CHANGE OF CONDITION

APPLICANT:

Southern California Edison
2244 Walnut Grove Ave
Rosemead, CA 91770

EQUIPMENT LOCATION:

9000 Etiwanda Ave.
Rancho Cucamonga CA 91739

EQUIPMENT DESCRIPTION:

Section H of the Facility Permit, ID# 149620

Proposed changes or additions are shown in **bold/underline**, proposed deletions are shown in ~~strikethrough~~

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
PROCESS 1: POWER GENERATION					
SYSTEM 1: GAS TURBINE					
GAS TURBINE, UNIT NO. 1, NATURAL GAS, GENERAL ELECTRIC MODEL LM6000PC SPRINT, SIMPLE CYCLE WITH WATER INJECTION, 505.7 MMBTU/HR, WITH A/N: ~~478600~~ **499010** GENERATOR, 49 MW	D1			**CO**: 6 PPM NATURAL GAS (4) [RULE 1303(a)(1)-BACT]; **CO**: 2000 PPM (5) [RULE 407]; **NOX**: 2.5 PPM NATURAL GAS (4) [RULE 1303(a)(1)-BACT]; **NOX**:25 PPM NATURAL GAS (8) [40 CFR60 SUBPART KKKK]; **VOC**: 2 PPM NATURAL GAS (4) [RULE 1303(A)(1)-BACT]; PM: 0.1 GR/SCF (5) [RULE 409]; PM: 11 LBS/HR (5) [RULE 475]; PM: 0.01 GR/SCF (5A) [RULE 475]; SOX: 0.060 LBS/MMBTU (8) [40CFR 60 SUBPART KKKK] SO2: (9) [40CFR 72 – ACID RAIN]	A63.1, A63.2, A63.3, **A63.4**, **A99.1**, **A99.2**, A99.3, A195.1, A195.2, A195.3, A195.4, A327.1, D12.1, C1.1, C1.2, C1.3, D29.1, D29.2, D29.3, D82.1, **E57.1**, E193.3, K40.1, K67.1
STACK, TURBINE NO. 1, DIAMETER: 13 FT, HEIGHT: 80 FT A/N: ~~478600~~ **499010**	S4				

FACILITY DESCRIPTION

The site is located at 9000 Etiwanda Ave, in Rancho Cucamonga, CA 91739, adjacent to an existing SCE substation. The site is also adjacent to the Reliant Energy power plant to the east. To the south is a vacant lot owned by SCE where a new 500 kv substation is proposed. To the north is a railroad right-of-way and heavy industrial buildings, and to the west is a railroad-right-of-way and commercial buildings.

The SCE facility consists of a natural gas fired GE LM6000 combustion turbine generator rated at 49 net MW, associated air pollution control equipment in the form of in-duct oxidation and reduction catalysts, a 10,000 gallon aqueous ammonia storage tank, and an 924 hp emergency internal combustion engine.

BACKGROUND:

The initial permit to construct was issued on March 1, 2007. Construction was completed on the unit in the summer of 2007, and first fire was around July 23 of that year. The permits for the gas turbine and the emergency engine were modified in 2008 to address start up limits, equipment description, and hours of operation. The SCR/CO catalyst and aqueous ammonia storage tank permits have not been modified since the initial P/C was issued.

Following is the application history:

Equipment	A/N	Description	Permit Date
Gas Turbine	461460	Initial Permit to Construct	3/1/07
	478600	Change of Condition to address start up limits and equipment description	12/10/08
SCR/CO Catalyst	461462	Initial Permit to Construct	3/1/07
Emergency Engine	461461	Initial Permit to Construct	3/1/07
	479361	Change of Condition to address hours of operation	12/10/08
Ammonia Storage Tank	461463	Initial Permit to Construct	3/1/07

SCE is now proposing a further modification to the gas turbine permit to address a requirement of Cal-ISO that the turbine be periodically 'black-start' tested, during which the unit would be operated at low load with no control.

The following applications were submitted for this project:

Table A-1 – Project Application Numbers

A/N	Submittal Date	Equipment	Previous A/N
499010	5/21/09	Gas turbine	478600
498962	5/21/09	Title V	//////////

The applications were deemed complete on 6/28/09.

The Etiwanda facility is NOT subject to Reclaim. It is, however, a Title V facility.

PROCESS DESCRIPTION:

SCE operates this facility as a peaking plant. The turbine is mainly used in the hot summer months when demand for electricity is highest. The LM6000 Enhanced Sprint turbine is a simple cycle unit, rated at 49 MW output and about 507 mmbtu/hr input. It is fired on natural gas only, and is controlled with water injection into both the low and high pressure compressors, followed by SCR and oxidation catalysts. The table below highlights some operating parameters:

Gas Turbine Data

Max rated heat input	505.68 mmbtu/hr
Max rated power output	49 MW
Fuel rate @ maximum load	0.4836 mmcf/hr
Exhaust flow @ maximum load	15.66 mmcf/hr
Net Plant Heat Rate, LHV	9,152 Btu/kw-hr
Net Plant Heat Rate, HHV	10,067 Btu/kw-hr
Net Plant Efficiency, LHV	37%

SCE is requesting that an exemption from BACT be allowed for black start testing which is required by the California Independent System Operator (CAl-ISO). Cal-ISO requires that at least 1/3 of all the black-start capable generating units subject to a Reliability Must Run (RMR) Agreement be tested each year to verify their readiness. During the test, the unit is isolated from the grid and must be started without assistance from the system, and operated in a stable manner while supplying only its own auxiliary loads or loads in the immediate area for at least 30 minutes. Because of the low load conditions (SCE estimates the unit output would be only about 3 MW-hr during the testing), the water injection system would be inactive. Once the exhaust temperature reaches 540 degrees F and the exhaust flow is stabilized, ammonia injection could be used in the SCR to reduce NOx during the test. The oxidation catalyst should be effective once the exhaust temperature reaches about 500 degrees F. But, because of the low load conditions, it would take longer than normal to reach these critical temperatures. Without the water injection system, the emissions of NOx would not meet the 2.5 ppm BACT limit, and because of the lower exhaust temperatures, emissions of CO would not meet the 6.0 ppm limit.

EMISSIONS:

SCE estimates the emissions from black start testing as follows:

Pollutant	Hourly Emissions, lbs	Total Emissions, lbs/yr(1)
NOx	38.00	76.00
CO	15.84	31.68
VOC	1.15	2.30
PM10	0.48	0.97
SOx	0.06	0.13

(1) based on 1 two hour test in a given year

The NOx and CO emission rates are higher than either normal or start up operation. VOC, PM10, and SOx rates are lower due to lower fuel usage. The emission estimates are based on a black start test performed at the Mira Loma plant in November of 2008. The results of the test showed the average NOx concentration at about 91 ppm, with a high of 96 ppm, and an average CO concentration of about 6 ppm, with a high of 435 ppm (which was only for the 1st minute, CO then dropped to 23 ppm). These concentration levels are within the range of the CEMS for the turbine. Both the NOx and CO CEMS range is 0-10 and 0-200 ppm.

Reference Appendix A for the data and calculations.

Monthly and annual permitted emission limits will remain unchanged. SCE may need to adjust their operation as necessary to accommodate the black start testing so that their emissions remain within their permitted caps.

Following is a summary of the emissions for this facility taken from the previous application (A/N 478600):

Pollutant	Uncontrolled Hourly Emissions	Controlled Hourly Emissions	Shutdown Hourly Emissions	Startup Hourly Emissions
NOx	126.00	4.75	6.44	10.36
CO	48.80	6.94	7.69	8.58
VOC	1.99	1.32	1.33	1.34
PM10	5.41	5.41	4.51	5.41
SOx	0.30	0.30	0.25	0.30
NH3	3.72	3.72	0.00	0.00

Maximum Daily Emissions

Pollutant	Uncontrolled Daily Emissions	Controlled Daily Emissions*
NOx	1154.22	50.82
CO	447.03	65.96
VOC	20.84	12.14
PM10	49.58	49.58
SOx	2.75	2.75
NH3	34.08	34.08

** includes 1 start up and shutdown, during a CAL-ISO test, the daily emissions of NOx will be limited to 90 lbs.*

Monthly Emissions

Pollutant	Controlled Emissions 30 SU/SD(1) lbs/month
NOx	1524.51
CO	1978.93
VOC	364.07
PM10	1460.23
SOx	80.94

(1) Monthly emissions are calculated assuming daily fuel use of 4.43 mmscf/day and 1 start/shutdown per day, for 30 days. The NSR 30 Day average emissions for NOx and PM10 are entered as 21 because of the facility exemption.

Annual Emissions Turbine Only

Pollutant	Total Annual Emissions(1)	
	Lbs/yr	TPY
NOx	7540.52	3.77
CO	9361.19	4.68
VOC	1697.27	0.85
PM10	6746.87	3.37
SOx	330.00	0.16
NH3	3272.56	1.64

(1) Assumes 200 starts and 200 shutdowns per year, 619 mmcf/yr total fuel use

EVALUATION:

The proposed modification will result in increased NOx and CO emissions, with either no effect, or slight reductions in the other criteria pollutants, and no increase in toxic emissions. Therefore, the rules evaluation will be limited to only those rules pertaining to NOx and CO.

RULE 212-Standards for Approving Permits

The black start testing will result in NOx emissions of about 80 lbs/day. Currently, the maximum daily NOx emissions estimated for the turbine is about 50.82 lbs/day, which includes a start up, a shutdown, and the equivalent of about 12 hours of normal full load operation. Rule 212 requires a public notice if the daily maximum NOx emissions for a modified source is increased by 40 lbs/day or more. SCE has agreed to a permit condition which will limit the NOx emissions to no more than 90 lbs/day on the day when the black start test is performed. This will require SCE to limit the turbine's operation outside of the black start testing, and in fact SCE may have to perform the testing on a day when it does not anticipate running the turbine for any other reason. This will keep the turbine's NOx from exceeding the 40 lbs/day threshold of this rule. CO emissions are very low for the black start testing, and VOC, SOx, and PM10 are actually less during the testing than during normal operation. Furthermore, the facility is not within 1000 feet of a school, and there is no increase in toxic emissions as a result of the proposed modification, therefore no public notice is required.

RULE 401 – Visible Emissions

Visible emissions are not expected during the black start testing operation.

RULE 402 – Nuisance

Nuisance problems are not expected during the black start testing operation.

RULE 407 – Liquid and Gaseous Air Contaminants

This rule limits the CO concentration from the turbine to 2000 ppm. The CEMS data from the black start test done at Mira Loma showed a maximum CO concentration of 435 ppm. Therefore, compliance is anticipated.

REGULATION XIII – New Source Review

The proposed modification results in higher hourly and daily NOx and higher hourly CO emissions from the 1 day out of the year when the black start tests occurs. The increases are quantified below:

Pollutant	Current Hourly Maximum	Black Start Test Hourly Maximum	Hourly Increase	Current Daily Maximum	Black Start Test Daily Maximum	Daily Increase
NOx	4.75	38.00	33.25	50.82	90*	39.18
CO	6.94	15.84	8.90	65.96	31.68	none

* *based on permit condition*

BACT
The turbine is limited to NOx and CO BACT concentration levels of 2.5 ppm and 6.0 ppm respectively. This is considered the current BACT levels for these pollutants. Therefore, there are no new BACT requirements. For the BACT exemption from the black start testing, SCE will be limited to a mass emission rate of 40 lbs/hr and a 2 hour test limit.

Offsets
No offsets are required since there is no increase in the monthly average emissions and the facility will remain below the 4 ton threshold of Regulation XIII.

Modeling
Modeling will not be required because SCE already performed modeling for the turbine at higher emission rates when the initial permit to construct was issued. At that time, SCE modeled the NOx emission rate during commissioning of 12.82 g/s, or about 102 lbs/hr, and showed that the impacts were about 106 ug/m3, for a total impact (project + background) of 326.53 ug/m3. This is below the new state standard of 338 ug/m3. The black start test will result in NOx emissions of no more than 40 lbs/hr. Modeling of CO was done at an emission rate of 7.84 g/s or 62.14 lbs/hr, with the result showing the maximum project + background of 4320 ug/m3, below the threshold of 23,000 ug/m3. Black start testing will result in CO emissions below about 5 lbs/hr. Reference A/N 461460 for the modeling details.

RULE 1401 – New Source Review of Toxic Air Contaminants
There is no increase in toxic air contaminants as a result of the proposed permit modification.

REGULATION XXX – Title V
The SCE Etiwanda facility is subject to the Title V requirements because it is an Acid Rain facility [Rule 3001(c)(3)]. The modification proposed under these applications can be considered a de minimis significant permit revision because the increase in the average daily emissions of NOx and CO are below the thresholds of 40 lbs/day and 220 lbs/day respectively [Rule 3000(b)(6)]. As a de minimis significant revision, the permit is subject to a 45 day review and comment period by the US EPA.

California Environmental Quality Act (CEQA)
Although the NOx emissions from the turbine on the day Cal-ISO testing is performed may exceed 55 lbs/day, the testing will occur on only 1 day in any 12 month period. Furthermore, the 55 lbs/day 'threshold' for CEQA purposes is really only a guideline which can and should be used along with other potential impacts from a proposed project to determine the appropriate level of CEQA analysis. Given the nature of the project (increased emissions occur only once/year with no other impacts), no further CEQA analysis is required. A Mitigated Negative Declaration was prepared for the original project when the turbine was first installed.

RECOMMENDATION:

It's recommended that the following changes be incorporated into the permit:

1. Allow an exemption from the NOx and CO BACT limits of 2.5 ppm and 6.0 ppm respectively for turbine operation during any CAL-ISO required black start testing. Limit the testing to one 2 hour test in any 12 month period, with a mass emission limit of 40 lbs/hr NOx and 5 lbs/hr CO to take the place of the concentration limits.
2. Allow an exception to the 55 lbs/day NOx limit for the day during which the CAL-ISO black start test occurs, with a new 90 lbs/day limit for those situations. The new 90 lbs/day limit will maintain the daily NOx increase below the thresholds of Rule 212 and Rule 3000 for public notice requirements.
3. Include a condition to require ammonia injection into the SCR whenever the exhaust temperature reaches 540 degrees F, which is the operational temperature of the SCR.

The permit to construct can be issued at the end of the EPA 45 day review period and comment period, and subject to the conditions as listed in the following section.

CONDITIONS:

Note that the requirement for an initial source test under conditions D29.1 (turbine) and D29.4 (engine) have already been met, and there is no need for additional tests under this proposed modification. However the conditions will remain until final Permits to Operate are issued.

Proposed changes or additions are shown in **bold/underline**, proposed deletions are shown in ~~strikethrough.~~

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

CONTAMINANT	EMISSION LIMIT
NOx	1525 LBS IN ANY ONE MONTH
PM10	1460 LBS IN ANY ONE MONTH
CO	1979 LBS IN ANY ONE MONTH
SOx	81 LBS IN ANY ONE MONTH
VOC	364 LBS IN ANY ONE MONTH

The operator shall calculate the annual emission limit(s) by using fuel use data and the following emission factors: VOC: 3.15 lbs/mmcf, PM10: 11.19 lbs/mmcf, and SOx: 0.62 lbs/mmcf.

Compliance with the NOx and CO emission limits shall be verified through CEMS data. If CO CEMS data is not available, CO emissions shall be calculated using fuel usage and a factor of 14.35 lbs/mmcf during normal operations, 8.58 lbs/hr during any start up hour, and 7.69 lbs/hr during any shutdown hour. The operator shall use the appropriate missing data procedures if NOx data is not available.

If a CEMS calibration occurs within 60 minutes of a start up, NOx emissions for the calibration period shall be calculated using the actual duration of the calibration in minutes times a factor of 0.0792 lb/min, and shall only occur when NOx emissions are at or below BACT levels.

[Rule 1303 – Offsets]

A63.2

The operator shall limit emission from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
NOx	7800 LBS IN ANY ONE YEAR
PM10	6681 LBS IN ANY ONE YEAR
CO	10683 LBS IN ANY ONE YEAR
SOx	370 LBS IN ANY ONE YEAR
VOC	1940 LBS IN ANY ONE YEAR

THIS CONDITION APPLIES DURING THE 1ST 12 MONTHS OF OPERATION ONLY, and the limits apply to the total emissions from the turbine plus the engine.

The operator shall calculate the annual emission limit(s) by using fuel use data and the following emission factors for the turbine: During commissioning with no control- NOx: 251.86 lb/mmcf; CO: 173.95 lbs/mmcf, VOC: 8.26 lb/mmcf; PM10: 11.19 lbs/mmcf, and SOx: 0.62 lb/mmcf . During commissioning with water injection- NOx: 103.23 lbs/mmcf, all other factors remain the same. During normal operation- VOC: 3.15 lbs/mmcf, PM10: 11.19 lbs/mmcf, and SOx: 0.62 lbs/mmcf.

The operator shall calculate the annual emission limit(s) by using hourly operation data and the following emission factors for the engine: NOx: 2.54 lbs/hr, CO: 3.56 lbs/hr, VOC: 0.92 lbs/hr, PM10: 0.064 lbs/hr, SOx: 0.0038 lbs/hr.

Compliance with the NOx and CO emission limits shall be verified through CEMS data. If CO CEMS data is not available, CO emissions shall be calculated using fuel usage and a factor of 14.35 lbs/mmcf during normal operations, 8.58 lbs/hr during any start up hour, and 7.69 lbs/hr during any shutdown hour. The operator shall use the appropriate missing data procedures if NOx data is not available.

If a CEMS calibration occurs within 60 minutes of a start up, NOx emissions for the calibration period shall be calculated using the actual duration of the calibration in minutes times a factor of 0.0792 lb/min, and shall only occur when NOx emissions are at or below BACT levels.

For the purpose 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 – Offsets]

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

CONTAMINANT	EMISSION LIMIT
NOx	**7769** LBS IN ANY ONE YEAR
PM10	**6753** LBS IN ANY ONE YEAR
CO	**9682** LBS IN ANY ONE YEAR
SOx	**330** LBS IN ANY ONE YEAR
VOC	**1780** LBS IN ANY ONE YEAR

THIS CONDITION APPLIES AFTER THE 1st 12 MONTHS OF OPERATION, and the limits apply to the total emissions from the turbine plus the engine.

The operator shall calculate the annual emission limit(s) by using fuel use data and the following emission factors for the turbine: VOC: 3.15 lbs/mmcf, PM10: 11.19 lbs/mmcf, and SOx: 0.62 lbs/mmcf.

The operator shall calculate the annual emission limit(s) by using hourly operation data and the following emission factors for the engine: NOx: 2.54 lbs/hr, CO: 3.56 lbs/hr, VOC: 0.92 lbs/hr, PM10: 0.064 lbs/hr, SOx: 0.0038 lbs/hr.

Compliance with the NOx and CO emission limits shall be verified through CEMS data. If CO CEMS data is not available, CO emissions shall be calculated using fuel usage and a factor of 14.35 lbs/mmcf during normal operations, 8.58 lbs/hr during any start up hour, and 7.69 lbs/hr during any shutdown hour. The operator shall use the appropriate missing data procedures if NOx data is not available.

If a CEMS calibration occurs within 60 minutes of a start up, NOx emissions for the calibration period shall be calculated using the actual duration of the calibration in minutes times a factor of 0.0792 lb/min, and shall only occur when NOx emissions are at or below BACT levels.

For the purpose 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 – Offsets]

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

CONTAMINANT	EMISSION LIMIT
NOx	55 LBS IN ANY DAY

The purpose of this condition is to ensure that the facility emissions are below the CEQA thresholds, and the limit is based on the total emissions from the turbine and the black start generator. The operator shall keep records on the NOx daily emissions.

The 55 lbs/day limit shall not apply when the unit undergoes CAL-ISO required black start testing, which shall not occur more than once per 12 month period. During CAL-ISO required black start testing the daily total NOx from all operations shall not exceed 90 lbs/day.

[CEQA, **Rule 212]**

A99.1
The 2.5 PPM NOx emission limits shall not apply during commissioning, start-up, shutdown, ~~and~~ an emergency electrical grid system blackout when the turbine is used to re-start another major electric generating station, **and during CAL-ISO required testing.** Commissioning shall not exceed 25 hrs total, with no more than 5 hrs uncontrolled and no more than 20 hrs with water injection. Each start-up shall not exceed 15 min. Each shutdown shall not exceed 10 min. There shall be no more than 60 start ups/yr in the first year of operation, and 200 start-ups/yr thereafter.

NOx emissions for the hour which includes a start shall not exceed 10.36 lbs, and for the hour which includes a shutdown 6.44 lbs.

In the case of a start during an emergency electrical grid system blackout, total NOx shall not exceed 28.23 lbs/hr.

During CAL-ISO required testing, NOx emissions shall not exceed 40 lbs/hr. In any 12 month period, there shall be no more than 1 completed successful test, and no more than 2 hours of total test time (including any aborted test time).

In case of a turbine shutdown which occurs less than 75 minutes from a start up, the emissions calculated for the shutdown shall not include any of the first 15 minutes of the start up, and the emissions calculated for the start up shall not include any of the last 10 minutes of the shutdown.

A shutdown is defined as a reduction in turbine load ending in a period of zero fuel flow. The hour which includes a shutdown is defined as the 60 minutes counted back from the period of zero fuel flow.

[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A99.2

The 6.0 PPM CO emission limits shall not apply during commissioning, start-up, shutdown, ~~and~~ an emergency electrical grid system blackout when the turbine is used to re-start another major electric generating station, **and during CAL-ISO required testing.** Commissioning shall not exceed 25 hrs total, with no more than 5 hrs uncontrolled and no more than 20 hrs with water injection. Each start-up shall not exceed 15 min. Each shutdown shall not exceed 10 min. There shall be no more than 60 start ups/yr in the first year of operation, and 200 start-ups/yr thereafter.

CO emissions for the hour which includes a start shall not exceed 8.58 lbs, and for the hour which includes a shutdown 7.69 lbs.

During CAL-ISO required testing, CO emissions shall not exceed 5 lbs/hr. In any 12 month period, there shall be no more than 1 completed successful test, and no more than 2 hours of total test time (including any aborted test time).

In case of a turbine shutdown which occurs less than 75 minutes from a start up, the emissions calculated for the shutdown shall not include any of the first 15 minutes of the start up, and the emissions calculated for the start up shall not include any of the last 10 minutes of the shutdown.

A shutdown is defined as a reduction in turbine load ending in a period of zero fuel flow. The hour which includes a shutdown is defined as the 60 minutes counted back from the period of zero fuel flow.

[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A195.1
The 2.5 PPMV NOX emission limit(s) is averaged over 60 minutes at 15 percent O2, dry.
[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A195.2
The 6.0 PPMV CO emission limit(s) is averaged over 60 minutes at 15 percent O2, dry.
[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A195.3
The 2.0 PPMV VOC emission limit(s) is averaged over 60 minutes at 15 percent O2, dry.
[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A195.4
The 25 PPMV NOX emission limit(s) is averaged over 4 hours rolling at 15 percent O2, dry.
[40 CFR60 Subpart KKKK]

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

D12.1
The operator shall install and maintain a(n) flow meter to accurately indicate the fuel usage being supplied to the turbine.

The operator shall also install and maintain a device to continuously record the parameter being measured.
The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every twelve months.
[Rule 1303(b)(2) – Offset]

C1.1
The operator shall limit the fuel usage to no more than 4.43 mmcf in any one day.

The operator shall maintain records in a manner approved by the District to demonstrate compliance with this condition.
[Rule 1303(b)(2) – Offset]

C1.2
The operator shall limit the fuel usage to no more than 597 mmcf in any one year.

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

For the purpose of this condition, the yearly fuel use limit shall apply only during the 1st 12 months of operation.
[Rule 1303(b)(2) – Offset]

C1.3
The operator shall limit the fuel usage to no more than 619 mmcf in any one year.

The operator shall maintain records in a manner approved by the District to demonstrate compliance with this condition.

For the purpose of this condition, the yearly fuel use limit shall apply after the 1st 12 months of operation. 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)(2) – Offset]

D29.1
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
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
VOC emissions	Approved District method	1 hour	Outlet of the SCR
PM10 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

The test shall be conducted after AQMD approval of the source test protocol, but no later than 180 days after initial start-up. 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 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 loads of 100, 75, and 50 percent.

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 theVOC BACT level of 2.0 ppmv calculated as carbon for natural gas fired turbines.

Because the VOC BACT level was set using data derived from various source test results, this alternate VOC compliance method provides a fair comparison and represents the best sampling and analysis technique for this purpose at this time. The test results shall be reported with two significant digits.

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

D29.2

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
NH3 emissions	District method 207.1 and 5.3 or EPA method 17	1 hour	Outlet of the SCR

The test shall be conducted and the results submitted to the District within 45 days after the test date. The AQMD shall be notified of the date and time of the test at least 7 days prior to the test.

The test shall be conducted at least quarterly during the first twelve months of operation and at least annually thereafter. The NOx concentration, as determined by the CEMS, shall be simultaneously recorded during the ammonia slip test. If the CEMS is inoperable, a test shall be conducted to determine the NOx emissions using District Method 100.1 measured over a 60 minute averaging time period.

The test shall be conducted to demonstrate compliance with the Rule 1303 concentration limit

[Rule 1303(a)(1) – BACT]

D29.3

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	Approved District method	District approved averaging time	Fuel Sample
VOC emissions	Approved District method	1 hour	Outlet of the SCR
PM10 emissions	Approved District	District approved	Outlet of the SCR

method	averaging time

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 100 percent load.

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.

Because the VOC BACT level was set using data derived from various source test results, this alternate VOC compliance method provides a fair comparison and represents the best sampling and analysis technique for this purpose at this time. The test results shall be reported with two significant digits.

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

D82.1

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

NOx and CO 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 90 days after initial startup of the turbine, in accordance with an approved AQMD Rule 218 CEMS plan application. The operator shall not install the CEMS prior to receiving initial approval from AQMD.

The CEMS will convert the actual NOx and 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 to measure the NOx and CO concentration over a 15 minute averaging time period.

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

CO Emission Rate, lbs/hr = K*Cco*Fd[20.9/(20.9%-%O2 d)][(Qg*HHV)/10E6], where

K	= $7.267*10^{-8}$ (lbs/scf)/ppm
Cco	= Average of 4 consecutive 15 min. average CO concentrations, ppm
Fd	= 8710 dscf/MMBTU natural gas
%O2, d	= Hourly average % by volume O2 dry, corresponding to Cco
Qg	= Fuel gas usage during the hour, scf/hr
HHV	= Gross high heating value of the fuel gas, BTU/scf

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

E57.1
The operator shall vent this equipment to the SCR and the oxidation catalysts whenever the turbine is in operation.

Ammonia injection shall commence once the exhaust temperature into the SCR catalyst has reached 540 degrees F.
[Rule 1303(a)(1) – BACT, Rule 1303(b)(2) – Offset]

E193.1
The operator shall upon completion of construction, operate and maintain this equipment according to the following specifications:

In accordance with all mitigation measures stipulated in the Negative Declaration prepared for this project (CEQA State Clearinghouse No. 2006121109).
[CEQA]

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 (lb/hr), and lb/MMCF. In addition, solid PM emissions, if required to be tested, shall also be reported in terms of grains/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. All moisture concentration shall be expressed in terms of percent corrected to 15 percent oxygen.
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]

K67.1
The operator shall keep records in a manner approved by the District, for the following parameter(s) or item(s):

Commissioning hours and type of control and fuel use
Date and time of each start-up and shutdown
Natural gas fuel use after the commissioning period and prior to CEMS certification
CEMS minute data during start up and shutdown

[Rule 1303(b)(2) - Offsets]

Appendix A

Black Start Test Emission Data

SCE has indicated that the SCR and oxidation catalysts will not be operational during the black start testing. Therefore, NOx and CO emissions will be considerably higher than during normal operation. The turbine will operate at about 3 MW output/

SCE performed a black start test at the Mira Loma facility in November, 2008. The unit operated at about 21.4% its full load heat input. NOx concentrations were around 95 ppm for most of the test time. CO concentrations started out at double digit levels, but quickly fell to below 10 ppm, and after the exhaust temperature reached 600 degrees, fell below 2 ppm.

The CEMS data is summarized below. Note that the unit was first started around 9 am and ran for about 30 minutes. It was then shutdown and restarted around 10:30 and ran for about another 2 hours.

30 Minute Run

15% NOx	NOx lbs/hr	15% CO	CO lbs/hr	Fuel	Temp
39.58	16.52	435.00	110.55	1078.80	98
67.95	27.73	23.63	5.87	1055.40	164
75.14	30.53	16.14	3.99	1050.60	286
76.97	31.11	15.04	3.70	1044.60	350
78.74	31.82	14.36	3.53	1045.20	383
77.51	31.24	11.36	2.79	1041.60	400
79.57	32.01	8.48	2.07	1040.40	421
79.70	31.97	8.04	1.96	1036.80	444
80.08	32.21	7.38	1.81	1039.80	459
81.51	32.82	7.01	1.72	1041.00	473
82.08	33.02	7.10	1.74	1039.80	483
81.75	32.71	7.05	1.72	1034.40	490
81.68	32.86	6.98	1.71	1039.80	495
81.82	32.76	7.03	1.72	1035.00	500
82.10	32.88	6.94	1.70	1035.60	505
82.48	33.25	6.97	1.71	1042.20	509
82.53	33.20	6.97	1.70	1040.40	513
82.34	33.09	6.91	1.69	1039.20	517
82.46	33.11	6.96	1.70	1038.00	520
82.13	32.80	6.86	1.67	1032.60	523
82.51	33.06	6.84	1.66	1036.20	526
82.98	33.32	6.82	1.67	1038.00	529
82.84	33.36	6.82	1.67	1041.00	532
82.04	32.85	6.79	1.65	1035.60	534
81.97	32.83	6.63	1.62	1035.60	537
82.91	33.41	6.66	1.63	1042.20	539
83.14	33.36	6.66	1.62	1037.40	542
82.48	33.19	6.53	1.61	1039.80	544
82.04	32.85	6.56	1.60	1035.60	546
82.46	33.08	6.63	1.62	1036.80	548

82.62	33.15	6.65	1.62	1037.40	550
81.94	32.79	6.49	1.57	1034.40	552
80.96	32.71	6.27	1.55	1045.20	554

2 Hour Run

15% NOx	NOx lbs/hr	15% CO	CO lbs/hr	Fuel	Temp
88.75	35.81	3.89	0.95	1042.80	559
88.94	35.95	3.79	0.93	1045.20	561
89.29	35.88	3.68	0.91	1039.20	564
88.80	35.75	3.51	0.86	1041.00	567
89.46	35.99	3.26	0.80	1039.80	569
90.48	36.53	3.02	0.75	1044.00	573
91.13	36.62	2.88	0.71	1039.20	576
91.82	36.87	2.74	0.68	1038.00	578
91.62	36.69	2.75	0.67	1035.60	581
92.70	37.26	2.46	0.60	1038.60	583
93.75	37.54	2.41	0.59	1035.60	585
93.66	37.64	2.52	0.62	1038.60	587
93.57	37.54	2.45	0.60	1037.40	588
93.96	37.62	2.45	0.60	1035.00	589
93.78	37.69	2.55	0.62	1038.60	590
93.89	37.56	2.43	0.59	1034.40	591
94.47	38.00	2.22	0.55	1040.40	592
94.40	37.77	2.29	0.55	1034.40	594
93.96	37.60	2.21	0.54	1034.40	594
94.54	37.86	2.13	0.52	1035.60	596
94.63	37.93	2.13	0.52	1036.20	597
94.33	37.67	2.22	0.54	1032.00	598
94.21	37.66	2.22	0.54	1033.20	599
94.05	37.66	2.29	0.55	1035.60	599
94.19	37.75	2.22	0.54	1036.20	600
94.47	38.07	2.11	0.51	1041.60	601
93.92	37.51	2.26	0.55	1032.00	601
93.58	37.54	2.06	0.50	1036.80	601
94.15	37.84	2.02	0.49	1038.60	603
93.76	37.68	1.97	0.48	1039.20	604
94.10	37.55	1.97	0.48	1031.40	604
93.89	37.60	1.97	0.48	1035.00	605
94.19	37.79	1.93	0.47	1037.40	606
94.79	37.96	1.88	0.46	1035.00	606
94.72	37.83	1.81	0.44	1032.60	607
94.17	37.78	1.85	0.46	1036.80	608
94.33	37.77	1.72	0.41	1035.60	608
94.47	37.76	1.67	0.40	1033.20	609
94.56	37.94	1.67	0.40	1037.40	610
94.67	37.88	1.72	0.41	1034.40	611
94.47	37.83	1.76	0.42	1035.60	611
94.83	37.77	1.65	0.40	1029.60	611
94.77	37.77	1.62	0.39	1030.20	612

94.65	37.90	1.62	0.39	1035.60	613
94.61	37.60	1.60	0.39	1027.80	613
94.47	37.79	1.69	0.41	1034.40	614
94.40	37.70	1.72	0.41	1032.00	614
94.49	37.77	1.58	0.38	1033.80	614
94.54	37.69	1.58	0.38	1030.20	615
94.26	37.58	1.57	0.38	1030.20	615
94.58	37.73	1.44	0.35	1031.40	615
94.79	37.78	1.46	0.36	1030.80	617
94.88	37.82	1.46	0.36	1030.20	617
94.97	37.86	1.46	0.36	1030.20	617
94.88	37.82	1.39	0.34	1030.20	618
94.76	37.84	1.37	0.34	1032.00	618
94.83	37.70	1.49	0.36	1027.80	619
94.51	37.61	1.56	0.38	1028.40	619
94.56	37.63	1.39	0.33	1029.00	619
94.99	38.01	1.39	0.34	1034.40	619
94.45	37.71	1.48	0.36	1032.00	620
94.42	37.71	1.55	0.38	1032.00	619
95.38	38.02	1.44	0.35	1030.80	619
95.04	37.99	1.39	0.34	1033.20	619
94.90	37.79	1.34	0.32	1029.60	620
94.83	37.70	1.39	0.33	1027.80	620
94.88	37.82	1.41	0.35	1030.20	621
94.81	37.76	1.39	0.34	1029.60	621
95.33	38.07	1.34	0.33	1032.60	621
95.33	38.11	1.32	0.33	1033.20	622
94.88	38.06	1.29	0.32	1036.80	622
94.94	37.74	1.34	0.32	1027.20	622
94.90	37.93	1.20	0.29	1033.80	622
95.40	38.00	1.30	0.31	1029.60	623
95.29	37.91	1.34	0.32	1029.00	623
95.24	37.90	1.34	0.32	1028.40	623
95.65	37.92	1.32	0.32	1024.80	623
95.47	37.98	1.34	0.32	1029.00	623
96.05	38.18	1.37	0.33	1027.80	623
95.68	38.07	1.32	0.32	1028.40	623
95.68	37.96	1.30	0.31	1025.40	623
95.15	37.82	1.34	0.32	1027.80	623
95.31	38.02	1.32	0.32	1031.40	624
95.28	37.91	1.29	0.31	1029.00	624
94.97	37.85	1.24	0.30	1030.20	624
95.38	37.95	1.23	0.29	1028.40	624
95.53	37.97	1.25	0.30	1027.80	624
95.44	38.04	1.29	0.31	1030.20	624
95.26	37.86	1.27	0.31	1027.80	624
95.03	37.71	1.33	0.32	1026.00	624
95.31	38.02	1.29	0.31	1031.40	625
95.15	37.85	1.29	0.31	1029.00	625
94.78	37.64	1.27	0.30	1026.60	625

94.87	37.78	1.24	0.30	1029.60	625
94.78	37.71	1.31	0.31	1028.40	625
94.85	37.70	1.24	0.30	1027.80	625
95.01	37.77	1.31	0.31	1027.20	626
94.85	37.74	1.27	0.30	1029.00	626
94.85	37.87	1.31	0.31	1032.60	626
94.92	37.84	1.27	0.30	1030.80	626
94.81	37.72	1.24	0.30	1029.00	626
94.94	37.74	1.27	0.30	1027.80	626
94.74	37.69	1.33	0.32	1029.00	626
94.65	37.69	1.27	0.30	1029.60	626
94.45	37.71	1.31	0.31	1032.00	626
94.56	37.63	1.27	0.30	1029.00	626
94.63	37.82	1.29	0.31	1033.80	626
94.58	37.77	1.33	0.33	1032.60	627
94.58	37.70	1.31	0.31	1030.80	627
94.76	37.84	1.33	0.33	1032.00	627
94.90	37.76	1.31	0.31	1028.40	627
94.90	37.90	1.27	0.30	1032.00	627
95.03	37.99	1.29	0.31	1033.20	627
94.69	37.75	1.36	0.32	1030.80	627
94.90	37.76	1.18	0.28	1028.40	627
94.81	37.65	1.20	0.29	1026.60	628
94.67	37.57	1.29	0.31	1026.00	628
94.42	37.57	1.29	0.31	1028.40	628

	NOx, ppm	NOx, lbs	CO, ppm	CO, lbs
Maximum	96.05	38.18	435	110.55
Average	91.13	36.44	6.00	1.49
Total	//////////	91.71	//////////////	3.75

Appendix B

Emission Calculations

Data:

Fuel Use Rate	0.4836	mmcf/hr
Fuel Use Daily Limit	4.43	mmcf/day
Fuel Use Annual Limit	619	mmcf/yr
Max Heat Input	505.68	mmbtu/hr
Calculated Max Exhaust	15.66	mmcf/hr

Normal Operation Emission Rates

Pollutant	Controlled Emission Rates	Source
NOX	4.75	Method 19
CO	6.94	Method 19
PM10	5.41	Previous factor X 20% higher fuel use
VOC	1.32	Method 19
SOx	0.0006	AP-42
NH3	5 ppm	Manufacturer

Example calculations:

NOx:
exhaust = 506 mmbtu/hr X 8710 cf/mmbtu X 3.54 = 15.66 mmcf/hr
emissions = 15.66 cf/hr (2.5 ppm) (46 lbs/lb-mol)/379 cf/lb-mol = 4.75 lbs/hr

Start Up Emission Rates

Pollutant	Emission Rate (lbs/hr)	Source
NOX	10.36	Applicant
CO	8.58	Manufacturer
VOC	1.34	Manufacturer
PM10	5.41	Previous factor X 20% higher fuel use
SOx	0.30	AP-42

Shutdown Emission Rates

Pollutant	Emission Rate (lbs/hr)	Source
NOX	6.44	Manufacturer
CO	7.69	Manufacturer
VOC	1.33	Manufacturer
PM10	4.51	Manufacturer
SOx	0.25	AP-42

Normal Operation Emissions
Fuel Use = 0.4836 mmcf/hr

Pollutant	Uncontrolled Concentration	Controlled Concentration	Uncontrolled Emission Rate (lbs/hr)	Controlled Emission Rate (lbs/hr)	Uncontrolled Emission Factor (lbs/mmcf)	Controlled Emission Factor (lbs/mmcf)
NOX	63	2.5	126.00	4.75	260.55	9.82
CO	40	6.0	48.80	6.94	100.92	14.35
VOC	3.0	2.0	1.99	1.32	4.12	2.73
PM10			5.41	5.41	11.19	11.19
SOx			0.30	0.30	0.62	0.62
NH3	5.0	5.0	3.72	3.72	7.69	7.69

Daily Emissions
Fuel Use = 4.43 mmcf/day

Pollutant	Uncontrolled Emissions lbs/day	Controlled Emisisons lbs/day
NOX	1154.22	50.82
CO	447.07	65.96
VOC	18.25	12.14
PM10	49.58	49.58
SOx	2.75	2.75
NH3	34.08	34.08

Sample calculations:

Uncontrolled NOx:
4.43 mmcf/day X 260.55 lbs/mmcf = 1154.22 lbs

Controlled NOx:
10.36 lbs + 6.44 lbs + (4.43 mmcf – 2*0.4836 mmcf) X 9.82 lbs/mmcf = 50.82 lbs

Controlled PM10:
4.43 mmcf/day X 11.19 lbs/mmcf = 49.58 lbs

Note that during a CAL-ISO black start test, emissions could be as high as 76 lbs (38 lbs/hr for a 2 hour test). SCE will be limited by permit condition to 90 lbs total for any day which includes a black start test, therefore, normal operation emissions could only amount to the balance of 90 lbs minus the emissions from the black start test. For simplicity, and since the test only occurs on 1 day during any given 12 month period (and probably only once every 3 years or so), the 90 lbs/day is not included in the maximum daily emission estimate, or the annual emission estimate. The monthly emission calculation will remain the same, and SCE will need to adjust their operation to maintain their monthly caps in any month a black start test occurs.

Monthly Emissions
Fuel Use = 132.9 mmcf/month

Pollutant	Controlled Emissions 30 SU/SD
	lbs/month
NOX	1524.51
CO	1978.93
VOC	364.07
PM10	1460.23
SOx	80.94

Sample Calculation:

NOx:
30(10.36 lbs) + 30(6.44 lbs) + 30(4.43 – 2*0.4836 mmcf) X 9.82 lbs/mmcf = 1524.51 lbs

Annual Emissions
Fuel Use = 619 mmcf/yr

	SU	SD	Normal
Hours	200	200	879.98
Fuel	96.72	96.72	425.56
NOX, lbs/hr	10.36	6.44	4.75
CO, lbs/hr	8.58	7.69	6.94
VOC, lbs/hr	1.34	1.33	1.32
PM10, lbs/hr	5.41	4.51	5.41
SOx, lbs/hr	0.30	0.25	0.25

Pollutant	SU	SD	Normal	Total
NOX	2072.00	1288.00	4180.52	7540.52

CO	1716.00	1538.00	6107.19	9361.19
VOC	268.00	266.00	1163.27	1697.27
PM10	1082.40	902.00	4762.47	6746.87
SOx	60.00	50.00	220.00	330.00

Sample Calculation:

NOx:
200(10.36) + 200(6.44) + 879.98(4.75) = 7540.52 lbs

Appendix C

Application Fees

A/N	Submittal Date	Equip	Bcat	Fee Sch	Fee
499010	5/21/09	Gas turbine	013008/81	D	$3,008.18
498962	5/21/09	Title V	555007		843.80
		Expedited Permit Processing			1,925.99
		Total			5,777.97