

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

RULE 1134 – EMISSIONS OF OXIDES OF NITROGEN FROM STATIONARY GAS TURBINES

(Adopted August 4, 1989) (Amended December 7, 1995; April 11, 1997; August 8, 1997)

(a) Applicability

The provisions of this rule shall apply to all existing stationary gas turbines, 0.3 megawatt (MW) and larger, as of August 4, 1989.

(b) Definitions

- (1) CHEMICAL PROCESSING GAS TURBINE UNIT is a gas turbine unit that vents its exhaust gases into the operating stream of a chemical process.
- (2) COGENERATION CYCLE GAS TURBINE UNIT is a gas turbine unit that operates both for the simultaneous production of shaft work and for the recovery of useful thermal energy from the exhaust gases or waste steam as defined by Section 25134 of the California Public Resources Code.
- (3) COMBINED CYCLE GAS TURBINE UNIT is a gas turbine unit that operates both for the production of electrical energy from shaft work and the useful energy produced from heat recovered from its exhaust gases.
- (4) EMERGENCY STANDBY GAS TURBINE UNIT is a gas turbine unit that operates only as a mechanical or electrical power source for a facility when the primary power source has been rendered inoperable, except due to power interruption pursuant to an interruptible power supply agreement. This does not include utility company electrical power plant units.
- (5) EMISSION CONTROL PLAN is a plan that shall contain at a minimum District permit or identification number; name of gas turbine manufacturer; model designation; rated brake horsepower; heat rate (BTU/KW-HR), corrected to the HHV for each type of fueling (liquid/gas); type of liquid fuel and/or type of gaseous fuel; hours of operation in the previous one-year period; fuel consumption (cubic feet of gas or gallons of liquid) for the previous one-year period; and a list of all gas turbine units required to be controlled identifying the type of emission control to be applied to such gas turbine units along with documentation showing existing emissions of NO_x and CO.
- (6) EXHAUST AFTER-TREATMENT means a control method for the post-combustion reduction of NO_x emissions, such as selective catalytic reduction (SCR).
- (7) EXISTING GAS TURBINE UNIT is a stationary gas turbine unit that met the following criteria prior to August 4, 1989:
 - a. Had been issued a valid permit to construct or operate by the District, or
 - b. Was in operation pursuant to the provisions of District Rule 219(b)(1).
- (8) HHV - HIGHER HEATING VALUE OF FUEL.
- (9) LHV - LOWER HEATING VALUE OF FUEL.
- (10) PEAKING GAS TURBINE UNIT is a gas turbine unit that is used intermittently to produce energy on a demand basis.
- (11) PIPELINE GAS TURBINE UNIT is a stationary gas turbine unit used to transport gases or liquids in a pipeline.

- (12) POWER AUGMENTATION is the increase in the gas turbine shaft output and/or the decrease in gas turbine fuel consumption by the addition of energy recovered from exhaust heat.
- (13) RATING OF A GAS TURBINE UNIT is the continuous MW (megawatt) rating or mechanical equivalent by a manufacturer for gas turbine unit(s) without power augmentation.
- (14) SEWAGE DIGESTER GAS is any gas derived from anaerobic decomposition of organic sewage.
- (15) SOUTHEAST DESERT AIR BASIN (SEDAB) means the portion of the air basin containing specific desert portions of Los Angeles, Riverside and San Bernardino counties, as defined in Title 17, California Code of Regulations, Section 60109, within the jurisdiction of the District.
- (16) STATIONARY GAS TURBINE UNIT is any gas turbine unit that is gas and/or liquid fueled with or without power augmentation. This gas turbine unit is either attached to a foundation at a facility or is portable equipment operated at a specific facility for more than 90 days in any 12-month period. Two or more gas turbines-units powering one shaft shall be treated as one gas turbine unit.
- (17) THERMAL STABILIZATION PERIOD is the two-hour start up time necessary for NOx control purposes in cogeneration cycle, combined cycle, or any other applicable stationary gas turbine units.

(c) Emissions Limitations

- (1) The operator of any stationary gas turbine unit shall not operate such unit under load conditions, excluding the thermal stabilization period or other time period specified in the Permit to Construct or the Permit to Operate issued prior to August 4, 1989, which result in the discharge of oxides of nitrogen (NOx) emissions, directly or indirectly, into the atmosphere at concentrations in excess of the following as measured pursuant to subdivision (e):

$$\text{Compliance Limit} = \text{Reference Limit} \times \text{EFF } 25\%$$

Where:

Compliance Limit = allowable NOx emissions (ppm by volume).

Reference Limit = the NOx emission limit (ppm by volume) is corrected to 15 percent oxygen on a dry basis, and averaged over 15 consecutive minutes. These limits for various megawatt ratings (continuous rating by the manufacturer without power augmentation) are as follows:

REFERENCE NOx LIMITS, PPM

Unit Size Megawatt (MW) Rating	Effective 12-31-95
0.3 to Less Than 2.9 MW	25
2.9 to Less Than 10.0 MW	9
2.9 to Less Than 10.0 MW No SCR	15
10.0 MW and Over	9
10.0 MW and Over No SCR	12
60 MW and Over Combined Cycle No SCR	15
60 MW and Over Combined Cycle	9
	Effective 4/11/97

2.9 to Less Than 10.0 MW Utilizing Fuel Containing a Minimum of 60% Sewage Digester Gas by Volume on a Daily Average 25

And, EFF = $\frac{3413 \times 100\%}{\text{Actual Heat Rate at HHV of Fuel (BTU/KW-HR)}}$
or,

EFF = $\frac{(\text{Manufacturer's Rated Efficiency at LHV}) \times \text{LHV}}{\text{HHV}}$
or

EFF = the demonstrated percent efficiency of the gas turbine unit only as calculated without consideration of any downstream energy recovery from the actual heat rate, (BTU/KW HR) or 1.34 BTU/HP; corrected to the HHV (higher heating value) of the fuel, as measured at peak load for that facility; or the manufacturer's continuous rated percent efficiency (manufacturer's rated efficiency) of the gas turbine unit after correction from LHV (lower heating value) to the HHV of the fuel, whichever efficiency is higher. The value of EFF shall not be less than 25 percent. Gas turbine units with lower efficiencies will be assigned a 25 percent efficiency for this calculation.

- (2) The operator of any existing gas turbine unit subject to this rule shall also be subject to Regulation XIII if carbon monoxide (CO) emissions increase as a result of the application of NOx controls.

(d) Monitoring and Source Testing

The operator of any stationary gas turbine unit subject to the provisions of this rule shall perform the following actions

- (1) For cogeneration and combined cycle gas turbine units 2.9 MW and larger (continuous rating by the manufacturer without power augmentation), install, operate, and maintain in calibration a continuous in-stack NOx and oxygen monitoring system which meets the requirements of 40 CFR Part 60, Appendix B, Spec. 2, for NOx, Spec. 3 for oxygen (except the alternative RA procedures for Spec. 2 shall not apply), the 2 and 24 -hour calibration spec. of Rule 218, and 40 CFR Part 60, Appendix F to demonstrate compliance with the emission limits of this rule. The continuous emissions monitoring system shall have data gathering and retrieval capability which meets the reporting requirements of 40 CFR part 60.7(c), 60.7(d), and 60.13. This system shall include equipment that measures and records the following:

- a. Flow rate of liquids or gases and the ratio of water or steam to fuel added to the combustion chamber or to the exhaust for the reduction of NOx emissions, as applicable.
- b. Elapsed time of operation.

(2) Source Testing

- a. Provide source test information regarding the gas turbine unit's exhaust gas NOx concentration, and the demonstrated percent efficiency (EFF), or the manufacturer's rated EFF, if the Executive Officer determines that it is representative of the unit's EFF, and the carbon monoxide concentration as specified pursuant to paragraph (e)(1). NOx and carbon monoxide concentrations shall be in ppm by volume, corrected to 15 percent oxygen on a dry basis.
- b. Source Test Frequency
 - i. Units emitting 25 tons or more of NOx per calendar year shall be source tested, at least once every 12 months.
 - ii. All other existing units shall be source tested within 90 days after every 8,400 hours of operation.

(e) Test Methods

The following may be used by the Executive Officer to verify the concentrations of NOx, CO and oxygen subject to the provisions of this rule. Emissions determined to exceed any limits established by this rule through either of the following shall constitute a violation of this rule.

- (1) District Test Methods 3.1, 7.1, 10.1 and 100.1 and EPA Test Method 10 or any method deemed to be equivalent by the Executive Officer and approved by CARB and EPA.
- (2) Data obtained from a continuous emissions monitoring system, which is installed and properly operated according to paragraph (d)(1) of this rule and as approved by the Executive Officer.

(f) Recordkeeping

The facility operator shall comply with the following provisions:

- (1) All records shall be maintained at the facility for a period of two years and made available to District staff upon request.

- (2) Maintain a gas turbine operating log that includes, on a daily basis, the actual Pacific Standard Time start-up and stop time, total hours of operation; type and quantity of fuel used (liquid/gas), cumulative hours of operation to date for the calendar year; and if applicable the cumulative hours of operation since the last source test required by subparagraph (d)(2)(A).
- (3) A monthly summary of emissions pursuant to paragraph (d)(1) shall be submitted to the District on or before the last day of the following calendar month.
- (4) The results of source tests shall be submitted to the District in a form and manner as specified by the Executive Officer within 30 days after testing is completed.
- (5) Any person using an emission control system as a means of complying with this rule shall maintain daily records of system operation and maintenance which will demonstrate continuous operation and compliance of the emission control device during periods of emission producing activities.

(g) Exemptions

Any person seeking to qualify for any one of the following exemptions has the burden of proving its existing gas turbine unit meets the applicable specified criteria.

- (1) All provisions of this rule shall not apply to the following:
 - (A) Laboratory gas turbine units used in research and testing.
 - (B) Gas turbine units operated exclusively for fire fighting and/or flood control.
 - (C) Chemical processing gas turbine units.
 - (D) All existing pipeline gas turbine units located in the Southeast Desert Air Basin (SEDAB).
- (2) The provisions of subdivisions (c) and (d), and paragraphs (f)(3), (f)(4) and (f)(5) shall not apply to the following:
 - (A) Emergency standby and peaking gas turbine units demonstrated to operate less than 200 hours per calendar year, which have installed and maintained in proper operation a non-resettable engine hour meter.
 - (B) All existing gas turbine units located in the Southeast Desert Air Basin (SEDAB) which are rated below 4 MW and operate less than 877 hours per year.
 - (C) All existing gas turbine units located on San Clemente Island which are rated below 4 MW and operate less than 877 hours per year.

However, if the hour-per-year limit is exceeded, the exemption shall be automatically and permanently withdrawn. The operator of any stationary gas turbine exempt under this subparagraph must notify the Executive Officer within seven days if the hour-per-year limit is exceeded. Within 30 days after the date the hour-per-year limit is exceeded, the operator must submit a permit application for modification to equipment to meet the applicable compliance limit within 24 months of the date the hour-per-year limit is exceeded. Included with this permit application, the operator must submit an emission control plan including a schedule of increments of progress for the installation of the required control equipment. This plan and schedule shall be subject to the review and approval of the Executive Officer.