

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 1
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

ENGINEERING EVALUATION

COMPANY NAME AND ADDRESS

City of Riverside Public Utilities Department
5901 Payton Avenue
Riverside, CA 92504

CONTACT(S): Charles Casey, Utility Generation Manager, (951) 710-5010

EQUIPMENT LOCATION

AQMD ID 139796
5901 Payton Avenue
Riverside, CA 92504

EQUIPMENT DESCRIPTION

Section H of the facility permit: Permit to Construct – Deletions shown as *italicized strikethroughs* and additions shown as **bold underlines**.

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
Process 1: INTERNAL COMBUSTION					
System 3: GAS TURBINES, POWER GENERATION					
GAS TURBINE NO. 3, NATURAL GAS, GENERAL ELECTRIC, MODEL LM6000 PC SPRINT, SIMPLE CYCLE, HEAT INPUT REFERENCED AT 100 DEGREES F, WITH WATER INJECTION, 490 MMBTU/HR A/N 481647 <u>544562</u>	D16	C18	NOX: MAJOR SOURCE	CO: 2000 PPMV (5) [RULE 407]; CO: 4 PPMV NATURAL GAS (4) [RULE 1303 – BACT] NOX: 2.3 PPMV NATURAL GAS (4) [RULE 2005]; NOX: 25 PPMV NATURAL GAS (8) [40 CFR 60 SUBPART KKKK]; NOX: 96.66 LBS/MMSCF NATURAL GAS (1) [RULE 2012]; NOX: 12.50 LBS/MMSCF NATURAL GAS (2A) [RULE 2012] PM: 11 LBS/HR (5) [RULE 475]; PM: 0.01 GRAINS/SCF (5A) [RULE 475]; PM: 0.1 GRAINS/SCF (5B) [RULE 409]	A63.3, A63.4, A63.5, A99.4, A99.5, A99.6, A99.7, A195.4, A195.5, A195.6, A327.1, A433.1, A433.2, C1.3, C1.4, D12.1, D29.4, D29.5, D29.6, D82.3, D82.4, E193.2, H23.1, I298.3, K40.1, K67.1, <u>K67.5</u>

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 2
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
GENERATOR, 49.8 MW				PM10: 6.42 5.35 LBS/MMSCF (7) [RULE 1303 - OFFSET] SO2: (9) [40 CFR 72 – ACID RAIN PROVISIONS]; 0.06 LB/MMBTU (8) [40 CFR 60 SUBPART KKKK] VOC: 2 PPMV NATURAL GAS (4) [RULE 1303 – BACT]	
CO OXIDATION CATALYST, BASF CATALYST LLC, PLATINUM AND ALUMINA, MODEL CANMET, 90 CU FT; HEIGHT: 2 FT 4 IN; WIDTH: 2 FT 0 IN; DEPTH: 0 FT 3 IN A/N: 481651	C18	D16 C19			
SELECTIVE CATALYTIC REDUCTION, NO.3, CORMETECH, 1024 CU FT; WIDTH: 8 FT 11.6 IN; HEIGHT: 6 FT 5 IN; LENGTH: 3 FEET 2 IN WITH A/N: 481651 AMMONIA INJECTION, GRID	C19	C18 S21		NH3: 5 PPMV (4) [RULE 1303 – BACT]	A195.7, D12.4, D12.5, D12.6, E179.1, E179.2, E193.2
STACK NO. 3, HEIGHT: 80 FT; DIAMETER: 13 FT A/N 481647 544562	S21	C19			
System 4: GAS TURBINES, POWER GENERATION					
GAS TURBINE NO. 4, NATURAL GAS, GENERAL ELECTRIC, MODEL LM6000 PC SPRINT, SIMPLE CYCLE, HEAT INPUT REFERENCED AT 100 DEGREES F, WITH WATER INJECTION, 490 MMBTU/HR A/N 481649 544563	D22	C24	NOX: MAJOR SOURCE	CO: 2000 PPMV (5) [RULE 407]; CO: 4 PPMV NATURAL GAS (4) [RULE 1303 – BACT] NOX: 2.3 PPMV NATURAL GAS (4) [RULE 2005]; NOX: 25 PPMV NATURAL GAS (8) [40 CFR 60 SUBPART KKKK]; NOX: 96.66 LBS/MMSCF NATURAL GAS (1) [RULE 2012]; NOX: 12.50 LBS/MMSCF NATURAL GAS (2A) [RULE 2012]	A63.3, A63.4, A63.5, A99.4, A99.5, A99.6, A99.7, A195.4, A195.5, A195.6, A327.1, A433.1, A433.2, C1.3, C1.4, D12.1, D29.4, D29.5, D29.6, D82.3, D82.4, E193.2, H23.1, I298.4, K40.1, K67.1, K67.5

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 3
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
GENERATOR, 49.8 MW				PM: 11 LBS/HR (5) [RULE 475]; PM: 0.01 GRAINS/SCF (5A) [RULE 475]; PM: 0.1 GRAINS/SCF (5B) [RULE 409] PM10: 6.42 5.35 LBS/MMSCF (7) [RULE 1303 - OFFSET] SO2: (9) [40 CFR 72 – ACID RAIN PROVISIONS]; 0.06 LB/MMBTU (8) [40 CFR 60 SUBPART KKKK] VOC: 2 PPMV NATURAL GAS (4) [RULE 1303 – BACT]	
CO OXIDATION CATALYST, BASF CATALYST, LLC, CANMET, PLATINUM AND ALUMINA, 90 CU FT; HEIGHT: 2 FT 4 IN; WIDTH: 2 FT 0 IN; DEPTH: 0 FT 3 IN A/N: 481650	C24	D22 C25			
SELECTIVE CATALYTIC REDUCTION, NO.4, CORMETECH, 1024 CU FT; WIDTH: 8 FT 11.6 IN; HEIGHT: 6 FT 5 IN; LENGTH: 3 FEET 2 IN WITH AMMONIA INJECTION, GRID A/N: 481650	C25	C24 S27		NH3: 5 PPMV (4) [RULE 1303 – BACT]	A195.7, D12.4, D12.5, D12.6, E179.1, E179.2, E193.2
STACK NO. 4, HEIGHT: 80 FT; DIAMETER: 13 FT A/N 481649 544563	S27	C25			

BACKGROUND/SUMMARY

The City of Riverside, Public Utilities (RPU) submitted applications (summarized in Table 1) to modify their existing gas turbines (units 3 & 4) located at the Riverside Energy Resource Center (RERC), which is a Title V/RECLAIM facility.

Table 1 Application Summary

A/N	Equipment	Submittal Date	Deemed Complete	BCAT	Schedule	Fee with XPP (\$)
544562	Gas Turbine Unit # 3 (D16)	11/15/12	3/28/13	013008	D	7,121.79
544563	Gas Turbine Unit # 4 (D22)	11/15/12	3/28/13	013008	D	3,560.90
544564	TV/RECLAIM Amendment	11/15/12	3/28/13	555009	-	1,789.12
Total						12,471.81

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 4
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

The facility has a total of four (4) identical, simple cycle, GE LM6000 units (identified numerically 1 to 4) each venting to a dedicated air pollution control system. Units 3 & 4 were installed at a later date than units 1 & 2, and despite being identical, have more stringent emission limits. The permit applications request to make the following changes to the operating conditions of Units 3 & 4:

- Lower the PM10 emission rates than what was originally proposed in the Permit to Construct;
- Increase monthly operations of 70 hours for each turbine and add an additional 20 start/stop sequences;
- Increase annual start/stop sequences of 150 events per turbine without changing the annual operating hours
- Maintain the same annual NOx limit – RTC hold, despite increase in start/stop sequences

The proposal would result in an increase in monthly emissions that will require PM10 external offsets in the amount of 8 pounds per day prior to permit approval.

DISCUSSION

RPU's RERC facility is a municipal power plant that operates four (4) identical, major NOx sources, simple cycle peaking turbines, primarily used when there is a high demand for power, usually in the summer months. Units 1 & 2 were installed in 2005 and units 3 & 4 were installed later in 2009. The turbines are all limited in the amount of time they are allowed to operate; the permit is conditioned with monthly and annual emission limits as well as with monthly and annual fuel use limits.

In anticipation of the continued shutdown of the San Onofre Nuclear Generating Station (SONGS) and the increase in power demand for the summer months, RPU submitted applications to increase the amount of time that units 3 & 4 could operate. The summary of the proposed changes that would allow RPU to run units 3 & 4 more are summarized in Table 2.

Table 2 Summary of Proposed Changes for RERC Units 3 & 4

Existing Operating Parameter	Proposed Operating Parameter
Monthly emissions allow for the equivalent of approximately 150 hours per turbine, including 20 start/stop sequences per turbine.	Monthly operations increased to allow for the equivalent of approximately 220 hours per turbine, including 40 start/stop sequences.
30-day PM10 emissions of 6.42 lb/MMscf (3 lb/hr at full load) based upon EPA AP-42 emission factor.	30-day PM10 emissions reduced to a lower emission rate of 5.35 lb/MMscf (2.5 lb/hr).
Annual operations of 150 start/stop sequences per turbine.	Annual operations will include 300 start/stop sequences per turbine with no increase in annual operating time.
Annual emissions limits (PTE) determined by fuel use limit and emission factors accounting for 150 start/stop sequences per turbine.	Increase the number of start/stop sequences to 300 per turbine, but maintain the annual fuel use limit. Take an annual NOx emission cap equivalent to current RTC holding, to be verified with CEMS and recordkeeping.

RPU is requesting to increase the number of annual start-ups and shutdowns from 150 to 300 per turbine, while maintaining the same annual fuel use limit. The request would result in a decrease in normal operating hours to offset the increase in start/stop sequences. The proposal, however, would result in an increase in the annual NOx RTC requirement, triggering an in-depth rule analysis as well as 30-day public notice under Rule 3006. RPU has opted to maintain operations under the current NOx limit per turbine. The proposal is acceptable as NOx concentrations are monitored with a Rule 2012

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 5
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

CEMS and reported directly to the District. RPU will be required to monitor and record the mass emission rates for all start/stop sequences as well as for normal operations to ensure compliance. The proposed PM10 mass emission rate requires a more in-depth analysis since the units the facility is proposing to modify have only had one source test.

Table 3 summarizes the PM test results for the RERC facility since it started operation in 2006.

Table 3 PM Source Test Results taken at Full Load for Units 1 (D1) and 2 (D5)

Equipment	Units	Year				
		2006	2007 ^(a)	2010	2011 ^(b)	2012
Turbine # 1 (D1)	lb/hr	5.98	1.58	0.29	-	1.38
	lb/MMscf	12.71	-	-	-	3.03
Turbine # 2 (D5)	lb/hr	1.76	1.15	0.68	-	1.45
	lb/MMscf	3.61	-	-	-	3.16
Turbine # 3 (D16)	lb/hr	-	-	-	0.11	-
	lb/MMscf	-	-	-	0.23	-
Turbine # 4 (D22)	lb/hr	-	-	-	0.13	-
	lb/MMscf	-	-	-	0.28	-

^(a) This source test was performed by District STE staff at the request of District Rule Development. The values were reported in 0.033 lb/MW-hr and 0.024 lb/MW-hr, for units 1 and 2 respectively. The value is an average of three runs for each unit performed over 3 days. Please refer to the report in the project file.

^(b) Initial and only source test for units 3 & 4.

The initial source test for turbine no. 1 indicated the PM emissions as 5.98 lbs/hr. According to the facility representative, the turbine had less than 300 hours of operating time before the source test was conducted. GE Energy’s conditions for the PM10 emissions guarantee states that the turbine must run for a minimum of 300 total fired hours at base load prior to testing. Although the PM emissions had tested were high for this test, they were still lower than the Rule 475 limit of 11 lbs/hr. Permit conditions for units 1 and 2 did not have limits for PM10, thus there was no re-test required.

All the PM results shown in Table 3 were performed using SCAQMD Method 5.1 rather than the accepted methodology of EPA Method 201A (*Determination of PM10 Emissions Constant Sampling Rate*) along with District Method 5.3. A small in-stack cyclone designed to collect particulates with an aerodynamic diameter greater than 10 microns is used in conjunction with a Method 5.3 impinger train. Method 5.1 collects and measures the total particulate, which overstates the PM10 emissions. However, the RPU data based on Method 5.1 could still be used provided that the total emissions were less than the PM10 emission permit limits. Thus the PM10 emissions would be less than the values shown in Table 3.

RPU initially proposed a value of 2.44 lbs/hr based on the results of the source tests for the four units at the RERC facility as well as the knowledge of PM10 emissions from permitted GE LM6000s in general. The proposed value included a “safety compliance margin” to allow for any deviations or uncertainty in measurement methodology. They later amended their proposal to 2.5 lb/hr.

GE Energy had prepared a detailed technical analysis on PM10 emissions from the LM6000 for another project located in the jurisdiction of the Bay Area AQMD (BAAQMD) that applies to the changes proposed by RPU for this project (refer to project file for GE Energy memorandum). The Mariposa Energy Project (MEP), located in Livermore, California, is a 200 MW simple cycle power plant facility consisting of four (4) identical LM6000 PC-SPRINT gas turbines similar to the turbines located RERC.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 6
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

The project received the Final Determination of Compliance (FDOC) from the BAAQMD in November 2010. The California Energy Commission (CEC) approved the facility's Application for Certification on May 18, 2011 and the facility begins producing power on October 1, 2012.¹

MEP's facility PM10 emissions are based on an hourly rate of 2.5 pounds as indicated in the FDOC. The basis of 2.5 lbs/hr for LM6000s is described in the memorandum prepared by GE Energy which is an account of GE's position with respect to gas turbine PM10 emissions and their guarantee policy. GE describes that the main sources of PM10 emissions from gas turbines fired on clean burning natural gas are:

- a) SO3 conversion from sulfur in fuel;
- b) Ammonium sulfates formed between ammonia in the SCR and sulfur in the fuel;
- c) Particulates in the air that passes through the inlet air filtration systems;
- d) Contaminants in the water used for NOx control and power augmentation;
- e) Contaminants in the tempering air;
- f) Uncertainties associated with measuring and quantifying particulate emissions.

GE analyzed PM10 data from a total of 42 source tests of LM6000s permitted in the Bay Area listed in the PDOC of another project in the BAAQMD. There was some variation in the data that GE attributed to the variability in sulfur in the fuel, contaminants and particulates in the air and water, and testing uncertainty. A statistical model was developed to predict PM10 emissions consisting of three modules of uncertainty; sulfur, air, and water. The sulfur model accounts for sulfur in the fuel and its conversion to SO2 and the conversion of SO2 to SO3 in the CO catalyst. Inlet air is assumed to contain a certain concentration of particulates that pass through the filtration system. The demineralized water used for NOx control and power augmentation contains very little impurities; therefore, only a small percentage of the particles are assumed to contribute to PM10 formation. Sampling error and measurement uncertainty were assumed and later added to the predicted PM10 emissions. Applying the model for fuel with a sulfur content of 0.25 gr/100 scf along with the sampling and measurement uncertainty of 2 standard deviations, GE had come to the following conclusion:

"GE Emissions guarantees are based on 85% confidence interval with 97.5% pass rate. Based on these criteria and also taking other sources of variation into consideration, it is our opinion that consistently testing PM10 emissions below 2.5 lb/hr cannot be achieved with certainty."

The largest contribution to PM10 emissions is sulfur from the fuel, ambient air, and water. A natural gas sulfur content of 0.25 gr/100 scf was used to determine the mass emission rate. It should be noted that the RERC gas analysis for sulfur compounds have been in the magnitude of less than 3.00E-07 gr/100 scf which could possibly explain the lower PM10 emission rates in Table 3.

Based on GE's analysis of PM10 emissions and the limit of 2.5 lb/hr, for LM6000s fueled with natural gas containing 0.25 gr/100 scf of sulfur, as the lowest value that could consistently be achieved, it will be recommended that the PM10 emission rate for RERC be lowered from 3 lb/hr to 2.50 lb/hr. Prior to permit issuance, a 45 day EPA review will be required as well as PM10 emission reduction credits.

¹ Information obtained from the CEC website <http://www.energy.ca.gov/>.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 7
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

COMPLIANCE REVIEW

The facility was inspected on 4/19/12 and was issued a NOV (#P53129) for a missing RTU transmission on 7/12/11. RERC failed to transmit the NOx emissions for all four major sources (Units 1, 2, 3 & 4) for one day. The facility has since made the necessary corrections to their RTU. As a Title V and RECLAIM facility, they are subject to annual inspections. Thus Enforcement is continuing to track their compliance status.

EMISSION CALCULATIONS

The calculations are shown in the following tables as pre-modification (PREMOD) and post-modification (POSTMOD) emissions. The proposed changes are indicated in POSTMOD tables as *italicized strikethroughs* for deletions and **bold underlines** for additions.

PREMOD EMISSIONS – TABLES 4 TO 9

Table 4 PREMOD Data

Parameter	Value	Unit	Source
Heat Input	490.35	MMBtu/hr	Applicant
Gas HHV	1050	MMBtu/MMscf	AQMD default
Fuel use	0.467	MMscf/hr	
	11.208	MMscf/day	Applicant
	70.05	MMscf/mo	Applicant
	574.41	MMscf/yr	Applicant
SU/SDs	4	each per day	Applicant
	20	each per month	Applicant
SU/SDs	150	each per year	Applicant
Maintenance	10	hours per turbine	Applicant
Fd	8710	dscf/MMBtu	Fd for natural gas at 68°F
SMV	385.44	scf/lb-mole	v = RT/P at 68°F and 14.7 psia
15% O2 correct.	3.5424	%/%	calculated as 20.9/(20.9-15)
NOx MW	46	lb/lb-mole	calculated as NO2
CO MW	28	lb/lb-mole	
ROG MW	16	lb/lb-mole	calculated as CH4
NH3 MW	17	lb/lb-mole	
PM10 Rate	3	lb/hr	manufacturer

Table 5 PREMOD Emission Factors

Pollutant	UNCONTROLLED			CONTROLLED			Source
	ppmvd	lb/MMBtu ^(a)	lb/MMscf ^(b)	ppmvd	lb/MMBtu ^(c)	lb/MMscf ^(d)	
NOx	25	0.0921	96.66	2.3	0.0085	8.89	Applicant
SOx	-	0.00064	0.67	-	0.00064	0.67	0.25 gr-H2S/100 scf
PM10	-	0.0061	6.42	-	0.0061	6.42	Manufacturer guarantee
CO	42	0.0941	98.84	4.0	0.0090	9.41	Manufacturer
ROG	5.0	0.0064	6.72	2.0	0.0026	2.69	Manufacturer
NH3	5.0	0.0068	7.14	5.0	0.0068	7.14	Manufacturer

^{(a), (c)} EF (lb/MMBtu) = ppmvd x 1E-6 x MW (lb/lb-mole) ÷ SMV (scf/lb-mole) x Fd (dscf/MMBtu) x 15% O2 correction

^{(b), (d)} EF (lb/MMscf) = EF (lb/MMBtu) x HHV (MMBtu/MMscf)

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 8
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

Table 6 PREMOD Hourly Mass Emission Rates

Pollutant	Normal (lb/hr) ^(a)	Start-up (lb/hr) ^(b)	Shutdown (lb/hr) ^(c)	Uncontrolled (lb/hr) ^(c)
NOx	4.15	11.02	6.14	45.14
SOx	0.31	0.31	0.31	0.31
PM10	3.00	3.00	3.00	3.00
CO	4.40	11.60	10.92	46.16
ROG	1.26	1.49	1.41	3.14
NH3	3.34	3.34	3.34	3.34

^(a) Fuel Use (MMscf/hr) x Controlled EF (lb/MMscf)

^{(b), (c)} Provided by Applicant.

Table 7 PREMOD Fuel Use

Mode of Operation	Monthly (MMscf)	Annual (MMscf)
Normal Ops ^(a)	46.70	429.64
Start-ups ^(b)	9.34	70.05
Shutdowns ^(c)	9.34	70.05
Maintenance ^(d)	4.67	4.67
TOTAL	70.05	574.41

^(a) Normal Ops Fuel Use = Total Fuel Use - (Start-up Fuel Use + Shutdown Fuel Use + Maintenance Fuel Use)

^(b) Start-up Fuel Use = Hourly Fuel Use x Hours of Start-up

^(c) Shutdown Fuel Use = Hourly Fuel Use x Hours of Shutdown

^(d) Maintenance Fuel Use = Hourly Fuel Use x Hours of Maintenance

Table 8 PREMOD Monthly Mass Emission Rates

Pollutant	Normal (lb/mo) ^(a)	Start-up (lb/mo) ^(b)	Shutdown (lb/mo) ^(c)	Maintenance (lb/mo) ^(d)	Total (lb/mo) ^(e)	30-DA
NOx	415.29	220.40	122.80	451.40	1,210	40.33
SOx	31.29	6.26	6.26	3.13	47	1.56
PM10	300.00	60.00	60.00	30.00	450	15.00
CO	439.62	232.00	218.40	461.60	1,352	45.05
ROG	125.61	29.80	28.20	31.40	215	7.17
NH3	333.64	66.73	66.73	33.36	500	16.68

^(a) Normal Ops = Normal Ops Fuel Use x Controlled Emission Factors

^(b) Start-up = Start-up (lb/hr) x Hours

^(c) Shutdown = Shutdown (lb/hr) x Hours

^(d) Maintenance = Uncontrolled (lb/hr) x Hours

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 9
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

Table 9 PREMOD Annual Mass Emission Rates

Pollutant	Normal (lb/yr) ^(a)	Start-up (lb/yr) ^(b)	Shutdown (lb/yr) ^(c)	Maintenance (lb/yr) ^(d)	Total (lb/yr) ^(e)	Total (tpy)
NOx	3,821	1,653	921	451	6,846	3.4
SOx	288	47	47	3	385	0.2
PM10	2,760	450	450	30	3,690	1.8
CO	4,045	1,740	1,638	462	7,884	3.9
ROG	1,156	224	212	31	1,622	0.8
NH3	3,070	500	500	33	4,104	2.1

^(a) Normal Ops = Normal Ops Fuel Use x Controlled Emission Factors

^(b) Start-up = Start-up (lb/hr) x Hours

^(c) Shutdown = Shutdown (lb/hr) x Hours

^(d) Maintenance = Uncontrolled (lb/hr) x Hours

POSTMOD EMISSIONS – TABLES 10 TO 15

Table 10 POSTMOD Data

Parameter	Value	Unit	Source
Heat Input	490.35	MMBtu/hr	Applicant
Gas HHV	1050	MMBtu/MMscf	AQMD default
Fuel use	0.467	MMscf/hr	
	11.208	MMscf/day	Applicant
	70 103	MMscf/mo	Applicant
Fuel use	574.41	MMscf/yr	Applicant
SU/SDs	4	each per day	Applicant
	20 40	each per month	Applicant
	150 300	each per year	Applicant
Maintenance	10	hours per turbine	Applicant
Fd	8710	dscf/MMBtu	Fd for natural gas at 68°F
SMV	385.44	scf/lb-mole	v = RT/P at 68°F and 14.7 psia
15% O2 correct.	3.5424	%/%	calculated as 20.9/(20.9-15)
NOx MW	46	lb/lb-mole	calculated as NO2
CO MW	28	lb/lb-mole	
ROG MW	16	lb/lb-mole	calculated as CH4
NH3 MW	17	lb/lb-mole	
PM10 Rate	3 2.50	lb/hr	Applicant

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 10
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

Table 11 POSTMOD Emission Factors

Pollutant	UNCONTROLLED			CONTROLLED			Source
	ppmvd	lb/MMBtu ^(a)	lb/MMscf ^(b)	ppmvd	lb/MMBtu ^(c)	lb/MMscf ^(d)	
NOx	25	0.0921	96.66	2.3	0.0085	8.89	Applicant
SOx	-	0.00064	0.67	-	0.00064	0.67	0.25 gr-H2S/100 scf
PM10	-	0.0061 0.0051	6.42 5.35	-	0.0061 0.0051	6.42 5.35	Applicant
CO	42	0.0941	98.84	4.0	0.0090	9.41	Manufacturer
ROG	5.0	0.0064	6.72	2.0	0.0026	2.69	Manufacturer
NH3	5.0	0.0068	7.14	5.0	0.0068	7.14	Manufacturer

^{(a), (c)} EF (lb/MMBtu) = ppmvd x 1E-6 x MW (lb/lb-mole) ÷ SMV (scf/lb-mole) x Fd (dscf/MMBtu) x 15% O2 correction

^{(b), (d)} EF (lb/MMscf) = EF (lb/MMBtu) x HHV (MMBtu/MMscf)

Table 12 POSTMOD Hourly Mass Emission Rates

Pollutant	Normal (lb/hr) ^(a)	Start-up (lb/hr) ^(b)	Shutdown (lb/hr) ^(c)	Uncontrolled (lb/hr) ^(c)
NOx	4.15	11.02	6.14	45.14
SOx	0.31	0.31	0.31	0.31
PM10	3.00 2.50	3.00 2.50	3.00 2.50	3.00 2.50
CO	4.40	11.60	10.92	46.16
ROG	1.26	1.49	1.41	3.14
NH3	3.34	3.34	3.34	3.34

^(a) Fuel Use (MMscf/hr) x Controlled EF (lb/MMscf)

^{(b), (c)} Provided by Applicant.

Table 13 POSTMOD Fuel Use

Mode of Operation	Monthly (MMscf)	Annual (MMscf)
Normal Ops ^(a)	46.70 60.97	429.64 289.54
Start-ups ^(b)	9.34 18.68	70.05 140.10
Shutdowns ^(c)	9.34 18.68	70.05 140.10
Maintenance ^(d)	4.67	4.67
TOTAL	70.05 103.00	574.41

^(a) Normal Ops Fuel Use = Total Fuel Use - (Start-up Fuel Use + Shutdown Fuel Use + Maintenance Fuel Use)

^(b) Start-up Fuel Use = Hourly Fuel Use x Hours of Start-up

^(c) Shutdown Fuel Use = Hourly Fuel Use x Hours of Shutdown

^(d) Maintenance Fuel Use = Hourly Fuel Use x Hours of Maintenance

The changes proposed and shown in Tables 9 to 12 will result in changes to the POSTMOD emission rates shown in the remainder of the tables.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 11
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

Table 14 POSTMOD Monthly Mass Emission Rates

Pollutant	Normal (lb/mo) ^(a)	Start-up (lb/mo) ^(b)	Shutdown (lb/mo) ^(c)	Maintenance (lb/mo) ^(d)	Total (lb/mo) ^(e)	30-DA
NOx	542.18	440.8	245.60	451.40	1,680	56.00
SOx	40.85	12.52	12.52	3.13	70	2.30
PM10	326.39	97.60	97.60	24.40	549	18.38
CO	573.96	464.00	436.80	461.60	1,955	64.55
ROG	163.99	59.60	56.40	31.40	320	10.38
NH3	435.59	133.46	133.46	33.36	750	24.53

^(a) Normal Ops = Normal Ops Fuel Use x Controlled Emission Factors

^(b) Start-up = Start-up (lb/hr) x Hours

^(c) Shutdown = Shutdown (lb/hr) x Hours

^(d) Maintenance = Uncontrolled (lb/hr) x Hours

Table 15 POSTMOD Annual Mass Emission Rates

Pollutant	Normal (lb/yr) ^(a)	Start-up (lb/yr) ^(b)	Shutdown (lb/yr) ^(c)	Maintenance (lb/yr) ^(d)	Total (lb/yr) ^(e)	Total (tpy)
NOx	2,575	3,306	1,842	451	8,174	4.1
SOx	194	94	94	3	385	0.2
PM10	1,513	732	732	24	3,001	1.5
CO	2,726	3,480	3,276	462	9,943	5.0
ROG	779	447	423	31	1,683	0.8
NH3	2,069	1,001	1,001	33	4,104	2.1

^(a) Normal Ops = Normal Ops Fuel Use x Controlled Emission Factors

^(b) Start-up = Start-up (lb/hr) x Hours

^(c) Shutdown = Shutdown (lb/hr) x Hours

^(d) Maintenance = Uncontrolled (lb/hr) x Hours

The POSTMOD NOx PTE is shown in Table 15; however, as stated in the Discussion section, RPU is requesting to remain below a NOx limit of **6,846 pounds per turbine** that is currently on the permit and shown in Table 9. Verification will be required with CEMS data and recordkeeping.

COMPARISON OF POSTMOD AND PREMOD EMISSIONS

Table 16 PREMOD Annual Project Emissions and Offset Applicability

Pollutant	Existing Facility Emissions ^(a)	Turbines 3&4 Com. Yr ^(b)	Turbines 3&4 Normal Year ^(c)	Grand Total Com. Yr. ^(d)	Grand Total Non-Com. Yr. ^(e)	Offset Threshold	Offsets Triggered?
NOx	18,397	30,087	13,692	49,002	32,607	n/a	n/a
SOx	710	770	770	1,480	1,480	8,000	No
PM10	7,806	7,380	7,380	15,188	15,188	8,000	Yes
CO	21,644	32,474	15,768	54,118	37,412	n/a	n/a
ROG	2,973	3,998	3,244	6,981	6,227	8,000	No

^(a) Emissions from existing turbines 1 & 2

^(b) Total of commissioning year emissions for turbines 3 & 4 (A/N 481647)

^(c) Total of normal (non-commissioning) year emissions for turbines 3 & 4

^(d) Existing Facility Emissions + Turbines 3 & 4 (Commissioning Year)

^(e) Existing Facility Emissions + Turbines 3 & 4 (Normal Year)

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 12
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

Table 16 shows the facility PREMOD emissions, which included commissioning and non-commissioning year emissions, as taken from A/N 481647. The PM10 emissions exceeded the exemption threshold, thus external offsets were required for PM10, which were acquired and surrendered by Riverside for the addition of units 3 & 4.

Table 17 shows the change in annual emissions as compared to PREMOD non-commissioning and commissioning year emissions.

Table 17 POSTMOD Facility Annual Emissions

Pollutant	Facility PREMOD		Facility POSTMOD ^(c)	Change	
	Com. Year ^(a)	Non-Com. Year ^(b)		Com. Year ^(d)	Non-Com. Year ^(e)
NOx	49,002	32,607	32,607	-16,395	0
SOx	1,480	1,480	1,480	0	0
PM10	15,188	15,188	13,808	-1,380	-1,380
CO	54,118	37,412	41,530	-12,588	4,118
ROG	6,981	6,227	6,339	-642	112

^(a) Grand Total Com. Yr. (from Table 16)

^(b) Grand Total Non-Com. Yr. (from Table 16)

^(c) Current NOx limit total for units 3 & 4

^(d) Facility POSTMOD – Com. Year

^(e) Facility POSTMOD – Non-Com Year

As shown in Table 17, the changes proposed by Riverside will result in an increase in CO and ROG facility PTE as compared to the non-commissioning year; however, the emissions are still less when compared to the commissioning year. Since units 3 & 4 were initially analyzed at the worst-case, commissioning year emissions, the current proposed changes do not trigger an increase in annual emissions. Since there is no increase in annual fuel throughput, there is no increase that triggers an HRA, GHG analysis, or NSPS and NESHAPS.

However, there is an increase in monthly emissions, which triggers the need for PM10 ERCs to offset the increase as shown in Table 18.

Table 18 ERCs Required for the Project

Pollutant	Units 3 & 4 PREMOD ^(a)	Units 3 & 4 POSTMOD ^(b)	Increase ^(c)	ERCs Required ^(d)
NOx	80.66	112.00	31.34	-
SOx	3.13	4.60	1.47	-
PM10	30.00	36.76	6.76	8
CO	90.11	129.09	38.98	-
ROG	14.33	20.76	6.43	-
NH3	33.36	49.06	15.69	-

^(a) 2 x 30-DA (from Table 8)

^(b) 2 x 30-DA (from Table 14)

^(c) POSTMOD – PREMOD

^(d) Pollutant x 1.2

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 13
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

RULES EVALUATION

RULE 212-STANDARDS FOR APPROVING PERMITS AND ISSUING PUBLIC NOTICES

Rule 212 requires that a person shall not build, erect, install, alter, or replace any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce, or control the issuance of air contaminants without first obtaining written authorization for such construction from the Executive Officer. Rule 212(c) states that a project requires written notification if there is an emission increase for ANY criteria pollutant in excess of the daily maximums specified in Rule 212(g), if the equipment is located within 1,000 feet of the outer boundary of a school, or if the MICR is equal to or greater than one in a million (1×10^6) during a lifetime (70 years) for facilities with more than one permitted unit, source under Regulation XX, or equipment under Regulation XXX, unless the applicant demonstrates to the satisfaction of the Executive Officer that the total facility-wide maximum individual cancer risk is below ten in a million (10×10^6) using the risk assessment procedures and toxic air contaminants specified under Rule 1402; or, ten in a million (10×10^6) during a lifetime (70 years) for facilities with a single permitted unit, source under Regulation XX, or equipment under Regulation XXX.

FACILITY / EQUIPMENT AND SCHOOL LOCATIONS

There are no schools located within 1000 feet of the facility. Therefore, a public notice will not be required per section (c)(1).

DAILY EMISSIONS

There will be no increase in daily emissions; however, there is an increase in 30-DA emissions since the monthly throughput will increase. Table 19 shows the increase in 30-DA emissions which are less than the thresholds that would trigger a public notice. Therefore, a notice is not required per section (c)(2).

Table 19 Project 30-DA Emissions

Pollutant	Project Increase	R212(g) Daily Threshold	Public Notice triggered?
NO _x	31.34	40	No
SO _x	1.47	60	No
PM ₁₀	6.76	30	No
CO	38.98	220	No
VOC	6.43	30	No

MAXIMUM INDIVIDUAL CANCER RISK (MICR)

The total facility wide MICR is less than 1×10^6 , as shown in the discussion under the Regulation XIV section; therefore, a public notice is not required for section (c)(3).

RULE 401 - VISIBLE EMISSIONS

This rule limits visible emissions to an opacity of less than 20 percent (Ringlemann No.1), as published by the United States Bureau of Mines. It is unlikely, with the use of the SCR /CO catalyst configuration on natural gas turbines that there will be visible emissions. However, in the unlikely event that visible emissions do occur, anything greater than 20 percent opacity is not expected to last for greater than 3 minutes. During normal operation, no visible emissions are expected. Therefore, based on the above and on experience with other natural gas fired turbines, continued compliance with this rule is expected.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 14
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

RULE 402 - NUISANCE

This rule requires that a person not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which cause, or have a natural tendency to cause injury or damage to business or property. The turbines are not expected to create a public nuisance based on experience with identical natural gas fired turbines. A review of the District Compliance database indicates that no nuisance complaints have been received in regards to this facility. Therefore, continued compliance with Rule 402 is expected.

RULE 407 – LIQUID AND GASEOUS AIR CONTAMINANTS

This rule limits CO emissions to 2,000 ppmvd and SO₂ emissions to 500 ppmvd, averaged over 15 minutes. For CO, units 3 & 4 have a limit of 4.0 ppmvd @ 15% O₂, 1-hr average, which has been verified through source test data. For SO₂, equipment which complies with Rule 431.1 is exempt from the SO₂ limit in Rule 407. The applicant will be required to comply with Rule 431.1 and thus the SO₂ limit in Rule 407 will not apply. Continued compliance is expected.

RULE 409 – COMBUSTION CONTAMINANTS

This rule restricts the discharge of contaminants from the combustion of fuel to 0.1 grain per cubic foot of gas, calculated to 12% CO₂, averaged over 15 minutes. Initial source test data has shown that the units 3 & 4 source tested at 0.0001 gr/dscf. Therefore, continued compliance with this rule is expected and verified through periodic source testing.

RULE 431.1-SULFUR CONTENT OF GASEOUS FUELS

The turbines will use pipeline quality natural gas which will comply with the 16 ppm sulfur limit, calculated as H₂S, specified in this rule. Natural gas will be supplied by the Southern California Gas Company which has a H₂S content of less 0.25 gr/100scf, which is equivalent to a concentration of about 4 ppm. It is also much less than the 1 gr/100scf limit typical of pipeline quality natural gas. Continued compliance is expected.

RULE 475-ELECTRIC POWER GENERATING EQUIPMENT

This rule applies to power generating equipment greater than 10 MW installed after May 7, 1976. Requirements are that the equipment meet a limit for combustion contaminants of 11 lbs/hr or 0.01 gr/scf. Compliance is achieved if either the mass limit or the concentration limit is met. Initial source test data has shown that the units 3 & 4 source tested at 0.0001 gr/dscf and 0.11 lb/hr and 0.0001 gr/dscf and 0.13 lb/hr, respectively. Therefore, continued compliance with this rule is expected.

RULE 1134 – EMISSIONS OF OXIDES OF NITROGEN FROM GAS TURBINES

This rule applies to gas turbines, 0.3 MW and larger, installed on or before August 4, 1989. Units 1 & 2 were installed after the date of applicability; therefore, the requirements of this rule are not applicable.

RULE 1135 – EMISSIONS OF OXIDES OF NITROGEN FROM ELECTRIC POWER GENERATING SYSTEMS

This rule applies to the electric power generating systems of several of the major utility companies in the basin. The plants which are included in the RECLAIM program are no longer subject to the requirements of this rule. Therefore, the NO_x requirements of this rule are not applicable to the turbines.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 15
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

REGULATION XIII – NEW SOURCE REVIEW (NSR)

The following section describes the NSR analysis for this project and it will be evaluated for compliance with the rules below.

RULE 1303(a) & RULE 2005(b)(1)(A) – BACT FOR GAS TURBINES

These rules state that the Executive Officer shall deny the Permit to Construct for any relocation or for any new or modified source which results in an emission increase of any non-attainment air contaminant, any ozone depleting compound, or ammonia unless the applicant can demonstrate that BACT is employed for the new or relocated source or for the actual modification to an existing source. As shown in the calculations section, the units already operate up to 24 hours per day (11.208 MMscf/day calculated as 0.467 MMscf/hr x 24 hrs) and the original evaluation included analysis of commissioning, which consisted of higher emissions. Therefore, since there is no increase per Rule 1306(b), BACT is not triggered.

RULE 1303(b)(1) – MODELING

As discussed, there is no increase in daily or hourly emissions that would necessitate the need for detailed modeling. Therefore, since there is no increase per Rule 1306(b), modeling is not triggered.

RULE 1303(b)(2) – OFFSETS

Emission offsets are required for all projects where there is an increase in emissions unless there is an exemption identified in Rule 1304. Rule 1306 outlines the methodology to determine the applicability of offsets, where emission increases for new sources and the new total emissions for modified sources shall be calculated, as approved by the Executive Officer or designee, using calendar monthly emissions divided by 30 for the determination of the required amount of offsets.

As shown in the Calculations section, the facility PM10 emissions exceed the Rule 1304 threshold of 4 tons per year. SOx and VOC facility emissions are less than 4 tons per year. PM10 ERCs were required to offset the increase associated with the installation of units 3 and 4. Although the annual PM10 emissions will decrease as a result of the proposed changes in operation, the monthly PM10 emissions will increase triggering the need for ERCs. Table 17 shows the increase in PM10 30-DA emissions as 6.76 lbs and using 1.2-to-1.0 offset ratio per Rule 1303(b)(2)(A), the required amount of ERCs is 8 pounds. The City of Riverside Public Utilities will be required to acquire and surrender the ERCs prior to permit issuance.

RULE 1325 – FEDERAL PM2.5 NEW SOURCE REVIEW PROGRAM

This rule applies to any new major polluting facility, major modifications to a major polluting facility, and any modification to an existing facility that would constitute a major polluting facility in and of itself; located in areas federally designated pursuant to Title 40 of the Code of Federal Regulations (40 CFR) 81.305 as non-attainment for PM2.5.

With respect to major modifications, this rule applies on a pollutant-specific basis to those pollutants for which (1) the source is major, (2) the modification results in a significant increase, and (3) the modification results in a significant net emissions increase.

Paragraph (d)(5) defines Major Polluting Facility, on a pollutant specific basis, as any emissions source located in areas federally designated pursuant to 40 CFR 81.305 as non-attainment for the South Coast Air Basin (SOCAB) which has actual emissions of, or the potential to emit, 100 tons or more per year

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 16
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

of PM2.5, or its precursors. A facility is considered to be a major polluting facility only for the specific pollutant(s) with a potential to emit of 100 tons or more per year. Although, the facility is a Major Polluting Facility for NOx, there is no annual increase in NOx emissions. The facility is not a Major Polluting Facility for PM2.5 or SOx, and there is no annual increase in these pollutants. Therefore, the project is not subject to the requirements of this rule.

REGULATION XVII – PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

Rule 1703 – PSD Analysis

The AQMD and EPA entered into an agreement on July 25, 2007 that AQMD is re-delegated a partial PSD authority. AQMD is authorized to issue new and modified PSD permits in accordance with AQMD's Regulation XVII. Since this is a partial delegation, the facilities in the South Coast Air Basin (SCAB) may either apply directly to EPA for the PSD permit in accordance with the current requirements of 40 CFR Part 52 Subpart 21, or apply to AQMD in accordance with the current requirements of Regulation XVII.

PSD analysis applies to new major stationary sources and major modifications to existing stationary sources located in attainment areas. A major source is a listed facility that emits at least 100 tons per year of a listed PSD pollutant or any other facility that emits at least 250 tons per year of a listed PSD pollutant. RERC is located in an attainment area for CO, SO2, and NO2 and it is an existing major source under PSD definitions. A significant increase in emissions is defined as an increase in 40 tons per year of either NOx or SOx, or 100 tons per year of CO emissions over the emissions before the modifications of the stationary source per Rule 1706(c)(1)(B)(i). The increase in emissions does not exceed 40 tons per year for NOx or SOx or 100 tons per year for CO; therefore, the project does not trigger PSD analysis.

Rule 1714 – PSD for Greenhouse Gases

This rule sets forth preconstruction review requirements for greenhouse gases (GHG). The provisions of this rule apply only to GHGs as defined by EPA to mean the air pollutant as an aggregate group of six GHGs: carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). All other attainment air contaminants, as defined in Rule 1702 subdivision (a), shall be regulated for the purpose of Prevention of Significant Deterioration (PSD) requirements pursuant to Regulation XVII, excluding Rule 1714. The provisions of this rule shall apply to any source and the owner or operator of any source subject to any GHG requirements under 40 Code of Federal Regulations Part 52.21 as incorporated into this rule. The rule specifies what portions of 40 CFR, Part 52.21 do not apply to GHG emissions, which are identified in Rule 1714(c)(1) as exclusions.

There is no change in annual fuel usage, which would result in an increase in any GHG emissions. Therefore, PSD for GHG will not be triggered for this project.

REGULATION XX – REGIONAL CLEAN AIR INCENTIVES MARKET (RECLAIM)

The turbines are NOx Major Sources under RECLAIM and are required to have CEMS under Rule 2012. The facility received Initial Approval for the CEMS installation on May 18, 2010. The CEMS have been installed and in operation in accordance with the rule. RERC is expected to continue to comply with this regulation.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 17
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

REGULATION XXX – TITLE V

The existing RERC facility has a Title V permit as a result of the applicability of federal Acid Rain provisions.

RULE 3003 – APPLICATIONS

RPU is has proposed to lower the emission rates for NOx start-up and for PM10 with an increase in the number of start-ups on a monthly and annual basis. However, the fuel use will increase per month but not per year. The annual NOx emissions will decrease as a result of this project. The TV revision meets the definition of “de minimis significant”, as there are no cumulative increases in non-RECLAIM pollutants or HAPs greater than the thresholds shown in Table 1 of Rule 3000(b)(7).

(i)(4) The de minimis significant permit revision will be issued only after the permit revision application has been found to comply with all conditions of this rule.

(j)(1) The permit revision will be forwarded to EPA for a 45 day review period.

RULE 3005 – PERMIT REVISION

(e) The proposed Title V permit revision satisfies all the applicable conditions listed in this rule. The modification constitutes a “de minimis significant permit revision” as defined in Rule 3000(b)(7).

RULE 3006 – PUBLIC PARTICIPATION

(b) The proposed “de minimis significant permit revision” is exempt from public participation.

40CFR PART 60 SUBPART KKKK - NSPS FOR STATIONARY GAS TURBINES

Each turbine is subject to Subpart KKKK because construction commenced after February 18, 2005 and for each unit the heat input is greater than 10.7 gigajoules per hour (10.14 MMBtu per hour) at peak load, based on the higher heating value of the fuel fired. The standards applicable for a turbine firing natural gas with a heat input at peak load >50 MMBtu/hr and ≤850 MMBtu/hr are as follows:

NOx: 25 ppm at 15% O2 or 1.2 lb/MW-hr

SO2: 0.90 lbs/MW-hr discharge, or 0.060 lbs/MMBtu potential SO2 in the fuel

The NOx limit for units 3 & 4 is 2.3 ppmvd, which has been verified through source testing data. The fuel sample taken for units 3 and 4 has also demonstrated to be in compliance with this subpart.

MONITORING

The regulation requires that the fuel consumption and water to fuel ratio be monitored and recorded on a continuous basis, or alternatively, that a NOx and O2 CEMS be installed. For the SO2 requirement, either a fuel meter to measure input, or a watt-meter to measure output is required, depending on which limit is selected. Also, daily monitoring of the sulfur content of the fuel is required if the fuel limit is selected. However, if the operator can provide supplier data showing the sulfur content of the fuel is less than 20 grains/100scf (for natural gas), then daily fuel monitoring is not required. The sulfur content results of the fuel samples taken are less than the threshold required for daily fuel monitoring. Therefore, daily monitoring of fuel sulfur content is not required.

Turbines 3 & 4 each have a RECLAIM CEMS to comply with the NOx Major Source requirements of Regulation XX. The CEMS received provisional approval from District Source Test Engineering Staff on 3/13/12. NOx monitoring requirements are satisfied.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 18
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

TESTING

As shown in Table 1, the initial source test for turbines 3 and 4 was conducted on April 18th, 19th, and May 23rd, 2011 for both units. Compliance with the testing requirements of this subpart has been satisfied.

40CFR PART 63 SUBPART YYYY - NESHAPS FOR STATIONARY GAS TURBINES

This regulation applies to gas turbines located at major sources of HAP emissions. Per this subpart, a major source is defined as a facility with emissions of 10 tons per year (tpy) or more of a single HAP or 25 tpy or more of a combination of HAPs. The largest single HAP emission is formaldehyde which is approximately 264 lb/yr (0.132 tpy). The total combined HAPs from the entire facility is 382 lb/yr (0.191 tpy) - ammonia is not defined as an HAP pollutant per this Rule. Therefore, the RERC facility is not a major source, per this subpart, and the requirements of this regulation do not apply.

40 CFR PART 64 – COMPLIANCE ASSURANCE MONITORING

The CAM regulation applies to each pollutant specific emissions unit (PSEU) at major stationary sources required to obtain a Title V permit, which use control equipment to achieve a specified emission limit. The rule is intended to provide “reasonable assurance” that the control systems are operating properly to maintain compliance with the emission limits.

CAM applicability is based on specific criteria; the PSEU must:

- be subject to an emission limitation or standard, and
- use a control device to achieve compliance, and
- have **potential pre-control** emissions that exceed or are equivalent to the major source threshold.

Only NOx and CO meet the criteria above for CAM applicability. Therefore, CAM requirements apply to these pollutants.

NOx

- Emission Limit – NOx is subject to a 2.3 ppm 1 hour BACT limit for units 3 & 4.
- Control Equipment – NOx is controlled with the SCR
- Requirement - As a NOx Major Source under RECLAIM, the turbines are required to have CEMS under Rule 2012. The NOx CEMS received provisional approval on 3/13/12. The use of a continuous monitor to show compliance with an emission limit is exempt from CAM under 64.2(b)(vi).

CO

- Emission Limit – CO is subject to a 4.0 ppm 1 hour BACT limit for units 3 & 4.
- Control Equipment – CO is controlled with the oxidation catalyst.
- Requirement – The turbines will be required to use a CO CEMS under Rule 218. The CO CEMS provisional initial approval on 3/13/12. The use of a continuous monitor to show compliance with an emission limit is exempt from CAM under 64.2(b)(vi).

The units will continue to comply with the requirements of this regulation.

40 CFR PART 72 – ACID RAIN PROVISIONS

The RERC facility is subject to the requirements of the federal Acid Rain program. The program is similar in concept to RECLAIM in that facilities are required to cover SO₂ emissions with SO₂ allowances; analogous to NOx RTCs. SO₂ allowances are however, not required in any year when the

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 19
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

unit emits less than 1,000 lbs of SO₂. Facilities with insufficient allowances are required to purchase SO₂ credits on the open market. Appropriate conditions are in Appendix B of the Title V permit. RERC is expected to continue to comply with this regulation.

PERMIT CONDITIONS

Deletions will be shown with an *italicized strike through* and additions will be shown with **bold underline** as noted below:

GAS TURBINES (DEVICES D16 & D22)

A63.3 The operator shall limit emissions from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
PM ₁₀	Less than 450 <u>551</u> LBS IN ANY ONE MONTH
CO	Less than 1,352 <u>1,936</u> LBS IN ANY ONE MONTH
SO _x	Less than 47 <u>69</u> LBS IN ANY ONE MONTH
VOC	Less than 215 <u>311</u> LBS IN ANY ONE MONTH

For the purposes of this condition, the limit(s) shall be based on the emissions from a single turbine.

The operator shall calculate the emission limit(s) by using monthly fuel use data and the following emission factors: PM10: ~~6.42~~ **5.35** lbs/MMscf, and SO_x: 0.67 lbs/MMscf.

Compliance with CO emissions limits shall be verified through CEMS data. If CO CEMS data is not available, CO emissions shall be calculated using fuel usage and the following factors – 9.41 lbs/MMscf during normal operations and 11.60 lbs/start-up and 10.92 lbs/shutdown.

VOC emissions shall be calculated using fuel usage and the following factors – 2.69 lbs/MMscf during normal operations and 1.49 lb/start-up and 1.41 lb/shutdown.
[Rule 1303(b)(2) – Offset]

A63.4 The operator shall limit emissions from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
PM ₁₀	Less than 7,380 <u>6,150</u> LBS IN ANY ONE YEAR
CO	Less than 15,768 <u>19,887</u> LBS IN ANY ONE YEAR
SO _x	Less than 770 LBS IN ANY ONE YEAR
VOC	Less than 3,244 <u>3,360</u> LBS IN ANY ONE YEAR

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 20
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

For the purposes of this condition, limit(s) shall be based on the combined emissions from both turbines.

The operator shall calculate the emission limit(s) by using monthly fuel use data and the following emission factors: PM10: ~~6.42~~ **5.35** lb/MMscf, and SOx: 0.67 lb/MMscf.

Compliance with CO emissions limits shall be verified through CEMS data. If CO CEMS data is not available, CO emissions shall be calculated using fuel usage and the following factors – 9.41 lb/MMscf during normal operations and 11.60 lbs/start-up and 10.92 lbs/shutdown.

VOC emissions shall be calculated using fuel usage and the following factors – 2.69 lbs/MMscf during normal operations and 1.49 lb/start-up and 1.41 lb/shutdown.

The CO emissions shall not exceed 32,474 lbs during a commissioning year and the VOC emissions shall not exceed 3,998 lbs during a commissioning year. If CO CEMS data is not available, CO emissions shall be calculated using fuel usage and the factor of 98.84 lbs/MMscf. VOC emissions shall be calculated using fuel usage and the factor of 6.72 lbs/MMscf for turbine operation prior to the installation of the CO oxidation catalyst.

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

For the purposes of this condition, 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 1303(b)(1) – Modeling]

A99.4 The 2.3 PPM NOx emission limit(s) shall not apply during turbine commissioning, start-up, shutdown, and maintenance periods. Start-up time shall not exceed 35 minutes for each start-up. Shutdown periods shall not exceed 10 minutes for each shutdown. The turbine shall be limited to a maximum of ~~20~~ **40** start-ups per month and ~~150~~ **300** start-ups per year. Maintenance shall not exceed 10 hours per year. Written records of commissioning, start-ups, shutdowns and maintenance shall be maintained and made available to the Executive Officer upon request.

For the purposes of this condition, start-up shall be defined as the start up process to bring the turbine and the SCR and ammonia injection system to full successful operation. If during start-up the process is aborted and the start-up is restarted, then the start-up and restart is defined as "one start-up". In this case the start-up time shall not exceed 35 minutes.

For the purposes of this condition, shutdown shall be defined as a reduction in turbine load ending in a period of zero fuel flow.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 21
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

For the purposes of this condition, maintenance shall be defined as optimizing and re-balancing of the NH3 grid or catalyst modules, and the retuning of the turbine control systems.

The commissioning period shall not exceed 200 hours.

[Rule 2005, Rule 1703(a)(2) – PSD BACT]

A99.5 The 4.0 PPM CO emission limit(s) shall not apply during turbine commissioning, start-up, shutdown, and maintenance periods. Start-up time shall not exceed 35 minutes for each start-up. Shutdown periods shall not exceed 10 minutes for each shutdown. The turbine shall be limited to a maximum of ~~20~~ **40** start-ups per month and ~~150~~ **300** start-ups per year. Maintenance shall not exceed 10 hours per year. Written records of commissioning, start-ups, shutdowns and maintenance shall be maintained and made available to the Executive Officer upon request.

For the purposes of this condition, start-up shall be defined as the start up process to bring the turbine and the SCR and ammonia injection system to full successful operation. If during start-up the process is aborted and the start-up is restarted, then the start-up and restart is defined as "one start-up". In this case the start-up time shall not exceed 35 minutes.

For the purposes of this condition, shutdown shall be defined as a reduction in turbine load ending in a period of zero fuel flow.

For the purposes of this condition, maintenance shall be defined as optimizing and re-balancing of the NH3 grid or catalyst modules, and the retuning of the turbine control systems.

The commissioning period shall not exceed 200 hours.

[Rule 1703(a)(2) – PSD BACT]

C1.3 The operator shall limit the fuel usage to no more than ~~70~~ **103** MMscf in any one calendar month.

For the purpose of this condition, fuel usage shall be defined as the total natural gas usage of a single turbine.

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

[Rule 1303(b)(2) – Offset]

D29.6 The operator shall conduct source test(s) for the pollutant(s) identified below.

Pollutant to be tested	Required Test Method(s)	Averaging Time	Test Location
SOX emissions	AQMD Laboratory	Not applicable	Fuel Sample

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 22
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

VOC emissions	Method 307-91 District Method 25.3	1 hour	Outlet of the SCR serving this equipment
PM emissions	District Method 5.2	Approved Averaging Time	Outlet of the SCR serving this equipment
PM10 emissions	District Method 201A	Approved Averaging Time	Outlet of the SCR serving this equipment

The test shall be conducted at least once every three years.

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 turbine generating output in MW.

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. The test shall be conducted when this equipment is operating at maximum load.

The test shall be conducted to demonstrate compliance with the PM10 emission factor of ~~6.42~~ **5.35** lb/MMscf. The PM10 shall be sampled by EPA Method 201A and the analysis shall be conducted by EPA method 202 or District method 5.2 or sampled and analyzed by a District Approved Method.

The test shall be conducted to demonstrate compliance with Rules 475 and 409 emission limits for PM. The test for PM shall be conducted by District Method 5.1 of 5.2 or by District Approved Method.

For natural gas fired turbines only, an alternative to AQMD Method 25.3 for the purpose of demonstrating compliance with BACT as determined by CARB and AQMD, may be the following:

a) Triplicate stack gas samples are extracted directly into Summa canisters, maintaining a final canister pressure between 400-500 mm Hg absolute,

b) Pressurization of the Summa canisters is done with zero gas analyzed/certified to containing less than 0.05 ppmv total hydrocarbons as carbon, and

c) Analysis of Summa canisters is per unmodified EPA Method TO-12 (with preconcentration) or the canister analysis portion of AQMD Method 25.3 with a

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING & COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 23	PAGE NO. 23
	APPL. NO. See below	DATE 5/30/2013
	PROCESSED BY M SAULIS	CHECKED BY

minimum detection limit of 0.3 ppmvC or less and reported to two significant figures, and

d) The temperature of the Summa canisters when extracting samples for analysis is not to be below 70 degrees Fahrenheit.

The use of this alternative method for VOC compliance determination does not mean that it is more accurate than unmodified AQMD Method 25.3, nor does it mean that it may be used in lieu of AQMD Method 25.3 without prior approval, except for the determination of compliance with the BACT level of 2.0 ppmv VOC calculated as carbon set by CARB for natural gas fired turbines. The test results shall be reported with two significant digits.

The test shall be conducted to demonstrate compliance with the Rule 1303 concentration and/or monthly emission limit.

The test shall be conducted for compliance verification of the BACT VOC 2.0 ppmv limit.

For natural gas fired turbines only, VOC compliance shall be demonstrated as follows: a) Stack gas samples are extracted into Summa canisters maintaining a final canister pressure between 400-500 mm Hg absolute, b) Pressurization of canisters are done with zero gas analyzed/certified to contain less than 0.05 ppmv total hydrocarbon as carbon, and c) Analysis of canisters are per EPA Method TO-12 (with pre concentration) and temperature of canisters when extracting samples for analysis is not below 70 deg F.

The use of this alternative method for VOC compliance determination does not mean that it is more accurate than AQMD Method 25.3, nor does it mean that it may be used in lieu of AQMD Method 25.3 without prior approval except for the determination of compliance with the VOC BACT level of 2.0 ppmv calculated as carbon for natural gas fired turbines.

The test results shall be reported with two significant digits.

For the purpose of this condition, alternative test method may be allowed for each of the above pollutants upon concurrence of AQMD, EPA and CARB.

[Rule 1303(a)(1) – BACT, Rule 1303(b)(2) – Offset, Rule 1703(a)(2) –PSD BACT]

K67.5 The operator shall keep records, in a manner approved by the District, for the following parameter(s) or item(s):

NOx start-up and shutdown mass emission rates each determined in pounds over duration of 60 minutes.

Total NOx mass emission rates in pounds for monthly and annual operations.

[Rule 1303(a)(1) – BACT]