(**Adopted**: 08/04/89; **Amended**: 12/07/95; **Amended**: 04/11/97; **Amended**: 01/19/10)

RULE 1134
Stationary Gas Turbines

(A) General

(1) Purpose

(a) The purpose of this rule is to limit the emission of oxides of nitrogen (NO_x) and carbon monoxide (CO) from Stationary Gas Turbines.

(2) Applicability

(a) This rule applies to any new or existing Stationary Gas Turbine of 0.3 megawatt (MW) and larger unless the equipment is exempt from this rule pursuant to Section (D) of this rule.

(B) Definitions

(1) "Air Pollution Control Officer (APCO)" – The person appointed to the position of Air Pollution Control Officer of the District pursuant to the provisions of California Health & Safety Code §40750, and his or her designee.

(2) "Chemical Processing Gas Turbine Unit" – A gas turbine unit that vents its exhaust gases into the operating stream of a chemical process.

(3) "Continuous Emissions Monitoring System (CEMS)" – All of the equipment that may be required to meet the data acquisition and availability requirements of this rule, to sample, condition (if applicable), analyze, and provide a record of emissions on a continuous basis.

(4) "Digester Gas" – Fuel containing a minimum of 60 percent process gas, derived from a digester, by volume on a daily average.

(5) "Dry Low NO_x Combustion Technology (DLN)" – Any turbine combustor design which uses multiple staging, air/fuel premixing or other modifications to achieve lower levels of NO_x emissions as compared to conventional combustors.

(6) "Emergency Standby Unit" – Any Stationary Gas Turbine that operates as a mechanical or electrical power source for a facility only when the primary power source has been rendered inoperable due to failure beyond the reasonable control of the operator. A power interruption pursuant to a voluntary interruptible power supply agreement is not to be considered as an emergency loss of primary power. Electricity generated by such a unit cannot be sold.

(7) "Emission Control Equipment" – Add-on technologies which control the turbine's emissions, including, but not limited to, Selective Catalytic Control (SCR), water injection, steam injection, but excluding DLN.

(8) "Emission Control Plan (ECP)" – 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.

(9) "Emission Control System Operating Parameters" – Any operating parameter(s) that the District deems necessary to analyze for the determination of compliance. Such parameters include, but are not limited to, the ammonia and gas flow rates, the exhaust temperature for the Selective Catalytic Reduction (SCR), humidity, water injection rate, exhaust gas flow rate and the temperature for water injection.

(10) "Enhanced Emissions Monitoring Device" – Any automated data recording device or system having both data gathering and retrieval capabilities. Such equipment includes, but is not limited to, Continuous Emissions Monitoring Systems (CEMS) and Predictive Emissions Monitoring Systems (PEMS).

(11) "Existing Gas Turbine Unit" – A stationary gas turbine unit that met the following criteria prior to 12/15/09:

(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 (D)(2)(a).

(12) "Higher Heating Value (HHV)" – The Higher Heating Value of the fuel.

(13) "Landfill Gas" – Gas derived from a landfill gas extraction system.

(14) "Lower Heating Value (LHV)" – The Lower Heating Value of the fuel.

(15) "Measured NO_x Emissions Concentration" – The concentration of oxides of nitrogen corrected to International Standards Organization (ISO) standard conditions:

$$NO_x = (NO_x \text{ obs})(\text{Pref}/\text{Pobs})^{0.5} (288 \text{ K}/\text{Tamb})^{1.53} \ (e^{19(\text{Hobs}-0.00633)})$$

Where: NO_x = emissions of NO_x at 15 percent oxygen and ISO standard conditions on a dry basis, ppm.
NO_x obs = measured NO_x emissions corrected to 15 percent oxygen on a dry basis, ppm.
Pref = standard reference pressure, (14.696 psia).
Pobs = measured site ambient absolute pressure, psia.
Hobs = measured humidity of ambient air, pounds water per pound dry air.
e = transcendental constant (2.718)
Tamb = measured temperature of ambient air, degrees Kelvin.

or an alternate calculation that corrects to ISO standard conditions and is approved by the APCO.

(16) "Power Augmentation" – An 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.

(17) "Predictive Emissions Monitoring System (PEMS)" – All of the equipment necessary to monitor process and control device operational parameters (for example, control device secondary voltages and electric currents) and other information (for example, gas flow rate, oxygen or carbon dioxide concentrations), and calculate and record the mass emissions rate (for example, lb/hr) on a continuous basis.

(18) "Public Service Unit" – A Stationary Gas Turbine used to generate electricity for sale or for use in serving the public.

(19) "Rating" – The continuous MW (megawatt) rating or mechanical equivalent by a manufacturer for gas turbine unit(s) without Power Augmentation.

(20) "Reasonably Available Control Technology (RACT)" – The lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

(21) "Selective Catalytic Reduction (SCR)" – A noncombustion control technology that destroys NO_x by injecting a reducing agent (e.g., ammonia) into the flue gas that, in the presence of a catalyst (e.g., vanadium, titanium, or zeolite), converts NO_x into molecular nitrogen and water.

(22) "Shutdown Period" – The period of time during which a unit is taken from an operational to a non-operational status by allowing it to cool down from its operating temperature to ambient temperature as the fuel supply to the unit is completely turned off.

(23) "Startup Period" – The period of time during which a unit is brought from a Shutdown status to its operating temperature and pressure, including the time required by the unit's emission control system to reach full operation.

(24) "Stationary Gas Turbine" or "Unit" – Any gas turbine unit that is gas and/or liquid fueled with or without power augmentation. This 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 twelve-month period. Two or more units powering one shaft shall be treated as one unit.

(25) "Thermal Stabilization Period" – The Startup or Shutdown Period necessary to bring the heat recovery steam generator to the proper operating temperature, not to exceed two hours.

(C) Standards

(1) The owner or operator of any affected Stationary Gas Turbine Unit shall not operate such Unit under load conditions, excluding the Thermal Stabilization Period and Startup and Shutdown Periods, which result in the Measured NO_x Emissions Concentration exceeding the emissions limits set forth below.

(a) For Stationary Gas Turbines the federal NO_x and CO RACT limits in Table 1 apply:

Table 1
NO_x and CO Compliance Limits

Control	Operating hours per year	Rating	NO_x Compliance Limit, ppmv at 15% oxygen		CO Compliance Limit, ppmv at 15% oxygen
			Gas Fuel	Liquid Fuel	
SCR + DLN	> 877	> 10 MW	5	25	200
DLN	> 877	2 – 10 MW	25	65	200
SCR (no DLN available)	> 877	2 – 10 MW	35	65	200
DLN	> 877	< 2 MW	42	50	250
SCR or DLN	< 877	> 10 MW	25	42	200
Any (fired on Digester Gas and/or Landfill Gas)	any	0.3 – 10 MW	25	N/A	200

(b) For the purposes of these emissions limits the following conventions are applicable:

(i) Gas includes natural gas, Digester Gas and Landfill Gas.
(ii) Oil includes kerosene, jet fuel, and distillate. The sulfur content of the oil shall be less than 0.05 percent.
(iii) NO_x = emissions of NO_x, in ppmv, corrected to 15 percent oxygen and ISO standard conditions on a dry basis, averaged over any consecutive 15 minute period.

(2) The owner or operator of any Stationary Gas Turbine subject to (C)(1)(a) shall submit to the APCO for approval, an Emission Control Plan (ECP) for the purpose of establishing compliance with provisions of this rule.

(3) The owner or operator of any Stationary Gas Turbine subject to (C)(1) shall minimize emissions insofar as technologically feasible during Thermal Stabilization Periods.

(D) Exemptions

(1) The provisions of Section (C) of this rule shall not apply to the operation of:

(a) Laboratory gas turbine units used in research and testing for the advancement of gas turbine technology.

(b) Units operated exclusively for fire fighting and/or flood control.

(c) Chemical Processing Gas Turbine Units.

(2) The provisions of this rule, with the exception of Section (F)(2), shall not apply to the operation of Stationary Gas Turbines used under the following conditions:

(a) Emergency Standby Units, and Stationary 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) Portable, turntable, or track mounted turbines whose operation generates intermittent, high velocity air flow for live fire sustainability, lethality, aerodynamic, cookoff, or remote control operation testing only.

(c) Intra facility portable flight-line equipment used to support aircraft systems or start up aircraft power plants.

(E) Administrative Requirements

(1) The ECP required pursuant to section (C)(2) shall, at a minimum, include the following information if such information is applicable:

(a) A list of all Stationary Gas Turbines required to be controlled pursuant to this rule.

(b) For each Stationary Gas Turbine listed:

(i) District identification number, and District permit to operate number;
(ii) Name of the gas turbine manufacturer;
(iii) Equipment model number;
(iv) Manufacturer's rated shaft power output (MW);
(v) Type of liquid fuel and/or type of gaseous fuel;
(vi) HHV for each fuel;
(vii) Heat rate ((Btu/kW-hr), corrected to the HHV) for each type of fuel (gas or liquid) for each turbine;
(viii) Monthly fuel consumption for the previous twelve-month period (cubic feet for gas; gallons for liquid);
(ix) Monthly hours of operation in the previous twelve-month period;
(x) The type of NO_x Emission Control Equipment, including any auxiliary equipment related to the control of emissions, to be applied;
(xi) Documentation showing the current (existing) concentration and mass rate of emissions of NO_x from the unit;
(xii) A schedule with specified increments of progress dates for construction of Emission Control Equipment, operational milestones for implementation of emissions control and/or installation of monitoring equipment; and
(xiii) A final compliance date.

(F) Monitoring and Recordkeeping Requirements

(1) The owner or operator of any Stationary Gas Turbine required to install Emission Control Equipment for compliance with this rule shall:

(a) Install, operate, and maintain in calibration, the following monitoring equipment, as approved by the APCO:

(i) Continuous measurement and recording of Emissions Control System Operating Parameters;
(ii) Continuous measurement and recording of elapsed time of operation; and
(iii) An Enhanced Emissions Monitoring Device.

(b) Notify the APCO, in writing, before issuance of the permit to operate, such information which correlates the Emission Control System Operating Parameters, and PEMS if present, to the associated measured NO_x emissions output. This information will be used to determine compliance with applicable provisions of this rule for non-CEMS-equipped turbines and CEMS-equipped units when the CEMS is not operating properly.

(c) Provide, on an annual basis, compliance testing data and information regarding NO_x emissions. The data shall be corrected to ISO conditions and at 15 percent oxygen on a dry basis; and the percent efficiency (EFF) of each turbine unit.

(2) The owner/operator of any Stationary Gas Turbine shall:

(a) On a daily basis, maintain a turbine operating log that includes, as a minimum, the following information:

(i) The total hours of operation per day;
(ii) The accumulated hours of operation per calendar month;
(iii) The type and quantity of fuel used; and
(iv) The nature of operation of the unit (exempt or non-exempt).

(b) The operating log required to be kept pursuant to this rule shall be kept current and on site for a minimum of two years; and provided to District or state personnel on request.

(G) Notification Requirements for Exempt and Emergency Standby Units

(1) Any Stationary Gas Turbine unit which is exempt or claimed to be exempt pursuant to subsection (D)(2) shall:

(a) Notify the APCO within seven (7) days if the hour-per-year threshold is exceeded.

(i) If the hour-per-year threshold is exceeded, the exemption pursuant to subsection (D)(2) shall be permanently withdrawn.
(ii) If the hour-per-year threshold is exceeded the owner/operator shall, within 30 days of the notification, submit an application for a permit to operate to the District. Such application shall including a plan detailing actions and a schedule of progress to meet the applicable RACT limits and provisions of this rule within 18 months after the date of the notification; an ECP conforming to the requirements of Section (E) for the Emission Control Equipment.

(2) Notwithstanding the provisions of Sections (F)(2) and (G)(1) above, a Public Service Unit shall not be subject to the hour-per-year threshold when:

(a) Such Unit is operating during a state of emergency declared by a proclamation of the Governor of the State of California; and

(b) Such Unit is located within the specific geographic location identified in the state of emergency proclamation.

(H) Test Methods

(1) Compliance testing shall be subject to the protocols prescribed in the District's Compliance Procedural Manual.

(2) The following test methods shall be used to determine compliance with the provisions of this rule.

(a) NO_x emissions shall be determined by EPA Test Method 20.

(b) The Higher Heating Value (HHV) and the Lower Heating Value (LHV) shall be determined by the appropriate method for the fuel type listed below:

(i) For liquid fuels:
- a. ASTM Test Method D 240-87 (Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter).

(ii) For distillate fuel:
- a. ASTM Test Method D 2382-88 (Standard Test Method for Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter - High Precision Method); or**,**

(iii) For gaseous fuels:
- a. ASTM Test Method D 3588-91 (Standard Practice for Calculation Heat Value, Compressibility Factor, and Relative Density (Specific Gravity) of Gaseous Fuels); or
- b. ASTM Test Method D 1826-88 (Standard test Method for Caloric (Heating) Value of Gases in Natural Gas Range by Continuous Recording Calorimeter); or
- c. ASTM Test Method D 1945-81 (Standard Method for Analysis of Natural Gas by Gas Chromatography).

(I) Compliance Schedule

(1) The owner/operator of any Existing Stationary Gas Turbine subject to the provisions of Section (C)(1)(a) above shall comply with the following increments of progress:

(a) An ECP shall be submitted to the District within 90 days of rule adoption. The District shall approve the ECP within 30 days of submission.

(b) Any affected turbine shall be in full compliance with all applicable provisions of the rule within twelve months of rule adoption.

(c) Demonstrate final compliance with all applicable standards and requirements of the rule within six months of the installation of the NO_x reduction technology.

(2) The owner/operator of any new Stationary Gas Turbine subject to the provisions of Section (C) shall comply as of the date of adoption of this rule.

[SIP: Submitted as amended 01/19/10 on mm/dd/yy; Submitted as amended 4/11/97 on 8/1/97; Approved _____, _____, 40 CFR 52.220(c)(230)(i)(B)(1)]

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