

SAN DIEGO AIR POLLUTION CONTROL DISTRICT

PROPOSED AMENDED RULE 69.3.1

Proposed amended Rule 69.3.1 to read as follows:

RULE 69.3.1. STATIONARY GAS TURBINE ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY

(Adopted and Effective 12/16/98; Rev. Effective (date of adoption))

(a) APPLICABILITY

Except as provided in Subsection (b)(1), this This rule shall apply to any existing stationary gas turbine engine with a power rating of 1.0 megawatt (MW) or greater, or to any new stationary gas turbine engine with a power rating of 0.3 MW or greater. Any unit subject to Section (d) of this rule shall not be subject to Rule 68.

(b) EXEMPTIONS

(1) The provisions of this rule shall not apply to the following:

(i) Any gas turbine engine when operated exclusively for the research, development or testing of gas turbine engines or their components.

(ii) Any portable gas turbine engine. It is the responsibility of any person claiming this exemption to maintain records indicating the dates that such gas turbine engine was located at each stationary source. These records shall be maintained for a minimum of two calendar years by the owner or operator of such gas turbine engine and made available to the District upon request.

(iii) Any stationary gas turbine engine with a power rating less than or equal to 0.4 MW used in conjunction with military tactical support equipment operated at military sites, provided that operations do not exceed 1,000 hours per calendar year. It is the responsibility of any person claiming this exemption to maintain records indicating the hours that such gas turbine engine was operated. These records shall be maintained for a minimum of two calendar years by the owner or operator of such gas turbine engine and made available to the District upon request.

(2) The provisions of Section (d) shall not apply to the following:

(i) Any emergency unit provided that operation for non-emergency purposes to ensure operability in the event of an emergency situation does not exceed 80 hours per calendar year. It is the responsibility of any person claiming this exemption to maintain records in accordance with Subsections (e)(5) and (e)(8) of this rule.

(ii) Any unit during startup, shutdown or a fuel change for a period not to exceed 120 ~~continuous~~ consecutive minutes except as provided for in Subsection (b)(3). ~~It is the responsibility of any person claiming this exemption to maintain records in accordance with Subsections (e)(4) and (e)(8) of this rule.~~ Nothing in this rule shall be construed to limit the actual time needed to conduct a startup, shutdown or fuel change.

(iii) For turbines equipped with dry low oxides of nitrogen (NOx) combustors, periods of operation at low load provided that:

(A) The aggregate time of such periods does not exceed 130 minutes in any calendar day,

(B) The aggregate of all such periods does not exceed 780 minutes in any calendar year, and

(C) The turbine is equipped with a continuous emission monitoring system (CEMS) or other monitoring system that monitors and records turbine fuel flow and gross electrical output in increments of one minute or less.

(3) The provisions of Section (d) shall not apply to any combined-cycle gas turbine engine during an extended startup for a period not to exceed 360 consecutive minutes.

(c) **DEFINITIONS**

For the purposes of this rule, the following definitions shall apply:

(1) **"Best Available Retrofit Control Technology (BARCT)"** means an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy and economic impacts by each class or category of source.

(2) **"Combined-Cycle Gas Turbine Engine"** means any stationary gas turbine engine which recovers heat from the gas turbine exhaust gases to generate steam that is used to create additional power output in a steam turbine.

(3) **"Dry Low NOx Combustor"** means any turbine combustor design which uses multiple staging, air/fuel premixing, or other modifications, in order to reduce NOx emissions to lower levels as compared to a conventional combustor.

(4) "**Electrical Grid Emergency**" means that the condition of the electrical grid as determined by the California Independent System Operator or a successor agency is, or will be, such that the reliability of the electrical grid is threatened. Electrical emergencies include, but are not limited to, Stage 1, Stage 2, or Stage 3 Emergency Notices; Transmission Emergency Notices; or System Emergencies declared by the California Independent System Operator that are applicable to San Diego County or the State as a whole. Restricted maintenance operation notices to facilities, power watches urging consumers to conserve electricity, alerts advising of marginal conditions the next day, and warnings advising of marginal conditions the next hour issued by the California Independent System Operator are not by themselves considered electrical emergencies.

(2)(5) **"Emergency Situation"** means any one of the following:

- (i) ~~An~~An unforeseen electrical power failure of the serving utility or of onsite electrical transmission equipment that is demonstrated by the owner or operator to the Air Pollution Control Officer's satisfaction to have been beyond the reasonable control of the owner or operator; or
- (ii) ~~An~~An unforeseen flood, or fire; ~~or life-threatening situation.~~
- (iii) A life-threatening situation.

Emergency situation shall not include operation of any unit for training purposes or other foreseeable event, or operation of any peaking unit for the purpose of supplying power for distribution to an electrical grid.

(3)(6) **"Emergency Unit"** means a stationary gas turbine engine used only in the event of an emergency situation. A peaking unit shall not be considered an emergency unit.

(4)(7) **"Existing" or "Existing Unit"** means any stationary gas turbine engine which was installed and operating in San Diego County on or before December 16, 1998.

(8) "**Extended startup**" means the startup of a combined-cycle gas turbine engine when, as determined by the Air Pollution Control Officer, key operational parameters, such as the steam turbine reheat bowl temperature, indicate that more than 120 consecutive minutes are needed to meet the emission limits of Section (d).

(5)(9) **"Fuel Change"** means the transitory operating period when a switch occurs between liquid or gaseous fuels, or any combination thereof.

(6)(10) **"Gaseous Fuel"** means natural gas, digester gas, landfill gas, methane, ethane, propane, butane, or any gas stored as a liquid at high pressure such as liquefied petroleum gas.

(7)(11) **"Higher Heating Value (HHV)"** means the total heat liberated, including the heat of condensation of water, per mass of fuel burned (Btu per pound) when fuel and dry air at standard conditions undergo complete combustion and all resultant products are brought to standard conditions.

(8)(12) **"Liquid Fuel"** means any fuel which is a liquid at standard conditions including but not limited to distillate oils, kerosene and jet fuel. Liquefied gaseous fuels are not liquid fuels.

(9)(13) **"Lower Heating Value (LHV)"** means the total heat liberated, excluding the heat of condensation of water, per mass of fuel burned (Btu per pound) when fuel and dry air at standard conditions undergo complete combustion and all resultant products are brought to standard conditions.

(10)(14) **"Manufacturer's Rated Thermal Efficiency (MRTE)"** means the manufacturer's continuous rated percent thermal efficiency of the gas turbine engine, including the effect of any ~~equipped with~~ air pollution control equipment if such equipment is installed, at peak load, after correction to lower heating value.

(11)(15) **"Military Tactical Support Equipment"** means any equipment owned by the U.S. Department of Defense or the National Guard and used in combat, combat support, combat service support, tactical or relief operations, or training for such operations.

(12)(16) **"New" or "New Unit"** means a stationary gas turbine engine installed in San Diego County after December 16, 1998.

(13)(17) **"Peaking Unit"** means a stationary gas turbine engine that is operated intermittently for generation of electric power during periods of high energy demand.

(18) **"Period of Operation at Low Load"** means a period of time that begins when the gas turbine power level is reduced from a higher level to below a critical level, as determined by the Air Pollution Control Officer, such that the gas turbine is unable to comply with the standards of Section (d), and ends 10 minutes after the turbine power level next exceeds the critical level provided that fuel is continuously combusted during the entire period. No period of operation at low load shall begin during a period when the

provisions of Section (d) do not apply pursuant to Subsection (b)(2)(ii), or Subsection (b)(3).

~~(14)~~(19) **"Portable Gas Turbine Engine"** means a gas turbine engine which meets the definition of a portable emission unit in Rule 20.1.

~~(15)~~(20) **"Power Augmentation"** means an increase in the gas turbine engine shaft output, or a decrease in turbine fuel consumption, by the addition of energy recovered from exhaust heat.

~~(16)~~(21) **"Power Rating"** means the maximum, continuous, gross power output of a unit, in megawatts (MW) or equivalent at ISO standard day conditions, as certified by the manufacturer unless limited by a condition in a District Authority to Construct or a Permit to Operate. Power augmentation shall not be included in power rating.

~~(17)~~(22) **"Selective Catalytic Reduction (SCR)"** means a post-combustion control technology that utilizes a reducing agent, such as ammonia, injected into the exhaust gas stream where it converts ~~oxides of nitrogen (NO_x)~~ to molecular nitrogen in the presence of a catalyst.

~~(18)~~(23) **"Shutdown"** means an action necessary to cease operation of a unit and includes the amount of time needed to safely do so. For gas turbines equipped with a continuous emission monitoring system (CEMS) or other continuous monitoring system that monitors and records fuel flow in increments of one minute or less, a shutdown period ends five minutes after fuel flow to the unit ceases.

~~(19)~~(24) **"Stationary Gas Turbine Engine"** means any gas turbine engine system, with or without power augmentation, which is permanently attached to a foundation, or is not a portable gas turbine. Two or more gas turbines powering a common shaft shall be treated as one gas turbine.

~~(20)~~(25) **"Stationary Source"** means the same as defined in Rule 2.

~~(21)~~(26) **"Startup"** means an action necessary to begin operation of a unit and includes the amount of time needed for a unit and ancillary equipment to achieve stable operation. For gas turbines equipped with a CEMS or other continuous monitoring system that monitors and records fuel flow in increments of one minute or less, a startup period begins when fuel starts flowing to the gas turbine engine.

~~(22)~~(27) **"Unit"** means any stationary gas turbine engine.

(23)(28) “Unit Thermal Efficiency (E)” means the percent thermal efficiency of the gas turbine engine and is calculated as follows:

$$E = \frac{(\text{MRTE}) (\text{LHV})}{(\text{HHV})}$$

A gas turbine engine with an efficiency lower than 25 percent shall be assigned a unit efficiency of 25 percent.

(d) STANDARDS

(1) Except as provided for in Section (b) and Subsection (d)(2), the emissions concentration in parts per million by volume (ppmv) of ~~nitrogen oxides (NOx)~~ from any unit subject to this rule, calculated as nitrogen dioxide at 15% oxygen on a dry basis, shall not exceed the following:

<u>Power Rating (Gross Megawatts)</u>	<u>NOx Emissions Concentration (ppmv @ 15% O₂)</u>	
	<u>Gaseous Fuel</u>	<u>Liquid Fuel</u>
≥0.3 and <2.9 (new units)	42	65
≥1.0 and <2.9 (existing units)	42	65
≥2.9 and <10.0	25 x E/25	65
≥10.0 without <u>installed</u> post-combustion <u>air pollution control equipment</u>	15 x E/25	42 x E/25
≥10.0 with <u>installed</u> post-combustion <u>air pollution control equipment</u>	9 x E/25	25 x E/25

(2) The emissions concentration in parts per million by volume (ppmv) of ~~nitrogen oxides (NOx)~~ from any unit subject to this rule and described below, calculated as nitrogen dioxide at 15% oxygen on a dry basis, shall not exceed the following:

<u>Unit Description</u>	<u>NOx Emissions Concentration (ppmv @ 15% O₂)</u>	
	<u>Gaseous Fuel</u>	<u>Liquid Fuel</u>
Peaking units ≥4 MW, and operating less than 877 hours per calendar year <u>and installed on or before (date of adoption).</u>	42	65
Units <4 MW and operating less than 877 hours per calendar year	42	65

(3) A person shall not operate a gas turbine engine used to generate electricity that does not comply with Subsection (d)(1) on or after July 1, 2010, unless:

(i) The Air Pollution Control Officer has determined that an exceedance of the State one-hour ambient air quality standard for ozone is not predicted at any location in the air basin at any time during the calendar day on which the gas turbine operates; or

(ii) The California Independent System Operator or a successor agency has declared an electrical grid emergency during the calendar day on which the gas turbine operates.

(e) MONITORING AND RECORDKEEPING REQUIREMENTS

(1) An owner or operator of a unit which is subject to the requirements of Section (d) shall install, calibrate and maintain continuous monitors in accordance with the manufacturer's recommended procedures to monitor and record the operational characteristics of the unit and of any NOx emissions reduction system, as applicable, to demonstrate continuous compliance, such as:

- (i) ~~exhaust gas~~fuel flow rate;
- (ii) exhaust gas temperature;
- (iii) ammonia injection rate;
- (iv) water injection rate; ~~and~~
- (v) stack-gas oxygen content;
- (vi) inlet or outlet SCR catalyst temperature; and
- (vii) operational parameters defining an extended startup.

The Air Pollution Control Officer may require recording of one or more of the above parameters, or other parameters, as necessary to ensure compliance.

(2) An owner or operator of any unit with a power rating of 10 MW or more that operates more than 4,000 hours per calendar year shall install and operate a ~~continuous~~

~~emission monitoring system (CEMS)~~ to measure and record NOx emissions. The CEMS shall be certified, calibrated and maintained in accordance with all applicable federal regulations including the requirements of Sections 60.7(c), 60.7(d), and 60.13 of Title 40, Code of Federal Regulations, Part 60 (40 CFR Part 60), performance specifications of Appendix B of 40 CFR Part 60, quality assurance procedures of Appendix F of 40 CFR Part 60, and a protocol approved in writing by the Air Pollution Control Officer.

(3) An owner or operator of any unit with a ~~continuous emission monitoring system~~ CEMS which has been installed to ~~measure~~ monitor and record NOx emissions pursuant to any federal regulation shall certify, calibrate and maintain the CEMS in accordance with applicable federal regulations including the requirements of Sections 60.7(c), 60.7(d), and 60.13 of Title 40, Code of Federal Regulations Part 60 (40 CFR Part 60), performance specifications of Appendix B of 40 CFR Part 60, quality assurance procedures of Appendix F of 40 CFR Part 60, and a protocol approved in writing by the Air Pollution Control Officer.

(4) An owner or operator of any unit subject to this rule shall maintain, as applicable for the type of unit, an operating log and records of dates and times of operation, actual times and duration of all startups, shutdowns, periods of operation at low load, and fuel changes, and records of the type and quantity of each fuel used during each calendar year.

(5) An owner or operator of an emergency unit shall maintain ~~an operating log and records of dates and times of operation, including the hours of operation~~ operating hours for non-emergency purposes and during each emergency situation. At a minimum, these records shall include the dates and ~~actual times and duration~~ of all startups and shutdowns, total cumulative ~~annual~~ hours of operation for non-emergency purposes during each calendar year, and a description of each emergency situation.

(6) An owner or operator of a peaking unit shall maintain ~~an operating log and records of dates and times of operation,~~ the hours of operation ~~each day during periods of high energy demand,~~ and the total cumulative hours of operation during each calendar year. The records of dates of operation shall also indicate if the peaking unit operated during a non-exceedance day of the State one-hour ozone standard or day declared an electrical emergency pursuant to Subsection (d)(3)(i) or Subsection (d)(3)(ii).

(7) An owner or operator of any unit ~~with a power rating less than 4 MW and~~ operating less than 877 hours per calendar year and subject to Subsection (d)(2) shall ~~maintain an operating log and~~ records of the total cumulative hours of operation during each calendar year.

(8) An owner or operator of any unit subject to this rule shall maintain all records required by Section (e) and records of all source tests required by Subsection (g)(2) or Subsection(g)(3) for a minimum of two calendar years. These records shall be maintained on the premises and made available to the District upon request. Records for facilities that are unmanned may be kept at an alternative location approved in writing by the Air Pollution Control Officer.

(9) An owner or operator of any peaking unit subject to Subsection (d)(2) or emergency unit subject to Subsection (b)(2)(i) shall install a non-resettable meter that measures elapsed operating time if deemed necessary by the Air Pollution Control Officer.

(f) TEST METHODS

(1) To determine compliance with Section (d), measurement of ~~oxides of nitrogen~~NO_x and stack-gas oxygen content shall be conducted in accordance with the U.S. Environmental Protection Agency (EPA) Method 7E and 3A, or District Source Test Method 100,~~or the Air Resources Board (ARB) Test Method 100~~ as approved by the EPA ~~U.S. Environmental Protection Agency (EPA).~~

(2) The higher heating value and lower heating value of a fuel shall be determined by the following methods or their most current versions and can be provided by a fuel supplier:

- (i) ASTM Test Method D240-~~92~~02 or D2382-~~88~~4809-06 for liquid fuels, and
- (ii) ASTM Test Method D1826-94(2003), or D1945-~~96~~03, in conjunction with ASTM Test Method D3588-94(2003) for gaseous fuels.

(g) SOURCE TEST REQUIREMENTS AND COMPLIANCE DETERMINATION

(1) Any required source testing shall be performed at no less than 80% of the power rating. If an owner or operator of a gas turbine engine demonstrates to the satisfaction of the Air Pollution Control Officer that the turbine cannot operate at these conditions, then emissions source testing shall be performed at the highest achievable continuous power rating.

(2) Except as specified in Subsection (g)(3), a A-unit subject to the requirements of Section (d) shall be tested for compliance at least once annually in the 12 month period before ending on the last day of the Permit to Operate-renewal expiration month-date, unless otherwise more frequent testing is specified in writing by the Air Pollution Control Officer. Testing shall be conducted in accordance with Section (f) and a source test protocol approved in writing by the Air Pollution Control Officer.

(3) Unless more frequent testing is specified in writing by the Air Pollution Control Officer, a unit equipped with a continuous emission monitoring system (CEMS), and subject to the requirements of Section (d), and subject to the provisions of the federal Acid Rain Program, Title 40, Code of Federal Regulations, Section 72.6 of 40 CFR Part 72, shall be tested for compliance at a frequency in accordance with 40 CFR Part 75 Appendix B Section 2.3.1 and Section 2.3.3.

(4) All testing shall be conducted in accordance with the requirements of Section (f) and a source test protocol approved in writing by the Air Pollution Control Officer.

~~(3)~~(5) Test reports shall include the operational characteristics, as described in Subsection (e)(1), of the unit and of all add-on NOx control systems.

~~(4)~~(6) For the purposes of a compliance determination based on source testing, the NOx emissions concentration shall be calculated as an average of three subtests.

~~(5)~~(7) For the purposes of a compliance determination based on CEMS data, the averaging period to calculate NOx emissions concentration shall be one clock hour. For

the purposes of compliance determination, the clock hour average NOx emissions concentration shall not include the data during periods of startup, shutdown, fuel change, and operation at low load.

(8) Notwithstanding provisions of this Section (g), the Air Pollution Control Officer may require source testing to determine compliance with these Rules and Regulations or to determine emissions.

(h) COMPLIANCE SCHEDULE

~~(3)~~(1) An owner or operator of a new or replacement unit shall comply with all applicable provisions of this rule upon initial installation and commencement of operation.

~~(1) An owner or operator of an existing unit requiring modification, replacement or installation of air pollution control equipment pursuant to Section (d) requirements shall meet the following increments of progress:~~

~~(i) By December 16, 1999 submit an application to the Air Pollution Control Officer for an Authority to Construct and Permit to Operate the modified or replacement air pollution control equipment necessary to meet the emission standards of Section (d) of this rule.~~

~~(ii) By December 16, 2000 demonstrate compliance with the emission standards specified in Section (d) and all other applicable provisions of this rule.~~

~~(2) By June 16, 1999 an owner or operator of an existing unit not requiring modification, replacement or installation of additional air pollution control equipment pursuant to Section (d) shall submit an application to modify conditions on the Permit to Operate as necessary to comply with the applicable requirements of Sections (d) and (e).~~