technologies, NREL confirms that CCS for natural gas units is not expected to be commercially available until after 2020 and that even for base-load natural gas fired combined cycle units, the limited demonstration projects to date present significant cost uncertainty. NREL also evaluated the costs and net power production impacts of CCS for a combined cycle system. While NREL did not investigate the cost of applying CCS to a simple cycle peaking unit, certain key points can be extracted from the

combined cycle system analysis to determine both cost and technological implications for a peaking facility such as the Canyon Power Plant.

Attachment B contains two tables. The first table summarizes NREL's cost and performance analysis for a 580 MW base load combined cycle system. NREL concluded the capital cost of CCS is approximately two times greater than the capital cost attributed to the power generating system itself. Variable and fixed operating costs of CCS are approximately 1.7 – 1.8 times greater than the cost of the power generating system. Most notably, NREL pointed to a significant technical deficiency when applying CCS to natural gas units. Specifically, the power demand of carbon capture compression and transport presents a 50% penalty on net combined cycle plant power output.

Table 2 reflects the extraction and application of data from the NREL study to the Canyon Power Plant, which consists of four units rated at 50.95 MW, each. Capital costs for the construction of the plant were approximately $1.1 million per MW, based upon data provided by the City of Anaheim. The additional cost of CCS is estimated to be approximately $2.6 million per MW; or approximately 2.4 times higher than the cost to construct the power generation, SCR and the balance of the plant. In all, the capital cost premium of a CCS system for the Canyon Power Plant is estimated to be approximately $537 million. As with combined cycle plants, CCS presents a net power generation penalty when applied to a peaking power plant. In this case, because of the lower assumed heat efficiency of a simple cycle turbine, the power penalty of CCS is estimated to be approximately 40%, which is still significant. Because NREL did not assess annual operating and maintenance costs of CCS for a simple cycle plant, the costs of a combined cycle plant are reflected in Table 2 and are likely to be significantly understated due to the restricted annual operating schedule of the Canyon Power Plant.

The costs and technical implications identified by NREL reflect the assumption that if CCS is applied to a new plant, that infrastructure exists to store and transport CO_2, and that a beneficial use of the reclaimed CO_2 exists. While it is reasonable to assume that CCS infrastructure can be factored into plant siting decisions, the presence of infrastructure and likely beneficial use does not exist near the existing facility. As such, the technical hurdles of retrofitting an existing facility are not considered and the costs identified by NREL are likely to be understated relative to the Canyon Power Plant.

Given the extreme cost and net power production penalties attributed to CCS utilized in a natural gas turbine facility, combined with the increased water demand noted by US EPA and the lack of sufficient data to determine feasibility, CCS cannot be considered technologically feasible for the Canyon Power Plant.

Alternative Fuels

The Canyon Power Plant utilizes natural gas, which is an inherently low GHG emission fuel compared with other solid and liquid fuels that are typically utilized in power generation. CO_2 emissions from natural gas combustion are 53.02 kg/mmBtu, compared with 73.96 kg/mmBtu

for distillate oil combustion. Additionally, natural gas complements SCAQMD's clean fuel objectives for criteria pollutant attainment strategies and BACT and the size of the facility makes biogases infeasible. Given the GHG emissions and local / regional air quality impacts associated with alternative fossil fuels, and the limited availability of biofuels, natural gas is considered the most technologically feasible fuel for power generation facilities in the South Coast Basin.

Alternative, More Efficient Combustion Turbines

As a peaking facility, the Canyon Power Plant utilizes aeroderivative simple cycle turbines which are uniquely able to achieve frequent and quick startup cycles and varying operating loads. Combined cycle gas turbines offer greater heat input efficiency, relative to simple cycle gas turbines, but only when operated at higher capacity factors than the Canyon Power Plant is expected to achieve. Combined cycle plants are also not suited to multiple rapid start cycles typically associated with peaking plant operations. In its September 20, 2013 rulemaking report for 40 CFR 60, TTTT, EPA clarified that that the efficiency benefits of combined cycle technology are not achieved in low capacity peaking facilities because typical operations would exist without use of the heat recovery steam generator (HRSG) due to cycling loads and intermittent operations. EPA also clarified that aeroderivative turbines such as the LM6000 are best suited to the rapid load changes that are common in peaking operations and the inherent fuel efficiency of the units make the use of HRSG less feasible (p. 295). Finally, EPA's RACT / BACT / LAER lists only simple cycle turbines for recently permitted peaking facilities.

General Electric's newest aeroderivative unit, the LMS100, offers heat input efficiencies that are slightly greater than the LM6000 at ISO conditions. At peak summer conditions, however, LMS benefits tend to diminish, relative to the LM6000 due to combustion intake chilling that is utilized on the LM 6000 to reduce water consumption. Cooling of the LMS100 is dependent upon evaporation units which are less effective and use more water that may not be available at the Canyon Power Plant. According to General Electric specification sheets, at ambient conditions of 90^{o}F the LMS100 heat input rate is approximately 8,000 Btu/kW to 8,300 Btu/kW when inlet conditioning is not utilized. The LM6000 input rate is approximately 8,500 Btu/kW-hr at the same ambient temperature with chilled inlet air (a difference of only 2% to 6%).

LMS100 units do not adequately meet a technical requirement of the Canyon Power Plant due to their size. The LMS100 becomes unstable relative to efficiency once operations are reduced to 50% load, which severely limits the ability of a facility to generate at low loads. A plant based upon an LMS100, would not be able to generate at loads below 50 MW, while an LM6000-based plant can cycle operations to as low as 20 – 23 MW.

Given the operating restrictions attributed to either combined cycle technology or the larger LMS100 and the complexities associated with replacing the relatively new LM6000 units, one must conclude that no alternative generation units with increased efficiency rates exist that are suitable for the existing facility.

BACT Clearinghouse Entries

California clearinghouses (CAPCOA / CARB / Local Districts) do not include any entries that reference GHG BACT applied to recently permitted gas turbines. The US EPA RACT / BACT / LAER Clearinghouse does include one entry for simple cycle peaking turbines. The entry indicates that GHG BACT for a simple cycle peaking turbine plant incorporates high efficiency turbines without any additional control or carbon capture technology (RBLC ID ND-0030-Lonesome Creek Generating Station). The EPA clearinghouse entry complements the previously-discussed findings that carbon capture and control technologies are not suitable for peaking operations and that BACT instead should incorporate only efficient combustion technology.

Summary

The Canyon Power Plant is a major source and the proposed modification will result in a significant emissions increase. The modification will trigger PSD analysis for GHGs but not for other criteria pollutants. The GHG PSD implementation guidance document specifies that an ambient air quality analysis or other environmental impacts are not required to be assessed for the project, but a GHG BACT analysis is required. CCS, alternative fuels and alternative processing units were reviewed as possible BACT but are technologically infeasible and the existing gas turbines burning natural gas continue to meet BACT for the project.

ATTACHMENT 2

List of Property Owners within 1,000 feet of the Proposed Project

	APN_D	OWNERNAME	M_HSENO	M_DIR	M_STREET	M_SFX	M_UNIT	M_CITY	M_STATE	M_ZIP
1	344-221-03,04,09	CITY OF ANAHEIM			PO BOX 3222			ANAHEIM	CA	92803
2	344-111-01	CITY OF PLACENTIA	401	E	CHAPMAN	AVE		PLACENTIA	CA	92870
3	344-111-03	DONALD H YODER	17291		IRVINE	BLVD	415	TUSTIN	CA	92780
4	344-111-06	LARRY A BRENAN	1492		HUNDLEY	ST		ANAHEIM	CA	92806
5	344-111-07	LEE K CLARK	13532		SANDHURST	PL		SANTA ANA	CA	92705
6	344-111-08	ALVAREZ FAMILY PARTNERSHIP	360	S	GLASSELL			ORANGE	CA	92866
7	344-111-18	WILLIAM R RUDDOCK	1412	N	HUNDLEY	ST		ANAHEIM	CA	92806
8	344-111-19	RICHARD A HADERER	3449		ENTERPRISE	AVE		HAYWARD	CA	94545
9	344-111-20	CRW LEASING CO INC	864	N	RED ROBIN	ST		ORANGE	CA	92869
10	344-112-02	SAMUEL C EASTERDAY	5375		CRESCENT	DR		YORBA LINDA	CA	92887
11	344-112-03	FURN BENCHMASTER	17875		SKY PARK	CIR	#A	IRVINE	CA	92614
12	344-112-04	RICHARD JAMES & R DARLENE ADKINS	1409	N	HUNDLEY	ST		ANAHEIM	CA	92806
13	344-112-05	BRIAN J GELINAS	1415	N	HUNDLEY			ANAHEIM	CA	92806
14	344-112-07	BANA LLC	600	W	HERMOSA	DR		FULLERTON	CA	92835
15	344-202-07	VICTOR AVIGDOR EINI	2971	E	LA JOLLA			ANAHEIM	CA	92806
16	344-202-08	R L R INVESTMENTS LLC			PO BOX 271			WILMINGTON	OH	45177
17	344-211-04	SONFARREL INC	3000	E	LA JOLLA	ST		ANAHEIM	CA	92806
18	344-211-05	DAN F WINKLER	1381	N	HUNDLEY	ST		ANAHEIM	CA	92806
19	344-211-06	BARRY E COLVIN	584		19TH	ST		HERMOSA BEACH	CA	90254
20	344-211-10	B & L PROPERTIES	190		SEA WIND	WAY		LOS OSOS	CA	93402
21	344-211-11	B & L PROPERTIES	190		SEA WIND	WAY		LOS OSOS	CA	93402
22	344-211-12	B & L 79 LLC	34145		PACIFIC COAST		405	DANA POINT	CA	92629
23	344-211-13	MOHRSCHLADT HOWARTH ASSOC INC	9424		CASSIA	RD		ADELANTO	CA	92301
24	344-211-14	B & L PROPERTIES	190		SEA WIND	WAY		LOS OSOS	CA	93402
25	344-211-15	WALLACE R VAN DEVENTER	8603		LAUREL	AVE		WHITTIER	CA	90605
26	344-211-16	STEVEN R YETZKE	17530		WORKING	WAY		YORBA LINDA	CA	92886
27	344-211-17	JOHN MONROE OWINGS	1930		BALEARIC	DR		COSTA MESA	CA	92626
28	344-211-18	CEENA CT PTNRS GEN PTNSHP	3071	E	CEENA	CT		ANAHEIM	CA	92806
29	344-211-19	CEENA COURT PARTNERS GENERAL PARTNERSHIP	3071	E	CEENA	CT		ANAHEIM	CA	92806
30	344-211-20	ASPEN REALTY LLC	2951	E	LA PALMA	AVE		ANAHEIM	CA	92806
31	344-211-21	ROBERT D CRANE			P O BOX 134			LOS ALAMITOS	CA	90720
32	344-211-22	ASPEN REALTY LLC	2951	E	LA PALMA	AVE		ANAHEIM	CA	92806
33	344-211-23	DIRECT COLOR INC	5858		WESTHEIMER	RD	200	HOUSTON	TX	77057
34	344-221-01	METROPOLITAN WATER DISTRICT OF SO CAL			P O BOX 54153			LOS ANGELES	CA	90054
35	344-221-05	STEPHEN H GROVE	343		PARSONS LANDING			LONG BEACH	CA	90803
36	344-221-06	BORIS PIRIH	1210	N	JEFFERSON UNIT J			ANAHEIM	CA	92807
37	344-221-07	DOROTHY CASSELLA	2124	E	VALLEY GLEN	LN		ORANGE	CA	92867
38	344-221-08	BANK, SECURITY PAC NATL	3903		BELLAIRE	BLVD		HOUSTON	TX	77025
39	344-221-10	CAC EXCHANGE I LLC	7910		CRESCENT EXECUTIVE			CHARLOTTE	NC	28217
40	344-221-11	BKM MIRALOMA ASSOC LLC	3185		PULLMAN	ST		COSTA MESA	CA	92626
41	344-231-02	BALTZELL D DEAN	2995	E	MIRALOMA	AVE		ANAHEIM	CA	92806
42	344-231-05	ERDSTIECK FAMILY LTD PARTNERSHIP	4501	E	LA PALMA		200	ANAHEIM	CA	92807
43	344-231-07	DWYER INSTRUMENTS INC			P O BOX 373			MICHIGAN CITY	IN	46361
44	344-231-08	GEORGE S MC CAN			P O BOX 2794			NEWPORT BEACH	CA	92659
45	344-231-12	LAMB LEASING LLC	1029		BAYSIDE COVE			NEWPORT BEACH	CA	92660
46	344-231-13	GYPSUM ENTERPRISES INC	1370	N	RED GUM	ST		ANAHEIM	CA	92806
47	344-231-14	ROBERT CARSON	23451		VIA ALONDRA			COTO DE CAZA	CA	92679
48	344-231-15	B & E ENTERPRISES INC	2723		VIA CASA LOMA			SAN CLEMENTE	CA	92672

49	344-231-16	GEORGE S MC CAN		P O BOX 2794			NEWPORT BEACH	CA	92659
50	344-231-17	GEORGE S MC CAN		P O BOX 2794			NEWPORT BEACH	CA	92659
51	344-231-18	CHARLES BOUDAKIAM	1365 N	MC CAN	ST		ANAHEIM	CA	92806
52	344-231-19	WILLIAM R BRIDGE	7282	PIUTE CREEK	DR		CORONA	CA	92881
53	344-231-20	ROBERT J SARNA	620 E	NEIL CHILES	RD		BUCKNER	MO	64016
54	344-231-21	LOIS E VICK	4831	ORLANDO	DR		YORBA LINDA	CA	92886
55	344-231-22	LOIS VICK	1320 N	RED GUM			ANAHEIM	CA	92806
56	344-231-23	MIRALOMA BUSINESS CENTER LLC		P O BOX 10077			SANTA ANA	CA	92711
57	344-231-24	DONALD P DORMEYER	342 W	WESTWAY	AVE		ORANGE	CA	92865
58	344-241-02	THOMAS C & KATHLEEN A JOHNSON	160 E	LA JOLLA	ST		PLACENTIA	CA	92870
59	344-241-03	PETER KARAGINES	166 E	LA JOLLA	ST		PLACENTIA	CA	92870
60	344-241-04	ADCOAT PROPERTIES	172 E	LA JOLLA	ST		PLACENTIA	CA	92870
61	344-241-05	MORROW ENTERPRISE LLC	34328	WILSON CREEK	ST		TEMECULA	CA	92592
62	344-241-07	DARRYL C BASSANI	2900 E	LA JOLLA	ST		ANAHEIM	CA	92806
63	344-241-09	DARRYL C BASSANI	2900 E	LA JOLLA	ST		ANAHEIM	CA	92806
64	344-241-11	NANCO LLC	2950 E	LA JOLLA	ST		ANAHEIM	CA	92806
65	344-241-13	GOLDAAB PROPERTIES LLC	12202	RED HILL	AVE		SANTA ANA	CA	92705
66	344-241-14	PAMELA C BLEDSOE	202 W	LINCOLN	AVE	E	ORANGE	CA	92865
67	344-241-15	B & D PARTNERS	1361 N	RED GUM	ST		ANAHEIM	CA	92806
68	344-241-16	TOTEA ASSOCIATES	1000	SEGOVIA CIRCLE			PLACENTIA	CA	92870
69	344-241-17	TOTEA ASSOCIATES	1000	SEGOVIA CIRCLE			PLACENTIA	CA	92870
70	344-241-18	TOTEA ASSOCIATES	1000	SEGOVIA CIRCLE			PLACENTIA	CA	92870
71	344-241-19	TOTEA ASSOCIATES	1000	SEGOVIA CIRCLE			PLACENTIA	CA	92870
72	344-241-20	TOTEA ASSOCIATES	1000	SEGOVIA CIRCLE			PLACENTIA	CA	92870
73	344-241-21	TOTEA ASSOCIATES	1000	SEGOVIA CIRCLE			PLACENTIA	CA	92870
74	344-251-03	CANNON RED GUM PROP L P	2911 E	MIRALOMA	AVE		27 ANAHEIM	CA	92806
75	344-322-09	DALE K LENK	525	EL MODENA	AVE		NEWPORT BEACH	CA	92663
76	344-322-10	CORONADO INVESTORS	1340	REYNOLDS	AVE		116 IRVINE	CA	92614
77	344-322-11	DESIGNS ACRYLIC	1221 N	BARSTEN	WAY		ANAHEIM	CA	92806
78	344-322-12	BARSTEN PROPERTIES	1340	REYNOLDS	AVE		116 IRVINE	CA	92614
79	344-322-13	BARSTEN PROPERTIES	1340	REYNOLDS	AVE		116 IRVINE	CA	92614
80	344-322-14	WALID A BARAKAT	1240 N	BARSTEIN	WAY		ANAHEIM	CA	92806
81	344-322-15	JAMES D AMATO	5906 E	CAMINO MANZANO			ANAHEIM	CA	92807
82	344-322-16	C & J COMMERCIAL PROPERTIES LLC	38	SARATOGA			DOVE CANYON	CA	92679
83	344-322-17	CORONADO INVESTORS	1340	REYNOLDS	AVE		116 IRVINE	CA	92614
84	344-322-18	CORONADO INVESTORS	1340	REYNOLDS	AVE		116 IRVINE	CA	92614
85	344-322-19	FRANCIS M SEIFORD	900	LA PAZ			PLACENTIA	CA	92870
86	344-322-20	ROBERT N JACKSON	2002	CALLE DE LOS ALAMOS			SAN CLEMENTE	CA	92672
87	344-331-05	JOHDAN ENTERPRISES OF FULLERTON INC	2940	MIRALOMA	AVE		ANAHEIM	CA	92806
88	344-332-01	PAUL M REITLER	333 S	HOPE ST FL 48			LOS ANGELES	CA	90071
89	344-332-03	CHURCH, MISSION COMMUNITY	1250 N	RED GUM	ST		ANAHEIM	CA	92806
90	344-332-04	CHURCH, MISSION COMMUNITY	1250 N	RED GUM	ST		ANAHEIM	CA	92806
91	344-332-06	ROBERT W GORDON	2980 E	MIRALOMA	AVE		ANAHEIM	CA	92806
92	344-332-07	PROPERTIES LIMITED	2701	LIGHTHOUSE	LN		CORONA DEL MAR	CA	92625
93	344-332-08	MARK W DOOLEY	1371 N	MILLER	ST		ANAHEIM	CA	92806
94	344-332-09	MARK W DOOLEY	1371 N	MILLER	ST		ANAHEIM	CA	92806
95	344-332-10	ASPEN LA LOMA CIRCLE PROPERTIES	2951 E	LA PALMA	AVE		ANAHEIM	CA	92806
96	344-333-02	ML2990 LLC		P O BOX 10077			SANTA ANA	CA	92711
97	344-333-03	PROPERTIES LIMITED	2701	LIGHTHOUSE	LN		CORONA DEL MAR	CA	92625

98	344-333-04	ALEXANDER MORALES	1241 N	LA LOMA	CIR	A	ANAHEIM	CA	92806
99	344-341-02	HERTZ EQUIPMENT RENTAL CORP	225	BRAE	BLVD		PARK RIDGE	NJ	7656
100	344-341-03	JGW FRAMES LLC	3060 E	MIRALOMA	AVE		ANAHEIM	CA	92806
101	344-341-04	BRIEN DAVID PARISEAU	4861	SILVER SPUR	LN		YORBA LINDA	CA	92886
102	344-341-05	BUU QUOC PHAM	903 E	BAY HILL	PL		PLACENTIA	CA	92870
103	344-341-06	BONNIE YETIVE BULLINGER	682	BROOKLINE	PL		FULLERTON	CA	92835
104	344-341-09	TONY LEE SPRIGGS	2002	CALLE DE LOS ALAMOS			SAN CLEMENTE	CA	92672
105	344-341-10	TONY LEE SPRIGGS	2002	CALLE DE LOS ALAMOS			SAN CLEMENTE	CA	92672
106	344-341-11	NORMAN & IRMA M SWITZER		P O BOX 49414			LOS ANGELES	CA	90049
107	344-341-13	MIRALOMA REAL ESTATE INVESTMENT LLC	17101	SANTA CRUZ	CT		YORBA LINDA	CA	92886
108	344-341-15	JOYCE W ALMAS	8055 E	FLORENCE	AVE		DOWNEY	CA	90240
109	344-341-16	PROPERTIES LIMITED	2701	LIGHTHOUSE	LN		CORONA DEL MAR	CA	92625
110	344-342-02	CHRISTIAN S HANSEN	136 S	EUCALYPTUS	DR		ANAHEIM	CA	92808
111	344-342-03	PROPERTIES LIMITED	2701	LIGHTHOUSE	LN		CORONA DEL MAR	CA	92625
112	344-342-04	TERRY T PEIFFER	4402	PROSPECT	AVE		YORBA LINDA	CA	92886
113	344-351-12	LAWRENCE E HEAP	2110 W	ELM	AVE		ANAHEIM	CA	92804
114	344-351-13	ALI & KRISTY TAYEBI	22725	HIDDEN HILLS	RD		YORBA LINDA	CA	92887
115	344-351-14	THOMAS M & HIEDI COTTON	1295 N	LANCE	LN		ANAHEIM	CA	92806
116	344-351-15	HHI WEST HOLDINS LLC	1290 N	LANCE	LN	B	ANAHEIM	CA	92806
117	344-351-16	SWENSON FAMILY LIMITED PARTNERSHIP	34372	COVE LANTERN			DANA POINT	CA	92629
118	344-351-17	SWENSON FAMILY LIMITED PARTNERSHIP	34372	COVE LANTERN			DANA POINT	CA	92629
119	344-351-18	SWENSON FAMILY LIMITED PARTNERSHIP	34372	COVE LANTERN			DANA POINT	CA	92629
120	344-351-24	SWENSON FAMILY LIMITED PARTNERSHIP	34372	COVE LANTERN			DANA POINT	CA	92629
121	344-351-25	SWENSON FAMILY LIMITED PARTNERSHIP	34372	COVE LANTERN			DANA POINT	CA	92629
122	344-351-26	E M C ASSOCIATES LP	240	NEWPORT CENTER	DR		201 NEWPORT BEACH	CA	92660
123	344-351-27	E M C ASSOCIATES LP	240	NEWPORT CENTER	DR		201 NEWPORT BEACH	CA	92660
124	344-351-29	PIPE FABRICATING & SUPPLY CO		PO BOX 66004			ANAHEIM	CA	92816
125	344-351-30	CK LIMITED PARTNERSHIP	3071 E	CORONADO	ST		ANAHEIM	CA	92806
126	344-351-31	C K LIMITED PARTNERSHIP	3071 E	CORONADO	ST		ANAHEIM	CA	92806
127	345-031-01	CYTEC ENGINEERED MATERIALS INC	5	GARRET MOUNTAIN	PL		WEST PATERSON	NJ	7424
128	345-041-01	ORANGE COUNTY WATER DISTRICT		P O BOX 8300			FOUNTAIN VALLEY	CA	92728
129	345-041-02	ORANGE COUNTY WATER DISTRICT		P O BOX 8300			FOUNTAIN VLY	CA	92728
130	345-051-01	ANAHEIM EXTRUSION CO INC		P O BOX 6380			ANAHEIM	CA	92816
131	345-051-02	ANAHEIM EXTRUSION CO INC		P O BOX 6380			ANAHEIM	CA	92816
132	345-051-05	ORANGE COUNTY WATER DISTRICT		P O BOX 8300			FOUNTAIN VALLEY	CA	92728
133	345-051-06	ORANGE COUNTY WATER DISTRICT		P O BOX 8300			FOUNTAIN VLY	CA	92728
134	345-051-07	KRAEMER PARTNERS	10700	JERSEY	BLVD		610 RANCHO CUCAMONGA	CA	91730
135	345-051-08	KRAEMER PARTNERS	10700	JERSEY	BLVD		610 RANCHO CUCAMONGA	CA	91730
136	345-051-09	KRAEMER PARTNERS	10700	JERSEY	BLVD		610 RANCHO CUCAMONGA	CA	91730
137	345-101-23	KILROY REALTY LP		PO BOX 64733			LOS ANGELES	CA	90064
138	345-101-25	REALTY KILROY		PO BOX 64733			LOS ANGELES	CA	90064
139	345-101-26	STERLING PROPERTIES	3110 E	MIRALOMA	AVE		ANAHEIM	CA	92806
140	345-101-31	ROBERT D ZANTOS	10002	DEERHAVEN	DR		SANTA ANA	CA	92705