

## DOCKETED

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<b>Project Title:</b>	Magnolia Power Project-Compliance
<b>TN #:</b>	217223
<b>Document Title:</b>	SCAQMD 2007 " South Coast Air Quality Management District " Permit to Operate Evaluation
<b>Description:</b>	N/A
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<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <i>ENGINEERING DIVISION</i>  <b>APPLICATION PROCESSING AND CALCULATIONS</b>	PAGES 23	PAGE 1
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**PERMIT TO CONSTRUCT**

**COMPANY NAME AND ADDRESS**

Southern California Public Power Authority (SCPPA)  
164 West Magnolia Blvd.  
Burbank, CA 91502-1720  
SCAQMD ID #128243

Contact: Devin Burns, (818) 238-3682

**EQUIPMENT LOCATION**

Southern California Public Power Authority (SCPPA)  
164 West Magnolia Blvd.  
Burbank, CA 91502-1720

**EQUIPMENT DESCRIPTION**

Section H of the facility permit: Permit to Construct and temporary Permit to Operate

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
<b>PROCESS 3: INTERNAL COMBUSTION: POWER GENERATION</b>					
GAS TURBINE, NO.1, COMBINED CYCLE, NATURAL GAS, GENERAL ELECTRIC, MODEL PG7241FA, WITH DRY LOW NOX COMBUSTORS, 1,787 MMBTU/HR WITH:  A/N: 386305, 464716  GENERATOR, 181.1 MW  GENERATOR, HEAT RECOVERY STEAM  STEAM TURBINE, STEAM, 142 MW	D4	C9 C10	NOX: MAJOR SOURCE**	<b>CO: 2 PPMV [RULE            1303(a)(1)-BACT]; CO:            2000 PPMV (5)[RULE 407]</b>  <b>NOx: 2 PPMV (4) [RULE            2005]; NOx: 37.15            LBS/MMSCF NATURAL            GAS (1) [RULE 2012];</b>  <b>PM: 0.01 GRAINS/SCF            (5A)[RULE 475]; PM: 0.1            GRAINS/SCF (5) [RULE            409]; PM: 11 LBS/HR (5C)            [RULE 475]</b>  <b>SOX: 150 PPMV (8)            [40CFR 60 Subpart GG, 3-</b>	A63.1, A99.1, A99.2, A99.3, A195.2, A195.3, A195.4, A327.1, A443.1, C1.4, D29.2, D29.3, D82.1, D82.2, E57.1, E193.1, E193.2,

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Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
				6-1981]; SO2: (9) [40CFR 72 - Acid Rain Provisions, 11-24-1997]  <b>VOC: 2 PPMV (4) [RULE 1303(a)(1)-BACT]</b>	I296.1, K40.1, K67.2
BURNER, DUCT, NATURAL GAS, 583 MMBTU/HR; WITH:  A/N: <u>386305</u> , <u>464716</u>	D6	C9 C10	NOX: MAJOR SOURCE**	<b>CO: 2 PPMV (4) [RULE 1303(a)(1)-BACT]; CO: 2000 PPMV (5) [RULE407]</b>  <b>NOX: 2 PPMV (4) [RULE 2005]; NOX: 114 PPMV NATURAL GAS (8A) [40CFR 60 Subpart GG] ; NOX: 0.2 LBS/MMBTU (8B) [40CFR 60 Subpart Da]; <del>NOX: 37.15 LBS/MMSCF NATURAL GAS (1) [RULE 2012]</del></b>  <b>PM: 0.01 GRAINS/SCF (5A) [RULE 475]; PM: 11 LBS/HR (5B) [RULE 475]; PM: 0.03 LBS/MMBTU (8A)[40CFR 60 Subpart Da]; PM: 0.1 GRAINS/SCF (5) [RULE 409];</b>  <b>SOx:150 PPMV (8A) [40CFR 60 Subpart GG]; SO<sub>2</sub>: 0.2 LBS/MMBTU (8A) [40CFR 60 Subpart Da]</b>  <b>VOC: 2 PPMV (4) [RULE 1303(a)(1)-BACT]</b>	<u>A63.1</u> , <u>A99.1</u> , <u>A99.2</u> , <u>A99.3</u> , A195.2, A195.3, A195.4, A327.1, <u>A443.1</u> , C1.1, C1.2, <u>C1.3</u> , D29.2, D29.3, D82.1, D82.2, E57.1, E193.1, E193.2, I296.1, K40.1, K67.2
CO OXIDATION CATALYST, SERVING UNIT NO. 1, ENGELHARD, WITH 360 CUBIC FEET CATALYST VOLUME, HEIGHT: 67 FT, WIDTH: 26 FT, DEPTH: 3 IN, WITH:  A/N: <u>386306</u> , <u>465931</u>	C9	D4 D6			

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Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
SELECTIVE CATALYTIC REDUCTION, SERVING UNIT NO.1, CORMETECH, VANADIUM-TITANIUM, 1,100 CU. FT; WIDTH: 26 FT; HEIGHT: 67 FT; LENGTH: 1 FT 4 IN WITH:  A/N: <u>386306, 465931</u>  AMMONIA INJECTION, GRID	C10	D4 D6		NH3: 5 PPMV (4) [RULE 1303(a)(1)-BACT]	A195.1, D12.1, D12.2, D12.3, D29.1, D232.1, <u>E73.1</u> , E179.1, E179.2, E193.1
STACK, NO. 1, HEIGHT: 150 FT; DIAMETER: 19 FT, WITH:  A/N: <u>386305, 464716</u>	S12				

## **BACKGROUND**

The Southern California Public Power Authority (SCPPA) owns the Magnolia Power Plant located in the city of Burbank. The city of Burbank is a member of SCPPA, and operates the Magnolia Power Plant under an agreement with SCPPA. The facility has a combined cycle gas turbine generator, permit to construct issued by the District on May 27, 2003. The combined cycle generator has GE 7FA gas turbine (D4) driving a 181.1 MW electric generator. In addition, the heat recovery steam generator has a 583 MMBtu/hr duct burner (D6) that reheats the exhaust gas and diverts the steam into the steam generator. The steam generator has a capacity of 142 MW. Collectively the total generation capacity is 343.1 MW. The combined cycle generation facility has been constructed and in service.

SCPPA submitted this application in January 2007 seeking a modification to the cold startup conditions. The following is a list of the applications submitted to the AQMD.

Application	Description	Date of Submission
464716	Change of condition – turbine cold startup	1/12/2007
465931	Change of condition – SCR condition	2/23/2007
465991	Title V facility permit modification	2/23/2007

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The initial application was submitted on January 12, 2007. However, it did not have insufficient fees and did not have the correct number of 400-A forms. The facility submitted the additional fee and two more 400-A forms on February 23, 2007. The facility also provided CEMS data.

The SCPPA is a Title V facility. It also participates in the NOx RECLAIM program.

### DISCUSSION

The facility initially proposed to change the permit conditions A99.1 and A99.2 so that the cold startup time can be extended from 4 hours to 6 hours and 40 minutes. The facility has observed that the gas turbine could not reach the 2.0 ppmv NOx BACT limit in 4 hours during a cold startup. The facility provided NOx CEMS data of the last three years to substantiate its claim. The 4 hours cold startup limit was initially recommended by the turbine manufacturer. However, the limit has not been demonstrated to have been achieved in practice. The SCPPA facility has a large steam turbine that takes significant longer time to be started. The gas turbine is forced to wait for the steam turbine, and could not reach the optimum operating parameters for the dry low NOx burners.

AQMD has researched similar permits issued by the AQMD and other agencies. The typical cold startup durations for these permits are six (6) hours. For example, the permit for the combined cycle generation at LADWP Valley allows a six hours cold startup limit. The six hours cold startup is consistent with the BACT requirement. AQMD discussed with the SCPPA staff, and the facility has agreed to accept a six (6) hour cold startup condition.

SCPPA has proposed to assume all post-commissioning startups as cold startups. The existing permit categorizes startups as cold, warm, and hot. They were determined by the steam turbine temperature at the time of startup. The facility submitted hourly CEMS data of this unit between 09/2005 till 04/2007. A summary of startup activities during this period is provided in the next table.

Event	Startup Date	Startup Duration (hour)	Shutdown Date	Downtime before next startup	Status of the next startup
1	09/18/05	13.0	10/21/05	62 hours	Cold
2	10/24/05	4.0	10/24/05	3 hours	Hot
3	10/25/05	6.0	11/10/05	>72 hours	Cold
4	11/23/05	7.0	12/02/05	60 hours	Cold
5	12/05/05	8.0	12/20/05	>72 hours	Cold
6	01/03/06	5.0	02/01/06	>72 hours	Cold
7	05/17/06	7.0	05/22/06	>72 hours	Cold
8	06/08/06	5.0	08/01/06	62 hours	Cold

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9	08/04/06	5.0	08/18/06	>72 hours	Cold
10	08/22/06	10.0	09/14/06	63 hours	Cold
11	09/17/06	4.0	09/17/06	39 hours	Warm
12	09/19/06	5.0	10/03/06	>72 hours	Cold
13	10/12/06	5.0	10/30/06	8 hours	Hot
14	10/30/06	4.0	11/10/06	3 hours	Hot
15	11/10/06	4.0	11/13/06	26 hours	Warm
16	11/14/06	4.0	12/01/06	>72 hours	Cold
17	12/28/06	6.0	01/22/07	16 hours	Warm
18	01/23/07	5.0	01/24/07	>72 hours	Cold
19	01/30/07	5.0	03/16/07	>72 hours	Cold
20	03/21/07	7.0			Cold

There is only a limited number of startups (20) in the 18-month period. Out of the twenty startups 3 are hot startups, 3 are warm startups, and 14 are cold startups. The gas turbine is not a peaking unit, and is not subject to the frequent startup requirements. In addition, the nature of being a combined cycle unit prevents it from a quick startup, thus hindering its ability to function as a peaking unit. In order not to have emission increases the facility has proposed to limit startups/shutdowns to three per month, and duct burner operation hours to 200 hours per month. Therefore, the facility's request will be accepted.

The following conditions are added to the permit:

- Condition C1.3 – This condition enforces the 200 hours per month duct burner operation limit by limiting total fuel usage to 111 mmscf per month.
- Condition C1.4 – This condition limits the gas turbine number of startups to 3 per month.
- Condition A433.1 – This condition maintains the overall NOx emissions per startup will remain at 440 lbs.

### **COMPLIANCE HISTORY**

According to the District's compliance database the following violations have been cited in the last five years.

- A notice to comply (NC) #C98670 was issued on 6/08/2005. The facility is required submit annual (APEP) and quarterly Emissions Reports (QCER'S) within time requirements as specified in Rule 2012. The facility has complied
- A notice of violation (NV) #P45262 was issued on 12/27/2005. The facility's turbine No. 1 (D4) exceeded Permit limits for NOx and CO, and also violated Permit Condition

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A99.1 by exceeding the startup time limit of 4 hours per startup per day. The facility has complied with the necessary requirements.

- A notice to comply (NC) #C98679 was issued on 6/01/2006. The facility is asked to conduct all RATAS per deadlines specified in Rule 2012.
- A notice to comply (NC) #C98681 was issued on 9/01/2006. The facility is required to report all breakdowns within one hour per rule requirements. The facility has come into compliance.
- A notice to comply (NC) #C98683 was issued on 9/20/2006. The facility was found operating with expired permits. It was required to pay reinstatement fees. The facility has come into compliance.
- A notice of violation (NV) #P45275 was issued on 2/15/2007. The facility's Turbine No. 1 (D4) exceeded BACT Permit Limit for NOx on 1/23/2007, and on 1/30/07, Turbine No. 1 (D4) exceeded four hour startup limit in Permit Conditions A99.1 and A99.2. The facility is taking corrective actions.

## EMISSIONS

Emissions are calculated in the Appendix A. The following table is a summary of the potential to emit of the proposed operation and the existing operation.

	NOx (lbs/day)	CO (lbs/day)	VOC (lbs/day)	PM10 (lbs/day)	SOx (lbs/day)
PTE – Proposed (Based on 1,050 Btu/scf HHV)	383	267.7	121.7	312	34
PTE – Existing (Based on 1,020 Btu/scf HHV)	1,940	266	121	336	35
Emission Increases	-1,557	1.7	0.7	-24	-1

There are emissions reductions for NOx, PM10, and SOx. CO and VOC emissions show a slight increase. CO is attainment pollutant and is not subject to NSR. The VOC increase is less than one pound per day. However, the facility has elected to maintain the monthly total VOC emissions unchanged through condition A63.1. This way the facility would not have to provide VOC offsets.

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## RULES EVALUATION

### 40 CFR PART 64 – COMPLIANCE ASSURANCE MONITORING (CAM)

The CAM regulation applies to major stationary sources 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. The gas turbine and the duct burner are major sources for NO<sub>x</sub>, CO, and VOC emissions. Control equipment in the form of a SCR and an oxidation catalyst are used to comply with the NO<sub>x</sub> and CO limits. Therefore, the CAM rule applies to NO<sub>x</sub> and CO emissions.

Compliance with BACT limits for NO<sub>x</sub> and CO will be based on CEMS, and the exemption of 64.2(b)(vi) (continuous compliance determination method) therefore applies.

### 40CFR PART 60 SUBPART Da – NSPS FOR STEAM GENERATORS

Subpart Da applies to the subject HRSG because the duct burner heat input will be greater than 250 MMBtu/hour at peak load. The emission limits specified in this rule are listed below.

PM (gaseous fueled equipment) = 0.03 lb/MMBtu, 20% opacity

SO<sub>2</sub> (gaseous fueled equipment) = 0.20 lb/MMBtu

NO<sub>x</sub> (gaseous fueled equipment, 30-day rolling average) = 0.20 lb/MMBtu

NO<sub>x</sub> (30-day rolling average) = 1.6 lbs/MW-hr

Emission monitoring requirements are as follows: a CEMS is required for the NO<sub>x</sub>, O<sub>2</sub>, and CO<sub>2</sub> emissions from the equipment, and a continuous wattmeter that measures gross electrical output in Megawatt-hours is also required for this project. In addition, a performance test is required within 60 days of achieving the maximum production rate but not later than 180 days after initial startup of the facility.

The maximum emissions from the gas turbine/HRSG will be as follows:

PM = 0.0063 lbs/MMBtu, and < 20% opacity

SO<sub>2</sub> = 0.0006 lbs/MMBtu

NO<sub>x</sub> (30 day-average) = (11,726 lbs/month)/(1,592,640 btu/month) = 0.0074 lbs/MMBtu

NO<sub>x</sub> (30-day average) = (11,726 lbs/month)/(180,000 MW-hrs/month) = 0.065 lbs/MW-hr

Based on the above, compliance with this rule is expected. A source test will be conducted to verify compliance with this rule.

### 40CFR PART 60 SUBPART GG – NSPS FOR GAS TURBINES

Subpart GG applies to the subject gas turbine because the heat input is greater than 10.14 MMBtu/hour (10.7 gigajoules per hour) at peak load. The manufacturer’s rated heat rate at



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manufacturer's rated load (kj/W-hr) based on the fuel LHV = 9.48 kj/W-hr. The NOx emissions standard for the gas turbine is based on the formula below.

NOx standard (ppmdv @ 15% O2) =  $0.0075 * 14.4 * (1/Y) * (1/100) * (1,000,000) + F$ , where  
Y = rated heat rate = 9.48 kj/W-hr

F = 0 for natural gas with a nitrogen content < 0.015% (by wt.)

NOx standard = 114 ppmdv corrected to 15% O2

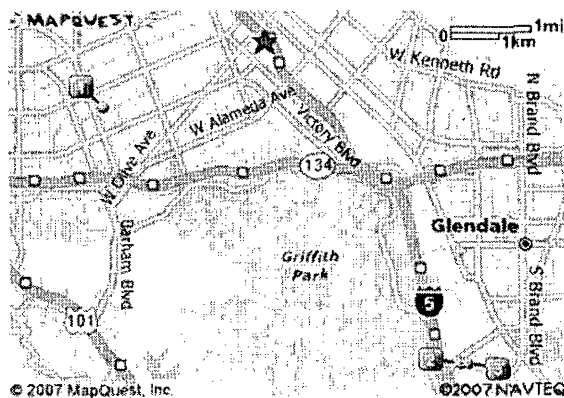
The allowable SOx emissions = 150ppm.

A performance test is required within 60 days of installation.

The NOx emissions from the gas turbines/HRSGs (during normal operations) will be less than 2.0 ppmdv corrected to 15% O2, and the SOx emissions will be less than 0.15 ppmdv corrected to 15% O2. Therefore, compliance with this rule is expected.

#### RULE 212 – STANDARDS FOR APPROVING PERMITS

There is no school within 1,000 feet of the facility boundary, and there is no emission increase from the proposed change of conditions. Public notice is not required. The following map shows the nearby schools. The closest school is located some 2 miles away.



Map# Business/Landmark Info

- 1 **Magnolia Park School**  
827 N Avon St, Burbank, CA (2.11 miles away)
- 2 **Glenfeliz Blvd Elementary School**  
3955 Glenfeliz Blvd, Los Angeles, CA (4.42 miles away)
- 3 **Glenfeliz Blvd Children's Ctr**  
3745 Dover Pl, Los Angeles, CA (4.46 miles away)

#### RULE 218 – CONTINUOUS EMISSION MONITORING

This rule requires the applicant to install and maintain a CO CEMS for monitoring and reporting of CO emissions. The applicant has installed the CO CEMS and have received approval of the CO CEMS plan. The facility is recording and reporting CO emissions through the CO CEMS. Compliance is achieved.

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RULE 401 – VISIBLE EMISSIONS

The proposed change of conditions should not increase visible emissions. Continued compliance is expected.

RULE 402 – NUISANCE

Nuisance problems are not expected under normal operating conditions of the gas turbine.

RULE 407 – LIQUID AND GASEOUS AIR CONTAMINANTS

This rule limits CO emissions to 2000 ppmv and SO<sub>2</sub> emissions to 500 ppmv (unless the equipment is subject to Rule 431.1). Since the gas turbine/HRSG will be subject to Rule 431.1, the only limit that applies is the 2000 ppmv CO limit. The CO emissions from the gas turbine/HRSG will be controlled by an oxidation catalyst to be less than 2 ppmv corrected to 15% O<sub>2</sub>. Therefore, compliance with this rule is expected.

RULE 409 – COMBUSTION CONTAMINANTS

This rule limits particulate emissions (from combustion) to 0.1 grain per cubic foot. The expected PM emissions from the gas turbine/HRSG are as follows:

$$\begin{aligned} \text{Max grain loading (w/ duct firing)} &= (18 \text{ lbs/hr})(7000 \text{ grains/lb}) / [(757,552 \text{ scfmd})(60 \text{ min/hr})] \\ &= 0.0028 \text{ grains/scfd} \end{aligned}$$

$$\begin{aligned} \text{Max grain loading (w/out duct firing)} &= (12 \text{ lbs/hr})(7000 \text{ grains/lb}) / [(778,132 \text{ scfmd})(60 \text{ min/hr})] \\ &= 0.0018 \text{ grains/scfd} \end{aligned}$$

Based on the above calculations, compliance with this rule is expected.

RULE 431.1 – SULFUR CONTENT OF GASEOUS FUELS

The pipeline quality natural gas that will be supplied to the gas turbine/HRSG is expected to comply with the 16 ppmv sulfur limit (calculated as H<sub>2</sub>S) specified in this rule. Compliance with this rule is expected.

RULE 475 – ELECTRIC POWER GENERATION 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/hour or 0.01 grains/scf. Compliance is achieved if either the mass limit or the concentration limit is met. The maximum PM concentration from the gas turbine/HRSG will be 0.0028 grains/scf. Therefore, compliance with this rule is expected.

REGULATION XIII – NEW SOURCE REVIEW FOR NON-RECLAIM POLLUTANTS

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Based on the emission calculations there will be no emission increases for PM and SOx. New source reviews of the non-attainment pollutants PM and SOx are not required.

New source review of VOC emissions is required since there are emission increases. However, since the VOC emission increase of 0.7 lbs/day is less than one pound a day it is exempted from the requirement of BACT. In addition, since the facility will be subject to the same monthly VOC limit of condition A63.1, offset is not required.

CO is an attainment pollutant and is no longer subject to new source review.

**RULE 1401 – NEW SOURCE REVIEW OF TOXIC AIR CONTAMINANTS**

This rule is not triggered since there are no increases of toxic air contaminants.

**REGULATION XVII – PREVENTION OF SIGNIFICANT DETERIORATION (PSD)**

The original project went through the PSD review for the attainment pollutants NOx and SOx. Compliance with the PSD rules was determined.

The proposed modification will reduce emissions, and will not alter the compliance status with the PSD rules.

**RULE 2005 – NSR FOR RECLAIM POLLUTANTS**

New source review for NOx is not required since there will be no increases in the maximum emission rates.

**Rule 2012 – Monitoring Recording and Record Keeping for RECLAIM**

The modification will not affect the compliance requirement for this rule. The installed NOx CEMS will continue to record and report NOx emissions. Compliance has been demonstrated.

**REGULATION XXX – TITLE V**

The facility is subject to the Title V requirements. The proposed change of startup conditions does not have emission increases and is considered a minor permit revision according to the definition provided in Rule 3000(b)(12). As required, EPA is afforded the opportunity to review and comment on the project within a 45 day review period.

**RECOMMENDATION**

The equipment is expected to comply with all the federal, state, and local regulations. It is recommended that a permit to operate be issued with the following conditions.

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**CONDITIONS**

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

Contaminant	Emission limits
CO	less than or equal to 7,988 lbs in any one month
PM10	less than or equal to <del>10,080</del> 9,375 lbs in any one month
VOC	less than or equal to 3,638 lbs in any one month
SOX	less than or equal to <del>4,039</del> 1,006 lbs in any one month

The operator shall calculate the emission limit(s) by using the monthly fuel use data and the following emissions factors: PM10 with duct firing = ~~7.89~~ 7.98 lb/MMscf, PM10 without duct firing = ~~6.86~~ 6.93 lb/MMscf, VOC with duct ring = ~~2.63~~ 2.69 lb/MMscf, VOC without duct ring = ~~2.62~~ 2.69 lb/MMscf, VOC startups = 30 lb/event, VOC shutdown = 17 lb/event, SOx = 0.75 lb/MMscf.

~~The operator shall calculate the emission limit(s) for CO, during the commissioning period, using fuel use data and the following emission factors: 228 lbs/MMscf during the no load and part load tests when the turbine is operating at or below 60 percent load, and 14 lbs/MMscf, during the mid load and full load tests when the turbine is operating at greater than 60 percent load.~~

The operator shall calculate the emission limit(s) for CO, after the commissioning period and prior to the CO CEMS certification, using fuel use data and the following emission factors: 500 lbs/event for cold startups, ~~300 lbs/event for warm startups, 285 lbs/event for hot startups,~~ 120 lbs/event for shutdowns, and 4.58 lbs/MMscf for all other operations.

The operator shall calculate the emission limit(s) for CO, after the CO CEMS certification based upon the readings from the AQMD certified CEMS. In the event the CO CEMS is not operating or the emissions exceed the valid upper range of the analyzer, the emissions shall be calculated in accordance with the approved CEMS plan.

For the purposes of this condition, the limit(s) shall be based on the total combined emissions from equipment D4 (Gas Turbine 1) and D6 (Duct Burner).

[RULE 1303(b)(2)-Offset]

[Devices subject to this condition: D4, D6]

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A99.1 The 2 PPM NO<sub>x</sub> emission limit(s) shall not apply during the turbine commissioning, startup, and shutdown periods. Startup time shall not exceed ~~4~~ 6 hours per startup per day. Shutdown time shall not exceed 30 minutes per shutdown per day. ~~The commissioning period shall not exceed 636 operating hours from the date of initial startup. The operator shall provide the AQMD with written notification of the startup date.~~ Written records of commissioning, startups, and shutdowns shall be maintained and made available upon request from AQMD.

[RULE 2005]

[Devices subject to this condition: D4, D6]

A99.2 The 2 PPM CO emission limit(s) shall not apply during the turbine commissioning, startup, and shutdown periods. Startup time shall not exceed 4 6 hours per startup per day. Shutdown time shall not exceed 30 minutes per shutdown per day. ~~The commissioning period shall not exceed 636 operating hours from the date of initial startup. The operator shall provide the AQMD with written notification of the startup date.~~ Written records of commissioning, startups, and shutdowns shall be maintained and made available upon request from AQMD.

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

[Devices subject to this condition: D4, D6]

~~A99.3 The 37.15 LBS/MMCF NO<sub>x</sub> emission limit(s) shall only apply during the interim reporting period to report RECLAIM emissions. The interim reporting period shall not exceed 12 months from the initial startup date.~~

~~[RULE 2012]~~

~~[Devices subject to this condition: D4, D6]~~

A195.1 The 5 PPMV NH<sub>3</sub> emission limit(s) is averaged over 60 minutes at 15 percent oxygen, dry.

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

[Devices subject to this condition: C10]

A195.2 The 2 PPMV NO<sub>x</sub> emission limit(s) is averaged over 3 hours at 15 percent oxygen, dry.

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[RULE 2005]

[Devices subject to this condition: D4, D6]

A195.3 The 2 PPMV CO emission limit(s) is averaged over 1 hour at 15 percent oxygen, dry.

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

[Devices subject to this condition: D4, D6]

A195.4 The 2 PPMV VOC emission limit(s) is averaged over 1 hour at 15 percent, dry.

RULE 1303(a)(1)-BACT]

[Devices subject to this condition: D4, D6]

A327.1 For the purpose of determining compliance with District Rule 475, combustion contaminant emissions may exceed the concentration limit or the mass emission limit listed, but not both limits at the same time.

[RULE 475]

[Devices subject to this condition: D4, D6]

A433.1 The operator shall comply with the 2.0 ppmv NOx BACT emission concentration limit at all times, except as specified in Condition A195.1 and under the following conditions:

<u>Emission Limit</u>	<u>Averaging Time</u>	<u>Operation Requirements</u>
440 lbs/startup	6 hours	The 440 lbs/startup emission limit shall apply to a startup event not exceeding 6 hours per day

[Rule 2005]

[Devices subject to this condition: D4, D6]

C1.1 The operator shall limit the fuel usage to no more than ~~572~~ 555 MM cubic feet per year.

[RULE 1303(b)(1)-Modeling; RULE 2005]

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[Devices subject to this condition: D6]

C1.2 The operator shall limit the fuel usage to no more than ~~6.86~~ 6.66 MM cubic feet per day.

[RULE 1303(b)(1)-Modeling]

[Devices subject to this condition: D6]

C1.3 The operator shall limit the fuel usage to no more than 111 MM cubic feet per month

[RULE 1303(b)(1)-Offset]

[Devices subject to this condition: D6]

C1.4 The operator shall limit the number of startups to no more than 3 times per month

[RULE 1303(b)(1)-Offset]

[Devices subject to this condition: D4]

D12.1 The operator shall install and maintain a(n) flow meter to accurately indicate the flow rate of the total hourly throughput of injected ammonia. The operator shall continuously record the flow rate with a measuring device or gauge accurate to +/- 5 percent, calibrated once every 12 months.

[RULE 1303(a)(1)-BACT; RULE 2012]

[Devices subject to this condition: C10]

D12.2 The operator shall install and maintain a(n) temperature gauge to accurately indicate the temperature of the exhaust at the inlet to the SCR reactor. The operator shall continuously record the temperature with a measuring device or gauge accurate to +/- 5 percent, calibrated once every 12 months.

[RULE 1303(a)(1)-BACT; RULE 2012]

[Devices subject to this condition: C10]

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D12.3 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 continuously record the pressure with a measuring device or gauge accurate to + /- 5 percent, calibrated once every 12 months.

[RULE 1303(a)(1)-BACT; RULE 2012]

[Devices subject to this condition: C10]

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

Pollutant(s) to be tested	Required Test Method(s)	Averaging Time	Test Location
NOx emissions	District method 100.1	1 hour	Outlet of the SCR
CO emissions	District method 100.1	1 hour	Outlet of the SCR
SOx emissions	Approved District method	District-approved averaging time	Fuel Sample
ROG emissions	Approved District method	1 hour	Outlet of the SCR
PM emissions	Approved District method	District-approved averaging time	Outlet of the SCR
NH3 emissions	District method 207.1 and 5.3 or EPA method 17	1 hour	Outlet of the SCR
Aldehydes	Approved District method	District-approved averaging time	Outlet of the SCR
Benzene	Approved District method	District-approved averaging time	Outlet of the SCR
Formaldehyde	Approved District method	District-approved averaging time	Outlet of the SCR
Polynuclear Aromatic Hydrocarbons (PAH)	Approved District method	District-approved averaging time	Outlet of the SCR

The test shall be conducted after AQMD approval of the source test protocol, but no later than 180 days after the initial startup. The AQMD shall be notified of the date and time of the test at least 10 days prior to the test.



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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 and steam turbine generating output in MW.

The test shall be conducted in accordance with a AQMD approved source test protocol. The protocol shall be submitted to the AQMD no later than 45 days before the proposed test date and shall be approved by 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 for all pollutants 1) when the gas turbine and duct burner are operating simultaneously at 100 percent of maximum heat input and 2) when the gas turbine is operating alone at 100 percent of maximum heat input. In addition, tests shall be conducted when the gas turbine is operating alone at loads of 75 and 50 percent of maximum heat input for the NOx, CO, VOC and NH3 tests.

[RULE 1303(a)(1)-BACT; RULE 1303(b)(2)-Offset; RULE 1401; RULE 2005]

[Devices subject to this condition: D4, D6]

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

Pollutant(s) to be tested	Required Test Method(s)	Averaging Time	Test Location
SOx emissions	Approved District method	District-approved averaging time	Fuel Sample
ROG emissions	Approved District method	1 hour	Outlet of the SCR
PM emissions	Approved District method	District-approved averaging time	Outlet of the SCR

The test shall be conducted at least once every three years. The results shall be submitted to the AQMD within 60 days after the test date. The AQMD shall be notified of the date and time of the test at least 10 days prior to the test. The test shall be conducted 1) when the gas turbine and duct burner are operating simultaneously at 100 percent of maximum heat input and 2) when the gas turbine is operating alone at 100 percent of maximum heat input.

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

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[RULE 1303(a)(1)-BACT; RULE 1303(b)(2)-Offset]

[Devices subject to this condition: D4, D6]

D82.1 The operator shall install and maintain a CEMS to measure the following parameters:

CO concentration in ppmv

Concentrations shall be corrected to 15 percent oxygen on a dry basis.

The CEMS will convert the actual CO concentrations to mass emission rates (lbs/hr) and record the hourly emission rates on a continuous basis.

The CEMS shall be installed and operated; in accordance with an AQMD approved Rule 218 CEMS plan application. The operator shall not install the CO CEMS prior to receiving AQMD approval of the CO CEMS plan. The CO CEMS shall be installed and operating no later than 90 days after initial startup of the turbine.

The CEMS shall be installed and operated to measure CO concentrations over a 15 minute averaging time period.

[RULE 1303(a)(1)-BACT; RULE 1303(b)(2)-Offset]

[Devices subject to this condition: D4, D6]

D82.2 The operator shall install and maintain a CEMS to measure the following parameters:

NOX concentration in ppmv

Concentrations shall be corrected to 15 percent oxygen on a dry basis.

The CEMS shall be installed and operating no later than 12 months after initial startup of the turbine and shall comply with the requirements of Rule 2012. During the interim period between the initial startup and the provisional certification date of the CEMS, the operator shall comply with the monitoring requirements of Rule 2012(h)(2) and 2012(h)(3). Within two weeks of the turbine startup date, the operator shall provide notification to the AQMD of the exact startup date.

[RULE 2012]

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[Devices subject to this condition: D4, D6]

- E57.1 The operator shall vent this equipment to the CO oxidation and SCR control whenever this equipment is in operation. This condition shall not apply during the initial turbine commissioning period.

[RULE 1303(a)(1)-BACT; RULE 1303(b)(2)-Offset; RULE 2005]

[Devices subject to this condition: D4, D6]

- E73.1 Notwithstanding the requirements of Section E conditions, the operator may, at his discretion, choose not to use ammonia injection if all of the following requirement(s) are met:

The SCR inlet exhaust temperature is 450 degrees F or less not to exceed 4 6 hours during a cold startup, ~~2.1 hours during a warm startup, 1.5 hours during a hot startup~~ and 0.5 hours during a shutdown.

[RULE 1303(a)(1)-BACT; RULE 2005]

[Devices subject to this condition: C10]

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

In accordance with all mitigation measures stipulated in the Final California Energy Commission Certificate for 01-AFC-6 prepared for this project.

[CA PRC CEQA]

[Devices subject to this condition: D1, D4, D6, C10]

- E193.2 The operator shall construct, operate, and maintain this equipment according to the following requirements:

This equipment must be fully and legally operational at the rated capacity within 3 years of the Permit to Construct issuance date, unless extended in writing by the Executive Officer, or otherwise the PM-10 Priority Reserve Credits in the amount of 336 lbs/day shall revert back to the AQMD Priority Reserve account and the operator

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shall not operate this equipment until PM-10 ERCs are provided by the operator to the AQMD in the amount of 403 lbs/day.

This equipment must be fully and legally operational at the rated capacity within 3 years of the Permit to Construct issuance date, unless extended in writing by the Executive Officer, or otherwise the SOx Priority Reserve Credits in the amount of 23 lbs/day shall revert back to the AQMD Priority Reserve account and the operator shall not operate this equipment until SOx ERCs are provided by the operator to the AQMD in the amount of 28 lbs/day.

[RULE 1309.1]

[Devices subject to this condition: D4, D6]

- 1296.1 This equipment shall not be operated unless the operator demonstrates to the Executive Officer that the facility holds sufficient RTCs to offset the prorated annual emissions increase for the first compliance year of operation. In addition, this equipment shall not be operated unless the operator demonstrates to the Executive Officer that, at the commencement of each compliance year after the first compliance year of operation, the facility holds sufficient RTCs in an amount equal to the annual emissions increase.

[RULE 2005]

[Devices subject to this condition: D4, D6]

- K40.1 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 concentration (ppmv) corrected to 15 percent oxygen (dry basis), mass rate (lbs/hr), and lbs/MM Cubic Feet. 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.

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Source test results shall also include the oxygen levels in the exhaust, fuel flow rate (CFH), the flue gas temperature, and the generator power output (MW) under which the test was conducted.

[RULE 1303(a)(1)-BACT; RULE 1303(b)(2)-Offset; RULE 2005]

[Devices subject to this condition: D4, D6]

K67.2 The operator shall keep records, in a manner approved by the District, for the following parameter(s) or item(s):

Natural Gas usage during the commissioning period

Natural gas fuel use after the commissioning period and prior to CEMS certification

Natural gas fuel use after CEMS certification

[RULE 1303(b)(2)-Offset; RULE 2012]

[Devices subject to this condition: D4, D6]

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**APPENDIX A EMISSION CALCULATIONS**

- Emissions of the proposed operation schedule

The gas turbine (GT) and the duct burner (DB) are subject to the following emission limits:

NO<sub>x</sub> = 2.0 ppmv at 15% O<sub>2</sub>, dry  
 CO = 2.0 ppmv at 15% O<sub>2</sub>, dry  
 VOC = 2.0 ppmv at 15% O<sub>2</sub>, dry  
 PM<sub>10</sub> = 6.6 \* 10<sup>-3</sup> lbs/MMBtu (GT)  
 PM<sub>10</sub> = 7.6 \* 10<sup>-3</sup> lbs/MMBtu (Duct Burner)  
 SO<sub>x</sub> = 0.75 lbs/MMscf (applicant proposed data)

For the gas turbine the rated heat input is 1,787 MMBtu/hr

NO<sub>x</sub> = 2.0\*10<sup>-6</sup> \* 8,710 / 385 \* 46 \* 1787 \* 20.9/5.9= 13.18 lbs/hr  
 CO = 2.0\*10<sup>-6</sup> \* 8,710 / 385 \* 28 \* 1787 \* 20.9/5.9= 8.02 lbs/hr  
 VOC = 2.0\*10<sup>-6</sup> \* 8,710 / 385 \* 28 \* 1787 \* 20.9/5.9= 4.58 lbs/hr, 2.69 lbs/mmscf  
 PM<sub>10</sub> = 6.6 \* 10<sup>-3</sup> \* 1787 = 11.79 lbs/hr, 6.93 lbs/mmscf  
 SO<sub>x</sub> = 0.75 \* 1787/1050 = 1.28 lbs/hr

For the duct burner the rated heat input is 583 MMBtu/hr

NO<sub>x</sub> = 2.0\*10<sup>-6</sup> \* 8,710 / 385 \* 46 \* 583 \* 20.9/5.9= 4.30 lbs/hr  
 CO = 2.0\*10<sup>-6</sup> \* 8,710 / 385 \* 28 \* 583 \* 20.9/5.9= 2.62 lbs/hr  
 VOC = 2.0\*10<sup>-6</sup> \* 8,710 / 385 \* 28 \* 583 \* 20.9/5.9= 1.50 lbs/hr, 2.69 lbs/mmscf  
 PM<sub>10</sub> = 7.6 \* 10<sup>-3</sup> \* 583 = 4.43 lbs/hr, 7.98 lbs/mmscf  
 SO<sub>x</sub> = 0.75 \* 583/1,050 = 0.42 lbs/hr

Emissions are then calculated according to the following operating scenario:

Monthly Schedule:

Gas turbine has 3 startups (18 hours) and 3 shutdowns (1.5 hours)  
 Gas turbine operates at 100% base load for the balance of time (700.5 hours)  
 Duct burner operates 200 hours

Annual schedule:

Gas turbine has 36 startups and 36 shutdowns  
 Gas turbine operates at 100% base load for the balance of hours

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Duct burner operates 1,000 hours

Therefore, monthly emissions are calculated in the next table

Monthly Emissions

	NOx (lbs)	CO (lbs)	VOC (lbs)	PM10 (lbs)	SOx (lbs)
GT startup	440	500	30	Same emission rate as normal operation	
GT shutdown	25	120	17		
GT, per hour of normal operation	13.18	8.02	4.58	11.79	1.28
DB, per hour	4.30	2.62	1.50	4.43	0.42
GT total startup	1320	1500	90	Included in normal operation	
GT total shutdown	75	360	51		
GT total normal operation	9229 (700.5 hours)	5618 (700.5 hours)	3210 (700.5 hours)	8489 (720 hours)	922 (720 hours)
DB total normal operation	860 (200 hours)	523 (200 hours)	299 (200 hours)	886 (200 hours)	84 (200 hours)
Monthly Total	11,484	8,001	3,650	9,375	1,006
<b>PTE Average</b>	<b>383</b>	<b>267.71</b>	<b>121.67</b>	<b>312</b>	<b>34</b>
Hourly Avg.	15.96	11.15	5.07	13.00	1.42
Yearly Total	137,808	96,012	43,800	112,500	12,072

The existing emissions are given in the next table, based on the District's NSR data base.

	NOx	CO	VOC	PM10	SOx
PTE Average	1,940	266	121	336	35
Monthly Total		7,988	3,636	10,080	1,039

In order not to have PTE increases the following monthly totals will use placed in Condition A63.1

CO: 7,988 lbs (11.1 lbs/hr)  
VOC: 3,636 lbs (5.05 lbs/hr)  
PM10: 9,375 lbs (13.0 lbs/hr)  
SOx: 1,006 lbs (1.4 lbs/hr)

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- Duct Burner Fuel Limit Determinations

The duct burner (D6) is now subject to the 200 hours monthly operating limit. The duct burner has a rated heat input of 583 MMBtu/hr and the higher heating value is 1050 btu/scf. The corresponding fuel limit is:

$$583 * 200 / 1050 = 111.05 \text{ mmscf/month}$$

It is also subject to the 12 hour per day and 1000 hour per year operating limit. The corresponding fuel limits are:

$$583 * 12 / 1,050 = 6.66 \text{ mmscf/day}$$

$$583 * 1000 / 1,050 = 555.24 \text{ mmscf/year}$$