PERMIT TO OPERATE EVALUATION

APPLICANT:

Southern California Edison
P.O. Box 900, GO 3, 3rd Floor
Rosemead, CA 91770
Facility ID# 4477

EQUIPMENT LOCATION:

1 Pebbly Beach Rd
Avalon, CA 90704

EQUIPMENT DESCRIPTION:

Section D of the SCE, Pebbly Beach Facility Permit, ID #4477.

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
Process 1: Internal Combustion					
System 1: Power Generation					
INTERNAL COMBUSTION ENGINE, LEAN BURN, NON-EMERGENCY, UNIT NO. 15, DIESEL FUEL, EMD, MODEL 16-710G4B, TWO CYCLE, WITH AFTERCOOLER, TURBOCHARGER, 3900 HP, WITH A/N: ~~405148~~ **548962** GENERATOR, 2800 KW	D42	C58	NOX: MAJOR SOURCE	CO: ~~2000~~ **250** PPMV DIESEL (5) [RULE 1110.2]; **CO: 23 PPMV (8) [40 CFR 63 SUBPART ZZZZ];** NOx: 51 PPM DIESEL (4) [RULE 2005]; NOx: 2.13 LBS/MW-HR (5) [RULE 2009.1]; PM: (9) [RULE 404]; ROG: ~~300~~ **30** PPMV DIESEL (5) [RULE 1110.2];	A63.1, A63.2, A99.1, A195.7, A195.9, ~~D29.1~~, D29.2, D29.3, D323.2, D425.1, E51.1, ~~E71.2~~, E73.1, E193.1, H23.1, ~~H33.1~~, K40.2
SELECTIVE CATALYTIC REDUCTION, UNIT NO.15, JOHNSON MATTHEY, METAL MONOLITH VANADIA/TITANIA, 1000.5 CUBIC FEET OF CATALYST VOLUME, HEIGHT: 6'-6"; LENGTH: 8'-9"; WIDTH: 4'-0" UREA INJECTION SYSTEM,	C58	D42		NH3: 10 PPM (5) [RULE 1303-BACT]	A195.2 D12.3 D12.4 D12.5 E179.1 E179.2 E193.1

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
Process 1: Internal Combustion					
System 1: Power Generation					
AQUEOUS UREA INJECTION GRID #15 TANK, DAY TANK #15, AQUEOUS UREA, LENGTH: 3'-0"; WIDTH: 3'-0", 150 GALLONS A/N: ~~405147~~ **548965**					
CO OXIDATION CATALYST A/N: 548965	**C82**	**D42**			**D12.6, D12.7**

COMPLIANCE RECORD REVIEW:

There is no record of any compliance activity against this facility in the District's compliance database for the last 12 months.

BACKGROUND:

A/N's 405148 & 405147 – Unit 15 SCR/CO Catalyst Applications
SCE installed SCRs and CO catalysts on this engine in 2004. The application for SCR was submitted in 2002 and a Permit to Construct was issued in August 2003.

A/N 483417 – Unit 15 Change of Conditions Application
SCE had received NOV's for exceeding the 51 ppm NOx limit on Unit 15 in 2006. They submitted this application to address that issue by: 1) allowing a 1 hour averaging time for the 51 ppm NOx limit, with a provision for exceeding the 1 hour average up to 5 times per year, in which case they would be subject to a 3 hour average limit of 40 ppm, 2) allowing a 1 hour start up exemption, and a 15 minute shut down exemption from the 51 ppm NOx limit, and 3) allowing removal of the oxidation catalyst to make room for a 5th layer of SCR NOx reduction catalyst. The Permit to Construct was approved on June 23, 2009.

A/N's 548962 & 548965 – Unit 15 Reinstall CO Catalyst
SCE reinstalled CO catalyst back into the SCR housing for Unit 15 to reduce the CO exhaust concentration to within the 40CFR 60 subpart ZZZZ required level of 23 ppm.

The following table summarizes the open applications for the equipment:

Equipment	A/N	Description	Permit Date
Unit 15	405148	Add SCR	8/5/03
	483417	Change of Conditions	6/23/09
	548962	Modify Engine to add CO Catalyst	pending
SCR/CO Catalyst	405147	Initial Permit to Construct	8/5/03
	548965	Add CO Catalyst	pending

The SCE, Pebbly Beach facility is subject to both RECLAIM and Title V.

The installation of the SCR/CO catalysts is complete and the equipment will now be evaluated for final Permit to Operate. The Permit to Operate will incorporate the SCR/CO catalyst initial installation application, the Change of Condition application, and the reinstallation of the CO catalyst applications.

PROCESS DESCRIPTION:

Unit #15 is one of six diesel engines and 23 propane-fueled micro turbines on site that are used to generate power for the island. Unit #15 is the newest and cleanest of the diesel engines, it was installed on the island in 1995. Originally it was controlled with a technology called "NOxTech" (developed by Cummins Power Generation) , which was a process that used cyuranic acid injected into the exhaust and heated to 1400° F in a reaction chamber. Once heated the acid reacted with the NOx to form N2, CO2, and water. In 2003, SCE removed the NOxTech system and instead installed a more conventional SCR system, although instead of ammonia, the reagent is urea, since storage of ammonia on the island was deemed by SCE to be unsafe.

Total generating capacity for the site is 9.3 MW. The engines are supplied diesel fuel from one of two 3,000 barrel diesel storage tanks.

The engine is manufactured by General Motors Corp., and is rated at 3,900 brake H.P. at 900 rpm, maximum rated output is 2.8 MW. It's a two-stroke engine with 16 cylinders, and is aftercooled and turbocharged. Fuel rate to the engine at maximum load is about 200 gallons per hour. Maximum exhaust flow rate at these conditions is about 12,500 DSCFM. The exhaust gas temperature is approximately 634° F at 100% load.

SCE provided the following information on this engine:

Engine	Model	Cylinders	HP	Date of Manufacture
15	16-710G4B-EC	16	3900	1/1/1995

The engine is controlled by an SCR/CO catalyst. There are 4 layers of catalyst in the catalyst housing, each layer consisting of 16 blocks of catalyst in a 4X4 arrangement. Currently, the 1st three layers consist of 16 SCR catalyst blocks. The 4th layer is a combination of 4 SCR catalyst blocks and 12 CO catalyst blocks. SCE has requested flexibility in the configuration of the catalyst, so that they may add CO catalyst blocks in the future, and/or add an additional layer of catalyst as necessary.

EMISSIONS:

Source Testing

The unit was stack tested in 2004 after installation of the SCR/CO catalysts. In accordance with permit condition D29.3, which was added to the permit in 2009 under the P/C for A/N 483417, the unit is required to be tested for PM and ROG on an annual basis and CO every 2 years. Additionally, recently amended Rule 1110.2 requires VOC and CO tests every 2 years or every 8,760 operating hours, whichever occurs first.

Following is a summary of the test results.

Initial Testing

Test date 3/18/04

		100% Load	75% Load
Generator Output	MW	2.817	2.158
Fuel Rate	gpm	3.403	2.593
Urea Flow	gph	8.9	7.8
O2	% dry	13.19	13.02
CO2	% dry	5.41	5.53
Stack flow	acfm	27,628	21,525
	Dscfm	12,328	9,480
Stack temp	°F	631	638
H2O	%	6.3	6.9
Fuel flow rate	gpm		
Urea flow rate	gph		
NOx (method 100.1)	Ppm @ 15%	29.45	22.8
	Lbs/hr	3.5	2.1
	lbs/net MW-hr	1.225	0.972
CO (method 100.1)	Ppm @ 15%	11.7	0.9
ROG (method 25.3)	Ppm @ 15%	2.1	2.2
PM (method 5.2)	Gr/dscf	0.010	0.014
SOx (method 6.1)	Ppm @ 15%	1.3	1.5
NH3 (method 207.1)	Ppm @ 15%	0.8	0.9

The test was reviewed by M&STE staff and deemed 'conditionally acceptable' (reference S/T ID RO4201).

Results of 10/24/07 Test With SCR, Without Oxidation Catalyst

Pollutant	Ppm @ 15%	Lbs/hr
ROG (method 25.3)	14.0	0.30

Periodic Testing

Test date 12/17/09

Generator Output	kW	2427
Stack Flow	wacfm	21,809
Stack Flow	dscfm	8,508
Stack Temp	deg F	770
O2	%	10.83
H2O	%	8.2
NOx (method 100.1)	ppm @ 15% O2	14.5
CO (method 100.1)	ppm @ 15% O2	109.3
	lbs/hr	7.03
ROG (method 25.3)	ppm @ 15% O2	9.3
	lbs/hr	0.3
PM (method 5.2)	gr/scf	0.0052
	lbs/hr	0.38

Test results were deemed 'conditionally acceptable' by M&STE staff (reference S/T ID PR10136).

Test date 12/8/10

Generator Output	kW	2496
Stack Flow	wacfm	21,266
Stack Flow	dscfm	8,517
Stack Temp	deg F	728
O2	%	11.25
H2O	%	728
NOx (method 100.1)	ppm @ 15% O2	23.3
CO (method 100.1)	ppm @ 15% O2	99.2
	lbs/hr	6.12
ROG (method 25.3)	ppm @ 15% O2	2.3
	lbs/hr	0.1
PM (method 5.2)	gr/scf	0.0059
	lbs/hr	0.43

Test results were deemed 'conditionally acceptable' by M&STE staff (reference S/T ID R11009).

Test dates 10/24/11 & 12/2/11

Generator Output	kW	2330
Stack Flow	wacfm	20,231
Stack Flow	dscfm	8,142
Stack Temp	deg F	720
O2	%	10.92
H2O	%	9.0
NOx (method 1001.)	ppm @ 15% O2	16.7
CO (method 100.1)	ppm @ 15% O2	56.5
	lbs/hr	3.45
ROG (method 25.1)	ppm @ 15% O2	21.6
	lbs/hr	0.65
ROG (method 25.3)	ppm @15% O2	1.4
	lbs/hr	0.04
PM (method 5.2)	gr/scf	0.0043
	lbs/hr	0.30

Test results were deemed 'conditionally acceptable' by M&STE staff (reference S/T ID R11555). ROG was tested separately on 12/2/11, and the results shown above reflect the corrections made by M&STE staff (reference S/T ID R12020).

Test date 12/12/12

Generator Output	kW	2508
Stack Flow	wacfm	20,312
Stack Flow	dscfm	8,714
Stack Temp	deg F	656
O2	%	12.44
H2O	%	7.6
NOx (method 1001.)	ppm @ 15% O2	26.1
CO (method 100.1)	ppm @ 15% O2	35.5
	lbs/hr	1.97
ROG (method 25.1)	ppm @ 15% O2	32.6
	lbs/hr	1.0
PM (method 5.2)	gr/scf	0.0024
	lbs/hr	0.18

The results were deemed 'acceptable' for PM, NOx, and CO, and 'unacceptable for ROG by M&STE staff (reference S/T ID R13053). SCE was advised to re-test for the ROG emissions, which they did on 1/28/13.

Test date 1/28/13

Generator Output	kW	2,477
Stack Flow	dscfm	7,811
O2	%	11.11
NOx (method 100.1)	ppm @ 15% O2	46.0
ROG (method 25.3)	ppm @ 15% O2	2.0
	lbs/hr	0.07
ROG (method 25.1 excluding siloxanes)	ppm @ 15% O2	21.3
	lbs/hr	0.70
ROG (method 25.1 including siloxanes)	ppm @ 15% O2	61.0
	lbs/hr	2.00

The results were deemed 'conditionally acceptable' after adjustment by M&STE staff (reference S/T ID R13115).

A discussion of the test results by the testing firm indicated that the sample from the modified Method 25.1 test was contaminated with volatile organic siloxane. While the testing firm was not sure of the source of contamination, they concluded it was not from the diesel fuel or flue gas from the engine itself.

Based on their review, M&STE staff adjusted the results for non-siloxane VOC as follows:

Parameter	Test #1A	Test #1B	Average
Tank ROG	3.65	5.53	/////////
Trap ROG	29.74	36.6	/////////
Net ROG	33.39	42.1	37.75
Net ROG @ 15% O2	20.13	25.39	22.76

Despite the adjusted results showing compliance with the 30 ppm ROG limit, the facility was advised to retest the engine again due to the siloxane issue, which they did on 2/7/13.

Test date 2/7/13

Generator Output	kW	2,554
Stack Flow	dscfm	7,919
O2	%	11.68
NOx (method 100.1)	ppm @ 15% O2	36.6
ROG (method 25.3)	ppm @ 15% O2	2.7
	lbs/hr	0.08
ROG (method 25.1)	ppm @ 15% O2	9.9
	lbs/hr	0.3

The test results were deemed 'conditionally acceptable by M&STE staff (reference S/T ID R13220).

Test date 4/15/13

Generator Output	kW	2,303
Stack Flow	dscfh	494,920
O2	%	11.35
H2O	%	7.8
NOx (method 1001.)	ppm @ 15% O2	28.0
CO (method 100.1/EPA 10	ppm @ 15% O2	13.68

Discussion

Based on a comparison of the test results performed on the unit in 2004 (with an oxidation catalyst) vs the 2009 and later tests (no oxidation catalyst), the removal of the oxidation catalyst increased CO and to a lesser extent ROG emission. CO went from about 10-15 ppm with the oxidation catalyst to about 50-100 ppm without. ROG emissions tested at about 2 ppm with the oxidation catalyst, and about 2-14 ppm without the catalyst, when comparing the results based on method 25.3. However, method 25.3 is generally not considered appropriate for equipment which fires diesel fuel. The AQMD has required more recent tests on this unit to use Method 25.1 (which is also required by Rule 1110.2), and SCE has been testing the unit using both methods the last 2 years. Using Method 25.1 results in ROG emissions around 20-30 ppm

SCE has recently re-installed some oxidation catalyst in the 4th bay of the SCR housing of Unit 15. An application to modify the permit for Unit 15 to account for the re-installation of the CO catalyst was submitted on 3/15/13 (A/N 548962). The most recent CO test performed on 4/15/13 reflects the latest control equipment configuration.

Emission Calculations

Emissions of NOx were most recently calculated for the Permit to Construct under A/N 483417. NOx is based on the BACT limit and exhaust flow for the engine. The emissions of non-Reclaim pollutants were calculated for the original Permit to Construct under A/N 296861 and are based on default emission factors, with an assumed control efficiency for PM10 and ROG. Reference Appendix A for the calculations, following is the summary. Note that the NOx emissions are being corrected from the Permit to Construct . The NOx calculations done for the P/C were based on an exhaust flow at 13% O2, which is now adjusted to 15% O2 resulting in a higher estimate.

Unit #15 Emission Estimates - Permit to Operate

Pollutant	Uncontrolled		Controlled		
	Lbs/hr	Lbs/day	Lbs/hr	Lbs/day	Annual[3]
NOx	~~63.7~~ 71.6	~~1528.8~~ 1718	~~27.8~~ 28.6[1]	~~157.8~~ 171.8[2]	~~57,370~~ 62,460
CO	8.6	206.1	8.6	206.1	75,227
ROG	2.04	48.9	0.47	11.2	4,088
PM10	2.40	57.7	1.86	44.4	16,206
SOx	1.37	32.9	1.37	32.9	12,009

(1) Represents maximum hourly rate, which is for a start up

(2) *Assumes 2 daily starts and shutdowns per day*

(3) For NOx annual emissions assume 720 starts and 720 shutdowns per year (1 hour each), with remaining 7,320 hours at full load operation. For all other pollutants, assume 24 hour full load operation for 365 days.

30 Day Average Emissions

Pollutant	Total Monthly Emissions	30-Day Average Emissions	Previous 30-Day Average Emissions	Increase/Decrease
NOx	~~4,844~~ 5336	~~161.5~~ 178	114.1	~~47.4~~ 63.9
CO	6,183	206.1	206.1	0
ROG	336	11.2	11.2	0
PM10	1332	44.4	44.4	0
SOx	987	32.9	32.9	0

For NOx, monthly emissions assume 60 starts and 60 shutdowns per month (1 hour each), with remaining 622 hours at full load operation. For all other pollutants, assume 24 hour full load operation for 31 days For previous NOx emissions, assume 4.6 lbs/hr for 744 hours (no start up or shut down provision)

EVALUATION:

Rule 401 – Visible Emissions

Visible emissions are possible from diesel fired internal combustion engines, especially upon start up. Proper maintenance and operation can minimize the possibility of visible emissions. The facility is required to perform a visible emissions evaluation for each engine at least quarterly under condition D323.2.

Rule 402 - Nuisance

Nuisance problems are not expected with the proper operation of the equipment, including minimizing the release of ammonia by maintaining the ammonia slip limit of 10 ppm.

Rule 404 – Particulate Matter Concentration

This rule restricts the discharge of PM from the engine, with the limit being based on the exhaust flow. The maximum exhaust flow from Unit #15 is about 16500 dscfm. At this exhaust rate, the Rule 404 limit is approximately 0.065 gr/scf. Compliance is expected based on the following calculation:

(1.86 lbs/hr * 7000 gr/lb)/16500*60 dscfh = 0.013 gr/scf

The stack tests on the unit show grain loading well below the rule limit.

Rule 431.2 – Sulfur Content of Liquid Fuels

SCE is expected to comply with the requirements that the maximum sulfur content of diesel fuel used in these engines cannot exceed 500 ppm, if the fuel was purchased prior to June 1, 2004, and that only 15 ppm sulfur fuel can be purchased after June 1, 2004.

Rule 1110.2 – Emissions from Gaseous and Liquid Fueled Engines

The engine is subject to NOx Reclaim and therefore not subject to the NOx requirements of Rule 1110.2 per the Rule 2001 exemption for Reclaim sources. The engine is still subject to the VOC and CO limits in the rule. As of July 1, 2010 the Table II limits are 30 ppm VOC and 250 ppm CO. The results of the testing on the unit shows it is able to meet the CO limit comfortably, however the ROG emissions from the unit are close to 30 ppm, and even tested higher than 30 ppm in 2012 using Method 25.1. Because the CO limit of 250 ppm is less than 2000 ppm, SCE is required to perform periodic emission checks with a portable analyzer. The emission checks are to be performed at least quarterly or every 2000 engine operating hours. The unit is a lean burn engine, therefore it are not required to have a CO CEMS by paragraph (f)(1)(A)(vii). The facility is required to submit an Inspection and Maintenance Plan, which they have (A/N 486420). The engine is required to have elapsed time meter by paragraph (f)(1)(B). As of August 1, 2008, CO and ROG stack testing is required at least once every 2 years or every 8,760 operating hours by paragraph (f)(1)(C), and the operator is required to maintain an operating log. Although the engine is lean burn with an SCR (using urea injection), it is not required under Rule 1110.2 to monitor the minimum inlet temperature for urea flow [paragraph (f)(1)(D)(i)(V)] because it is not subject to the NOx limit of the rule. Under Reclaim, however, the engine IS required to measure this parameter. Compliance is anticipated with the reinstallation of the oxidation catalyst (see A/N 548962).

Results of periodic CO testing:

Test Date	Test Duration, min	Load, kW	CO, ppm	O2%	CO ppm @ 15%
6/14/10	32	2504	166.6	11.56	105.3
5/13/11	36	2540	154.7	10.64	89
4/4/12	32	2565	103.8	11.37	64.3
4/15/13	68	2303	22.21	11.35	13.68

Rule 1470 – Air Toxic Control Measure

The engines at SCE, Pebbly Beach are exempt from the PM limit of this rule because they use SCRs [exempt by subparagraph (h)(12)]. The requirements for using only CARB certified diesel fuel still apply. The units are expected to comply.

Rule 2005 – NSR for NOx

The increase in NOx as a result of the BACT exemption during start up and shutdown was accounted for when the Permit to Construct was issued under A/N 483417, refer to that file for the NSR evaluation. There is no increase in emissions for the reinstallation of the oxidation catalyst.

Rule 2012 – Monitoring, Reporting, and Recordkeeping for RECLAIM

The engine is a major sources under Reclaim and is required to maintain a CEMS, including in-stack NO2 and O2 analyzers, a fuel meter, and a data handling and recording system. NOx emissions are to be reported daily. Other parameters to be measured are the ammonia flow rate, the exhaust temperature into the SCR catalyst, and the differential pressure across the catalyst bed. The unit is currently in compliance with the requirements of this rule.

Regulation XXX – Title V

The Pebbly Beach facility is currently subject to Title V, and the reinstallation of the CO catalyst and issuing of the final Permits to Operate for the engine and its SCR is considered a minor revision to the existing Title V permit. Minor revisions are required to go through a 45 day EPA review period. The initial permit for installation of the SCR and the modification permit were both forwarded to EPA for review as required by Title V.

40CFR 63 Subpart ZZZZ – NESHAPs for Engines

The engines at Pebbly Beach became subject to this rule by way of the 2010 amendments (first published on 8/20/10).

The Pebbly Beach facility is an area source of HAP emissions (see Appendix B). Unit #15 is a non-emergency stationary compression ignition (CI) engine, and considered an existing source because it is located at an area source, is >500 hp, and was constructed before 6/12/06. By subsection 63.6603, existing non-emergency CI engines >500 hp at area sources are subject to the emission limitations in Table 2d and the operating limitations in Table 2b (CI). Table 2d requires a CO limit of 23 ppm at 15% O2 or a 70% reduction in CO. The limit takes effect May 3, 2013. An initial performance test is required before May 3, 2013. Subsequent tests are required every 8,760 operating hours or every 3 years, whichever occurs first. The required test method is EPA Method 10 (40 CFR60 Appendix A), ASTM Method D6522-00 (2005), EPA Method 320 (40 CFR63 Appendix A), or ASTM D6348-03.

The 4/15/13 test of the unit showed CO emissions of 13.68 ppm at 15% O2.

RECOMMENDATION:

Based on the foregoing analysis, after the EPA review and comment period, a final Permit to Operate is recommended for Unit 15 and its SCR/CO catalyst. The following table outlines the recommended disposition for each of the outstanding applications:

Equipment	A/N	Recommended Disposition
Unit 15	405148	Cancel
	483417	Cancel
	548962	Issue P/O
SCR/CO catalyst	405147	Cancel
	548965	Issue P/O

Also the Rule 1110.2 CO and VOC limits should be updated at this time, and a new 23 ppm CO limits should be added to each engine to reflect the requirement of 40 CFR 63 subpart ZZZZ.

CONDITIONS:

The following condition changes will be incorporated into the permit:

1. Add Device C82, CO catalyst for Unit #15.

2. Delete condition D29.1 which required source testing after installation of the SCR. The testing has been completed.
3. Delete condition D425.1 which required the CEMS to be re-evaluated after installation of the SCR. The condition has been met.
4. Delete condition E71.2 which required shutdown of Unit #11 prior to Unit 15 start up. The condition has been met.
5. Delete condition I331.1 which specified that the P/C conditions would take effect after construction was completed.
6. Add condition A195.10 to specify the averaging time of the 40 CFR 63 subpart ZZZZ CO limit.
7. Add condition D29.5 to specify the testing required by 40 CFR 63 subpart ZZZZ
8. Add condition D12.6 to the oxidation catalyst to require a pressure gauge and specify the pressure drop requirement of 40 CFR 63 subpart ZZZZ.
9. Add condition D12.7 to the oxidation catalyst to require a temperature gauge and specify the exhaust temperature requirement of 40 CFR 63 subpart ZZZZ.

All other conditions remain the same.

Facility Condition

F14.2
The operator shall not purchase fuel oil containing sulfur compounds in excess of 15 ppm by weight as supplied by the supplier.

This condition shall become effective on or after June 1, 2004.
[RULE 431.2, 9-15-2000]

Engine Conditions

A63.1
The operator shall limit emissions from this equipment as follows:

Contaminant	Emission Limit
ROG	Less than or equal to 11.2 lbs/day
SOx	Less than or equal to 32.9 lbs/day
PM10	Less than or equal to 44.4 lbs/day
CO	Less than or equal to 206.1 lbs/day

The limits for ROG, CO, and PM10 shall be verified using the latest source test results for each pollutant in lbs/hr multiplied by the actual number of hours operated each day.
[RULE 1303(b)(2)-Offset, 5-10-1996]

A63.2
The operator shall limit emissions from this equipment as follows:

Contaminant	Emission Limit
PM Emissions	Less than or equal to 5.32 tons/yr

The limit shall be verified by using the results from the latest source test for PM emissions and either the total annual fuel use or the total annual hours of operation for the unit. The yearly emission limit shall be defined as a period of twelve (12) consecutive months determined on a rolling basis with a new 12 month period beginning on the first day of each calendar month. [Rule 1401]

A99.1
The 51 ppm NOx emission limit shall not apply during start up or shutdown periods. Each start up shall not exceed 60 minutes and each shutdown shall not exceed 15 minutes. There shall be no more than 720 start ups per year. NOx emissions for the 60 minutes which includes a start up shall not exceed 25 lbs.
[Rule 2005 – BACT]

A195.7
The 2.13 lbs/net MW-hr NOx emission limit is averaged over 1 year.

1. To demonstrate compliance with the NOx emission rate for Device D42, the facility permit holder shall comply with the following:
   a) Determine the NOx emissions from the device pursuant to Rule 2012 including any required data substitution.
   b) For each quarter stating from the fourth quarter of compliance year 2001, report the quarterly NOx emissions and the energy produced in megawatt-hours for the quarter for this device. The report shall be filed along with the Quarterly Certificate of Emissions Report (QCER) as required by Rule 2004.
2. The SCR control equipment shall be capable of achieving a NOx reduction of at least 70%.

A195.9
The 51 ppm NOx emission limit is averaged over 60 minutes at 15 percent O2, dry.
If the 51 ppm NOx limit is exceeded, Unit 15 shall be subject to a 40 ppm NOx limit averaged over any 3 hour block period which includes the one hour period during which the 51 ppm limit is exceeded, at 15 percent O2, dry, for no more than 5 times per calendar year.

The One-Hour Average NOx Limit is based on four consecutive valid 15 minute averaging periods. At least 1 minute of valid data is required for each 15 minute period.
The Three-Hour Average NOx Limit is based on twelve consecutive valid 15-minute averaging periods. At least 1 minute of valid data is required for each 15 minute period. If the daily calibration check occurs during any of the twelve periods (periods 1-12), that period may be excluded and a 13th 15-minute period may be added (period 0 or 13).

All other valid 15 minute average periods, including periods with data substitution, shall be used to calculate the averages.

Notwithstanding the clock-hour requirements of Rule 2012, or the definition of One Hour Average in this condition, the NOx emissions from the unit shall comply with the BACT limit for

the 60 minute period beginning after the end of each start up, and for the 60 minute period beginning 15 minutes before the end of each shutdown. The operator shall also show compliance with the BACT limit for the overlapping clock-hour average in these situations

The operator shall keep minute data for at least 60 minutes after the end of a start up and at least 60 minutes prior to the start of a shutdown, and use the average of the data to show compliance with the BACT limit. Any data substitution during these 60 minute periods shall be used in the calculation of the average.
[Rule 2005 – BACT]

A195.10
The 23 ppm CO limit is average over 1 hour at 15%O2, dry.

This limit shall take effect no later than May 3, 2013.
[40 CFR 63 Subpart ZZZZ, 3-9-2011]

~~D29.1~~
~~The operator shall conduct source test(s) for the pollutant(s) identified below.~~

~~Pollutant to be Tested~~	~~Required Test Methods~~	~~Averaging Time~~	~~Test Location~~
~~NOx emissions~~	~~District Method 100.1~~	~~1 hour~~	~~Outlet stack~~
~~CO emissions~~	~~District Method 100.1~~	~~1 hour~~	~~Outlet stack~~
~~SOx emissions~~	~~District Method 6.1~~	~~1 hour~~	~~Outlet stack~~
~~ROG emissions~~	~~Approved District Method~~	~~1 hour~~	~~Outlet stack~~
~~PM emissions~~	~~Approved District Method~~	~~District approved averaging time~~	~~Outlet stack~~
~~NH3 emissions~~	~~District Method 207.1 and 5.3 or EPA Method 17~~	~~1 hour~~	~~Outlet stack~~

~~The District shall be notified of the date and time of the test at least 10 days prior to the test~~

~~The test(s) shall be conducted after approval of the test protocol, but no later than 180 days after initial start-up of the internal combustion engine(s) with SCR~~

~~The test shall be conducted to determine the oxygen levels in the exhaust. In addition, the test shall measure the fuel flow rate (CFH), the flue gas flow rate, and the generator output (MW)~~

~~The test shall be conducted when the equipment is operating at loads of 100, 75, and 50 percent of maximum load~~

~~The test shall be conducted in accordance with a AQMD approved source test protocol. The protocol shall be submitted to the AQMD engineer no later than 45 days before the test date and shall be approved by the~~
~~AQMD before the test commences. The test protocol shall include the proposed operating conditions of the~~
~~ICE(s) during the test, the identity of the testing lab, a statement from the testing lab certifying that it meets~~
~~the criteria of R304, and a description of all sampling and analytical procedures.~~
~~[RULE 1303(a)(1) BACT, 5-10-1996; RULE 1303(b)(2) Offset, 5-10-1996; RULE 2005, 4-9-1999; RULE~~
~~2005, 4-20-2001]~~

D29.2
The operator shall conduct source test(s) for the pollutant(s) identified below.

Pollutant to be Tested	Required Test Methods	Averaging Time	Test Location
NH3 emissions	District Method 207.1 and 5.3 or EPA Method 17	1 hour	Outlet stack

The test shall be conducted at least quarterly during the first 12 months of operation of the SCR, and at least annually thereafter.

The test shall be conducted to determine the NH3 emissions at the outlet using the specified method measured over a 60 minute averaging time period. The NOx concentration , as determined by the CEMS, shall be simultaneously recorded during the ammonia slip test. If the CEMS is inoperable, a test shall be conducted to determine the NOx emissions using District method 100.1.

The test shall be conducted when the equipment is operating at 80 percent load or greater.

The test shall be conducted and the results submitted to the District within 45 days after the test date.
[RULE 1303(a)(1)-BACT, 5-10-1996]

D29.3
The operator shall conduct source test(s) for the pollutant(s) identified below.

Pollutant to be Tested	Required Test Methods	Averaging Time	Test Location
ROG emissions	Approved District Method	1 hour	Outlet stack
PM emissions	District Method 5.2	1 hour	Outlet stack
CO emissions	District Method	1 hour	Outlet stack

	100.1		

The test shall be conducted at least once every year for PM and ROG, and at least once every 2 years for CO, or in accordance with Rule 1110.2, whichever is more stringent.

The test shall be conducted to determine compliance with the A63.1 limits. Test results in lbs/hr or lbs/1000 gallons shall be used in conjunction with either the hours of operation or the fuel use data to calculate the daily and annual emissions of these pollutants.

The test shall be conducted to determine the oxygen levels in the exhaust. In addition, the tests shall measure the fuel flow rate (CFH), the flue gas flow rate, and the engine generating output in MW. The test shall be conducted when the unit is operating at 80% of full load or greater (less than full load test results will be prorated to full load). The NOx concentration, as determined by the CEMS, shall be simultaneously recorded during the ROG and CO test. If the CEMS is inoperable, a test shall be conducted to determine the NOx emissions using District Method 100.1 measured over a 60 minute averaging time period.

The test shall be conducted in accordance with AQMD approved test protocol. The protocol shall be submitted to the AQMD engineer no later than 45 days before the proposed test date and shall be approved by the AQMD before the test commences. The test protocol shall include the proposed operating conditions of the turbine during the tests, the identity of the testing lab, a statement from the testing lab certifying that it meets the criteria of Rule 304, and a description of all sampling and analytical procedures.
[RULE 1303(a)(1)-BACT, 5-10-1996]

D29.5
The operator shall conduct source test(s) for the pollutant(s) identified below.

Pollutant to be Tested	Required Test Methods	Averaging Time	Test Location
CO Emissions	EPA Method 10	1 hour	Outlet stack

The test shall be conducted at least once every 3 years or 8,760 operating hours, whichever comes first.

The test shall be conducted to verify compliance with 40 CFR 63 subpart ZZZZ limit.

The initial test shall be performed no later than May 3, 2013.
[40 CFR 63 Subpart ZZZZ, 3-9-2011]

D323.2
The operator shall conduct an inspection for visible emissions from all stacks and other emission points of this equipment whenever there is a public complaint of visible emissions, whenever visible emissions are observed, and on a quarterly basis, at least, unless the equipment did not operate during the entire quarterly period. The routine quarterly inspection shall be conducted while the equipment is in operation and during daylight hours.

If any visible emissions (not including condensed water vapor) are detected that last more than three minutes in any one hour, the operator shall verify and certify within 24 hours that the equipment causing the emission and any associated air pollution control equipment are operating normally according to their design and standard procedures and under the same conditions under which compliance was achieved in the past, and either:

1). Take corrective action(s) that eliminates the visible emissions within 24 hours and report the visible emissions as a potential deviation in accordance with the reporting requirements in Section K of this permit; or

2). Have a CARB-certified smoke reader determine compliance with the opacity standard, using EPA Method 9 or the procedures in the CARB manual "Visible Emission Evaluation", within three business days and report any deviations to AQMD.

The operator shall keep the records in accordance with the recordkeeping requirements in Section K of this permit and the following records:

1). Stack or emission point identification;

2). Description of any corrective actions taken to abate visible emissions;

3). Date and time visible emission was abated; and

4). All visible emission observation records by operator or a certified smoke reader.
[RULE 3004(a)(4)-Periodic Monitoring, 12-12-1997]

~~D425.1~~
~~The operator shall have the existing NOx CEMS monitoring this device reevaluated by the District by submitting a CEMS application. If the CEMS is not recertified within 90 days of the start-up of this device, the facility permit holder shall calculate and report NOx emissions in accordance with Rule 2012, Appendix A, Chapter 2, Paragraph (B)(17) Recertification Requirements.~~
~~[RULE 2012, 3-16-2001; RULE 2012, 12-5-2003]~~

E51.1
The following condition number(s) shall not apply if all of the requirements stated below are met:

Condition number 63-1
Requirement number 1: startup, not to exceed 1 hour
[RULE 1303(b)(2)-Offset, 5-10-1996]

~~E71.2~~
~~The operator shall not operate this equipment if engine #11 is not shutdown, and the Permit to Operate surrendered to the District.~~
~~[RULE 1303(b)(2) Offset, 5-10-1996]~~

E73.1
Notwithstanding the requirements of Section E conditions, the operator may, at his discretion, choose not to use urea injection during start ups when the exhaust temperature at the inlet of the SCR reactor is less than 550 Deg F, not to exceed 1 hour:
[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 402, 5-7-1976]

H23.3 This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
PM	District Rule	1470

These engines operating with SCR, are exempt from the PM standards of this rule
[RULE 1470, 6-1-2007]

~~I331.1~~
~~The conditions and requirements for this device in Section H shall take effect, and shall supersede those in Section D, when the modifications authorized in Section H are completed. The operator shall notify the AQMD when the modifications are completed.~~
~~[RULE 202, 5-7-1976]~~

K40.2
The operator shall provide to the District a source test report in accordance with the following specifications:

Source test results shall be submitted to the District no later than 60 days after the source test was conducted.

Emission data shall be expressed in terms of mass rate (lbs/hr). In addition, solid PM emissions, if required to be tested, shall also be reported in terms of grains per DSCF.

All exhaust flow rate shall be expressed in terms of dry standard cubic feet per minute (DSCFM) and dry actual cubic feet per minute (DACFM).

All moisture concentration shall be expressed in terms of percent corrected to 15 percent oxygen.

Source test results shall also include engine fuel , exhaust gas rate, and engine and generator output under which the test was conducted.

In addition, NOx emission data shall be expressed in terms of lbs/MW-hr

Emission data shall be expressed in terms of concentration (ppmv), corrected to 15 percent oxygen, dry basis.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 2005, 4-9-1999; RULE
2005, 4-20-2001]

SCR Conditions

A195.2
The 10 ppmv NH3 emission limit(s) are averaged over 60 minutes at 15 percent O2 dry. The operator shall calculate and continuously record the NH3 slip concentration using: NH3(ppmv)=[a-b*c/1E6]**(1-d)***1E6/b, a=NH3 (urea) injection rate (lb/hr)***34 lb NH3/60 lb urea**/17(lb/lb-mole), b=dry exhaust gas flow rate(lb/hr)/29(lb/lb-mole), c=change in measured NOx across the SCR, ppmv at 15 percent O2), **d= 50% assumed NH3 oxidation efficiency**. The operator shall install and maintain a NOx analyzer, or other method as approved by the AQMD to measure the SCR inlet NOx ppm accurate to within +/- 5 percent calibrated at least once every 12 months.

The operator shall use the method described above or another alternative method approved by the Executive Officer.

The ammonia slip calculation procedures described above shall not be used for compliance determination or emission information determination without corroborative data using an approved reference test method for the determination of ammonia.

[Rule 1303(a)(1)-BACT]
[Devices subject to this condition: C54, C59, C55, C56, C57]

D12.3
The operator shall install and maintain a(n) temperature gauge to accurately indicate the temperature at the inlet of the SCR reactor.

The operator shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every 12 months.

[Rule 1303(a)(1)-BACT]
[Devices subject to this condition: C54, C59, C55, C56, C57]

D12.4
The operator shall install and maintain a(n) continuous monitoring system to accurately indicate the flow rate of the urea injection system.

The operator shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every 12 months.

[Rule 1303(a)(1)-BACT]

[Devices subject to this condition: C54, C59, C55, C56, C57]

D12.5
The operator shall install and maintain a(n) pressure gauge to accurately indicate the differential pressure across the SCR catalyst bed in inches of water column.

The operator shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every 12 months.
[Rule 1303(a)(1)-BACT]
[Devices subject to this condition: C54, C59, C55, C56, C57]

E179.1
For the purpose of the following condition number(s), "continuously record" shall be defined as recording at least once every hour and shall be calculated based upon the average of the continuous monitoring for that hour.

Condition no. D12.3
Condition no. D12.5
[Rule 1303(a)(1)-BACT, Rule 2012]
[Devices subject to this condition: C54, C59, C55, C56, C57]

E179.2
For the purpose of the following condition number(s), "continuously record" shall be defined as recording at least once every hour and shall be calculated based upon the average of the continuous monitoring for that month.

Condition no. D12.4
[Rule 1303(a)(1)-BACT, Rule 2012]
[Devices subject to this condition: C54, C59, C55, C56, C57]

E193.1
The operator shall construct, operate, and maintain this equipment according to the following specifications:

In accordance with all mitigation measures, as well as all design and operational representations, stipulated in the CEQA document that was prepared for this project by the South Coast AQMD (SCH No. 2003031050)
[CEQA, 11-23-1970]
[Devices subject to this condition: C54, C59, C55, C56, C57]

Oxidation Catalyst Conditions

D12.6
The operator shall install and maintain a(n) pressure gauge to accurately indicate the differential pressure across the oxidation catalyst bed in inches of water column.

The operator shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every 12 months.

The pressure drop across the catalyst shall not be greater than 2 inches more than the pressure drop measure during the initial performance test.

For the purposes of this condition, continuously record shall be defined as recording at least once every hour and shall be calculated based upon the average of the continuous monitoring for that hour.

The gauge shall be installed and operating no later than May 3, 2013.
[40 CFR 63 Subpart ZZZZ]

D12.7
The operator shall install and maintain a(n) temperature gauge to accurately indicate the temperature at the inlet of the oxidation catalyst.

The operator shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every 12 months.

The temperature of the exhaust entering the catalyst shall be between 450 and 1350 degrees F.

For the purposes of this condition, continuously record shall be defined as recording at least once every hour and shall be calculated based upon the average of the continuous monitoring for that hour.

The gauge shall be installed and operating no later than May 3, 2013.
[40 CFR 63 Subpart ZZZZ]

Appendix A

Emission Calculations

Emissions were calculated for the Permit to Construct. The following procedure was used, with a slight variation in that the exhaust flow in dscfm is now corrected to 15% O2.

Normal Operation Data

Exhaust Flow, DSCFM @ 13% O2*	Exhaust Flow, DSCFM @ 15% O2	Max Fuel Use, gph	HP	MW	Uncontrolled NOx, ppm @ 15%	Controlled NOx, ppm @ 15%
12500	16,700	200	3900	2.8	700	51

* *13% O2 is based on the results from the initial test*

1. Normal NOx

Under fully controlled conditions, hourly NOx emissions can be estimated as follows:

NOx concentration = 51 ppm
Exhaust flow = 16,700 scfm

$$NOx_{con} = \frac{(16{,}700\ scfm * 60\ min/hr) * 51 ppm * 46\ lbs/lb\text{-}mole}{379E+6\ ft^3/lb\text{-}mole}$$

NOx_{con} = ~~4.6 lbs~~ 6.2 lbs/hr

Similarly, using a concentration of 700 ppm, the uncontrolled NOx can be calculated at:

NOx_{un} = ~~63.7 lbs~~ 85.1 lbs/hr.

2. Start Up NOx

Start Up Operation Data

	Exhaust Flow	NOx Concentration
1st 30 minutes	10,000	700 ppm
Last 30 minutes	16,700	51 ppm

Mass emission rate of NOx during a start up hour can be estimated as follows:

Assume the uncontrolled portion of the start up hour lasts 30 minutes, after which the exhaust temperature reaches the SCR operating temperature, and the remaining 30 minutes of the hour is fully controlled by the SCR to 51 ppm.

Average uncontrolled NOx concentration = 700 ppm
Average controlled NOx concentration = 51 ppm
Average exhaust flow 1st 30 minutes = 10,000 scfm
Average exhaust flow last 30 minutes = 16,700 scfm

$$NOx = \frac{[(10{,}000*30)*700 + (16{,}700*30)*51]*46 \text{ lbs/lb-mole}}{379E+6}$$

NOx = ~~27.8 lbs~~ 28.6 lbs

3. Shutdown NOx

Shutdown Operation Data

	Exhaust Flow	NOx Concentration
1st 45 minutes	16,700	51 ppm
Last 15 minutes	10,000	90 ppm

Although the exemption from the 51 ppm for a shutdown will only be for 15 minutes, the NOx emissions for the hour that includes a shutdown can be estimated by assuming the unit operates at full load under normal conditions for the first 45 minutes, then the concentration increases to 90 ppm during the shutdown when the SCR is no longer operating. A 10,000 scfm exhaust flow is assumed for the last 15 minutes.

$$NOx = \frac{[(10{,}000*15)*90 + (16{,}700*45)*51]*46 \text{ lbs/lb-mole}}{379E+6}$$

NOx = ~~5.1 lbs~~ 6.3 lbs

Daily NOx emissions:

Assumes 2 start ups and 2 shutdowns per day, the remaining time at full load operation

Operational Status	Time, hours	Emissions, lbs/hr	Emissions, lbs
Start Up	2	~~27.8~~ 28.6	~~55.6~~ 57.2
Normal Full Load	20	~~4.6~~ 5.1	~~92~~ 102
Shutdown	2	~~5.1~~ 6.3	~~10.2~~ 12.6
Total	24 hours	////////	~~157.8~~ 171.8

Monthly NOx Emissions

Assumes 60 starts and shutdowns per month, 31 days

Operational Status	Time, hours	Emissions, lbs/hr	Total, lbs
Start Up	62	~~27.8~~ 28.6	~~1,668~~ 1,773
Normal Full Load	622	~~4.6~~ 5.1	~~2,870~~ 3,172
Shutdown	62	~~5.1~~ 6.3	~~306~~ 391
Total	744 hours	/////////	~~4,844~~ 5,336
		30 Day Average	~~161.5~~ 177.9

Annual NOx Emissions

Assumes 720 starts and shutdowns per year

Operational Status	Time, hours	Emissions, lbs/hr	Total, lbs
Start Up	720	~~27.8~~ 28.6	~~20,016~~ 20,592
Normal Full Load	7320	~~4.6~~ 5.1	~~33,672~~ 37,332
Shutdown	720	~~5.1~~ 6.3	~~3,672~~ 4,536
Total	8760 hours	//////////	~~57,360~~ 62,460
		Total, tons	~~28.7~~ 31.2

Emissions of non-RECLAIM pollutants were calculated for the original Permit to Construct for this unit under A/N 296861. The emission calculation methodology was based on manufacturer data for CO, ROG, and PM10 which were adjusted for the NOxTech control efficiency. The control efficiency was estimated to be 77% for ROG and 23% for PM10, based on source test results from Unit #8 which was also equipped with NOxTech at the time (no control efficiency was assumed for CO). SOx was based on an AP-42 factor. The factors are summarized as follows:

Pollutant	Emission Factor, gr/bhp-hr	Source	Control Efficiency
CO	1.001	manufacturer	none
ROG	0.237	manufacturer	77
PM10	0.28	manufacturer	23
SOx	0.16	AP-42	none

That methodology results in the following emission estimates for Unit #15:

Unit #15 Emission Calculations, Non-Reclaim Pollutants

Pollutant	Uncontrolled		Controlled	
	Lbs/hr	Lbs/day	Lbs/hr	Lbs/day
CO	8.60	206.1	8.60	206.1
ROG	2.04	48.9	0.47	11.2
PM10	2.40	57.7	1.86	44.4
SOx	1.37	32.9	1.37	32.9

Although the control systems in place now (SCR and recently re-installed oxidation catalyst) is different from the previous control system (NOxTech), the original emission estimates can still be supported by recent test results.

Results of 3/18/04 Test With SCR & Oxidation Catalyst

Pollutant	Test Results	
	100% Load	75% Load
CO	11.7 ppm @ 15%	0.9 ppm @ 15%
ROG	2.1 ppm @ 15%	2.2 ppm @ 15%
PM10	0.01 gr/scf	/////////
SOx	1.3 ppm @ 15 %	1.5 ppm @ 15%

At 16,700 dscfm estimated exhaust flow @ 15% O2 for 100% load, the calculated mass emission rates from the test results are as follows:

Estimated Mass Emissions from Source Test Results

Pollutant	Emissions	
	Lbs/hr	Lbs/day
CO	0.87	20.9
ROG	0.59	14.2
PM10	1.43	34.3
SOx	0.22	5.3

ROG without the oxidation catalyst may be slightly higher than originally estimated based on the test results. All other pollutants estimates are conservative (i.e. the test results are less than the calculations).

Appendix B

Major Source Determination

For purposes of NESHAPs, and specifically subpart ZZZZ (RICE MACT), the definition of major source is a facility with a PTE of 25 tpy of a combination of HAPs or 10 tpy of a single HAP. Following is the estimated PTE of the Pebbly Beach facility.

Data

Engine	HP	Maximum Fuel Rate, gph
7	1500	65
8	2150	87
10	1575	69
12	2200	91
14	1950	92
15	3900	200
D81	399	19.2

The estimated toxic emissions from each engine are based on factors from CARB's database, CATEF. Maximum hourly emissions are based on the fuel use rate as shown above. Maximum annual PTE emissions are based on 8760 hours per year operation at full load.

Unit #7

Pollutant	Emission Factor	Hourly Emissions	Annual Emissions
	Lbs/mgal	Lbs/hr	Lbs/yr
Acetaldehyde	1.52E-01	9.88E-03	8.65E+01
Acrolein	3.16E-02	2.05E-03	1.80E+01
Benzene	3.30E-01	2.15E-02	1.88E+02
Butadiene, 1,3-	5.41E-03	3.52E-04	3.08E+00
Ethyl benzene	8.03E-03	5.22E-04	4.57E+00
Formaldehyde	2.23E+00	1.45E-01	1.27E+03
PAHs	4.70E-02	3.06E-03	2.68E+01
Napthalene	1.58E-01	1.03E-02	9.00E+01
Toluene	1.11E-01	7.22E-03	6.32E+01
Xylenes	4.44E-02	2.89E-03	2.53E+01
		Total, lbs/yr	1775.1
		Total, tpy	0.89

Unit #8

Pollutant	Emission Factor Lbs/mgal	Hourly Emissions Lbs/hr	Annual Emissions Lbs/yr
Acetaldehyde	1.52E-01	1.32E-02	1.16E+02
Acrolein	3.16E-02	2.75E-03	2.41E+01
Benzene	3.30E-01	2.87E-02	2.51E+02
Butadiene, 1,3-	5.41E-03	4.71E-04	4.12E+00
Ethyl benzene	8.03E-03	6.99E-04	6.12E+00
Formaldehyde	2.23E+00	1.94E-01	1.70E+03
PAHs	4.70E-02	4.09E-03	3.58E+01
Napthalene	1.58E-01	1.37E-02	1.20E+02
Toluene	1.11E-01	9.66E-03	8.46E+01
Xylenes	4.44E-02	3.86E-03	3.38E+01
		Total, lbs/yr	2375.9
		Total, tpy	1.19

Unit #10

Pollutant	Emission Factor Lbs/mgal	Hourly Emissions Lbs/hr	Annual Emissions Lbs/yr
Acetaldehyde	1.52E-01	1.05E-02	9.19E+01
Acrolein	3.16E-02	2.18E-03	1.91E+01
Benzene	3.30E-01	2.28E-02	1.99E+02
Butadiene, 1,3-	5.41E-03	3.73E-04	3.27E+00
Ethyl benzene	8.03E-03	5.54E-04	4.85E+00
Formaldehyde	2.23E+00	1.54E-01	1.35E+03
PAHs	4.70E-02	3.24E-03	2.84E+01
Napthalene	1.58E-01	1.09E-02	9.55E+01
Toluene	1.11E-01	7.66E-03	6.71E+01
Xylenes	4.44E-02	3.06E-03	2.68E+01
		Total, lbs/yr	1884.3
		Total, tpy	0.94

Unit #12

Pollutant	Emission Factor Lbs/mgal	Hourly Emissions Lbs/hr	Annual Emissions Lbs/yr
Acetaldehyde	1.52E-01	1.38E-02	1.21E+02
Acrolein	3.16E-02	2.88E-03	2.52E+01
Benzene	3.30E-01	3.00E-02	2.63E+02
Butadiene, 1,3-	5.41E-03	4.92E-04	4.31E+00
Ethyl benzene	8.03E-03	7.31E-04	6.40E+00
Formaldehyde	2.23E+00	2.03E-01	1.78E+03
PAHs	4.70E-02	4.28E-03	3.75E+01
Napthalene	1.58E-01	1.44E-02	1.26E+02
Toluene	1.11E-01	1.01E-02	8.85E+01
Xylenes	4.44E-02	4.04E-03	3.54E+01
		Total, lbs/yr	2485.1
		Total, tpy	1.24

Unit #14

Pollutant	Emission Factor Lbs/mgal	Hourly Emissions Lbs/hr	Annual Emissions Lbs/yr
Acetaldehyde	1.52E-01	1.40E-02	1.22E+02
Acrolein	3.16E-02	2.91E-03	2.55E+01
Benzene	3.30E-01	3.04E-02	2.66E+02
Butadiene, 1,3-	5.41E-03	4.98E-04	4.36E+00
Ethyl benzene	8.03E-03	7.39E-04	6.47E+00
Formaldehyde	2.23E+00	2.05E-01	1.80E+03
PAHs	4.70E-02	4.32E-03	3.79E+01
Napthalene	1.58E-01	1.45E-02	1.27E+02
Toluene	1.11E-01	1.02E-02	8.95E+01
Xylenes	4.44E-02	1.40E-02	3.58E+01
		Total, lbs/yr	2512.4
		Total, tpy	1.24

Unit #15

Pollutant	Emission Factor Lbs/mgal	Hourly Emissions Lbs/hr	Annual Emissions Lbs/yr
Acetaldehyde	1.52E-01	3.04E-02	2.66E+02
Acrolein	3.16E-02	6.32E-03	5.54E+01
Benzene	3.30E-01	6.60E-02	5.78E+02
Butadiene, 1,3-	5.41E-03	1.08E-03	9.48E+00
Ethyl benzene	8.03E-03	1.61E-03	1.41E+01
Formaldehyde	2.23E+00	4.46E-01	3.91E+03
PAHs	4.70E-02	9.40E-03	8.23E+01
Napthalene	1.58E-01	3.16E-02	2.77E+02
Toluene	1.11E-01	2.22E-02	1.94E+02
Xylenes	4.44E-02	8.88E-03	7.78E+01
		Total, lbs/yr	5461.8
		Total, tpy	2.73

Unit D81

Pollutant	Emission Factor Lbs/mgal	Hourly Emissions Lbs/hr	Annual Emissions Lbs/yr
Acetaldehyde	1.52E-01	2.92E-03	2.56E+01
Acrolein	3.16E-02	6.07E-04	5.31E+00
Benzene	3.30E-01	6.34E-03	5.55E+01
Butadiene, 1,3-	5.41E-03	1.04E-04	9.10E-01
Ethyl benzene	8.03E-03	1.54E-04	1.35E+00
Formaldehyde	2.23E+00	4.28E-02	3.75E+02
PAHs	4.70E-02	9.02E-04	7.91E+00
Napthalene	1.58E-01	3.03E-03	2.66E+01
Toluene	1.11E-01	2.13E-03	1.87E+01
Xylenes	4.44E-02	8.52E-04	7.47E+00
		Total, lbs/yr	524.3
		Total, tpy	0.26

Summary

Unit	Total HAP, tpy	Formaldehyde, typ
7	0.89	1.27E+03
8	1.19	1.70E+03
10	0.94	1.35E+03
12	1.24	1.78E+03
14	1.26	1.80E+03
15	2.73	3.91E+03
D82	0.26	3.75E+02
TOTAL	8.51	6.09

Appendix C

Greenhouse Gas Emissions

The following data is used in the calculation:

Maximum Fuel Use = 200 gal/hr
Maximum Hours/day Operation = 24
Maximum Hours/yr Operation = 8760

The following emission factors are from EPA (2009 FR *Mandatory Reporting of Greenhouse Gases, Final Rule*)

Pollutant	Factor	
	g/mmbtu	g/gallon
CO2	73,960	10,210
CH4	3.0	0.41
N2O	0.6	0.08

Emissions

Pollutant	Emissions		
	lbs/hr	lbs/day[1]	lbs/yr[2]
CO2	4,497.8	107,947.2	39,400,728
CH4	0.18	4.32	1,576.8
N2O	0.04	0.96	350.4

1 based on 24 hrs/day
2 based on 8760 hrs/yr

There is no increase in GHG emissions as a result of the changes requested under this application.