

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

(Adopted and Effective 12/16/98; Rev. Effective 2/24/10)

**(a) APPLICABILITY**

Except as provided in Subsection (b)(1), 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 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.

(3) The provisions of Subsections (d)(1) and (d)(2) shall not apply to the following:

(i) Any unit during startup, shutdown or a fuel change for a period not to exceed 120 consecutive minutes except as provided for in Subsection (b)(4). Nothing in this rule shall be construed to limit the actual time needed to conduct a startup, shutdown or fuel change.

(ii) For turbines equipped with lean premix 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.

(4) The provisions of Subsections (d)(1) and (d)(2) shall not apply to any combined-cycle gas turbine engine during an extended startup for a period not to exceed 360 consecutive minutes.

(5) The provisions of Subsection (d)(3) shall not apply on any calendar day for which the California Independent System Operator (CAISO), or its successor has declared a System Emergency or on any calendar day during which the local serving utility's transmission operations department is unable to contact the CAISO and has declared the need for operation of one or more emission units to protect transmission system reliability.

(6) The provisions of Subsection (d)(3)(i) and (d)(3)(ii) shall not apply when burning liquid fuel is required due to a force majeure natural gas curtailment.

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

(i) An 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 unforeseen flood or fire; or

- (iii) A life-threatening situation.

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

(4) **"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.

(5) **"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.

(6) **"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).

(7) **"Force Majeure Natural Gas Curtailment"** means an interruption in natural gas service such that the daily fuel needs of a gas turbine engine subject to this rule cannot be met with the natural gas available due to:

(i) Unforeseeable natural disaster or other cause resulting in the failure or malfunction of natural gas supply, delivery or storage system facilities, not resulting from an intentional or negligent act or omission on the part of an owner or operator of a unit, or

(ii) A supply restriction resulting from a California Public Utilities Commission priority allocation ruling, or

(iii) Delivery restrictions due to pipeline capacity limitations of the natural gas supplier or upstream transports or within a gas utility's delivery system.

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

(9) **"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.

(10) **"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.

(11) **"Lean Premix Combustor"** means any turbine combustor design where the air and majority of the fuel are thoroughly mixed to form a lean mixture before combustion under normal operational conditions, as determined by the Air Pollution Control Officer. Mixing may occur before or in the combustion chamber. A lean premix combustor may operate in a non-lean-premix mode (diffusion flame mode) during operating conditions such as startup and shutdown, extreme ambient temperature, or low or transient load.

(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.

(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.

(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 air pollution control equipment if such equipment is installed, at peak load, after correction to lower heating value.

(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.

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

(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)(3)(i), or Subsection (b)(4).

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

(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.

(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.

(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 NOx to molecular nitrogen in the presence of a catalyst.

(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.

(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.

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

(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.

(27) **"System Emergency"** means that the condition of the electrical grid as determined by the California Independent System Operator (CAISO) or its successor agency is, or will be, such that the reliability of the electrical grid is threatened. System emergencies include, but are not limited to, Stage 1, Stage 2, or Stage 3 Emergencies or Transmission Emergency Notices issued by the CAISO that are applicable to a portion of the CAISO controlled grid that includes all or part of San Diego County or the CAISO controlled grid as a whole. System Emergency also includes the unscheduled loss of generation or transmission resources such that the reliability of the electrical grid is threatened. 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 CAISO are not by themselves considered electrical emergencies.

(28) **"Under the Same Common Ownership"** means units in San Diego County that are owned or operated by the same person including all units that are owned or operated by another entity in which the person has a controlling interest.

(29) **"Unit"** means any stationary gas turbine engine.

(30) “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 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</u>	
	<u>(ppmv @ 15% O<sub>2</sub>)</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 installed post-combustion air pollution control equipment	15 x E/25	42 x E/25
≥10.0 with installed post-combustion air pollution control equipment	9 x E/25	25 x E/25

(2) The emissions concentration in parts per million by volume (ppmv) of 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</u>	
	<u>(ppmv @ 15% O<sub>2</sub>)</u>	
	<u>Gaseous Fuel</u>	<u>Liquid Fuel</u>
Peaking units ≥4 MW and operating less than 877 hours per calendar year and installed on or before December 16, 1998.	42	65
Units <4 MW and operating less than 877 hours per calendar year	42	65

(3) Notwithstanding Subsection (d)(2), on or after January 1, 2012, a person shall not operate a peaking unit with a power rating greater than or equal to 4 megawatts that was installed on or before December 16, 1998, and that does not comply with the emissions concentration limits specified in Subsection (d)(1), as determined by the most recent source

test pursuant to Subsection (g) as approved by the Air Pollution Control Officer, on any calendar day that the Air Pollution Control Officer has predicted an exceedance of the federal eight-hour ambient air quality standard for ozone, unless the following standards are complied with:

(i) For each peaking unit permitted to operate on natural gas and liquid fuel before December 16, 1998, and not complying with Subsection (d)(1), the gas turbine engine shall operate on natural gas only.

(ii) For each peaking unit permitted to operate on natural gas and liquid fuel before December 16, 1998, and not complying with Subsection (d)(1), the aggregate emissions of NO<sub>x</sub> per calendar day, as expressed as nitrogen dioxide, from all such units combined that are under the same common ownership shall not exceed the following aggregate calendar-day NO<sub>x</sub> emission limits expressed in pounds, as applicable:

(A) From January 1, 2012 through December 31, 2014, the limit, expressed in pounds, shall be equal to 1.2652 multiplied by the sum of the rated heat inputs, expressed in MMBtu per hour, of all such turbines under the same common ownership.

(B) On and after January 1, 2015, the limit, expressed in pounds, shall be equal to 0.8594 multiplied by the sum of the rated hourly heat inputs, expressed in MMBtu per hour, of all such turbines under the same common ownership.

In calculating the aggregate calendar-day emission limit, the rated heat input for each unit shall be the unit's heat input as described on the applicable District Permit to Operate as it exists on February 24, 2010.

(iii) For the gas turbine engine permitted to operate on liquid fuel only before December 16, 1998, and not complying with Subsection (d)(1), the aggregate emissions of NO<sub>x</sub>, as expressed as nitrogen dioxide, from all such units combined that are under the same common ownership shall not exceed the following aggregate calendar-day NO<sub>x</sub> emission limits, as applicable:

(A) From January 1, 2012, through December 31, 2014, 550 pounds during each calendar day.

(B) On and after January 1, 2015, 430 pounds during each calendar day.

(4) For purposes of Subsection (d)(3), an exceedance of the federal 8-hour ozone standard on a calendar day shall be considered to have been predicted if the Air Pollution Control Officer makes such a prediction that is applicable to any location at any time in the San Diego air basin and makes the prediction publicly available no earlier than three calendar days before the day for which the prediction is made and no later than 5:30 PM of the day immediately preceding the day for which the prediction is made.

(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 NO<sub>x</sub> emissions reduction system, as applicable, to demonstrate continuous compliance, such as:

- (i) fuel flow rate;
- (ii) exhaust gas temperature;
- (iii) ammonia injection rate;
- (iv) water injection rate;
- (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 CEMS to measure and record NO<sub>x</sub> emissions. The CEMS shall be certified, calibrated and maintained in accordance with all applicable federal regulations including, but not limited to, 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, Sections 75.10 and 75.12 of 40 CFR Part 75, the specifications and test procedures of Appendix A of 40 CFR Part 75, the quality assurance and quality control procedures of Appendix B of 40 CFR Part 75, and a protocol approved in writing by the Air Pollution Control Officer.

(3) An owner or operator of any unit with a CEMS which has been installed to monitor and record NO<sub>x</sub> 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, records of dates and times of operation, times of all startups, shutdowns, periods of operation at low load, fuel changes and records of the type and quantity of each fuel used during each calendar day and calendar year.

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

(7) An owner or operator of any unit operating less than 877 hours per calendar year and subject to Subsection (d)(2) shall maintain 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) shall install and maintain a non-resettable meter that measures elapsed operating time if deemed necessary by the Air Pollution Control Officer.

(10) The owner or operator of any unit or units subject to Subsection (d)(3) shall maintain following records:

(i) Records of calendar-day aggregate NO<sub>x</sub> mass emissions for all such units combined under the same common ownership;

(ii) For each unit, calendar-day records of the applicable operational parameter(s) that are used to calculate the aggregate NO<sub>x</sub> mass emissions for that unit.

The recorded calendar-day NO<sub>x</sub> mass emissions shall be based on each individual unit's most recent source test results and a suitable operational parameter(s) and calculated in accordance with a protocol approved in writing by the Air Pollution Control Officer. Any such protocol shall rely on existing recordkeeping and monitoring to the extent feasible and may provide for calculation of NO<sub>x</sub> mass emissions for a group of emission units based

on an average emission factor for the group units and an operational parameter(s) applicable to the group as a whole in order to minimize additional monitoring or recordkeeping.

In lieu of calculating and recording aggregate NO<sub>x</sub> mass emissions for each calendar day pursuant to Subsection (e)(10)(i), the owner or operator may, with the advanced written approval of the Air Pollution Control Officer, maintain records of a suitable surrogate parameter for aggregate NO<sub>x</sub> mass emissions on some or all calendar days provided that the Air Pollution Control Officer determines that the surrogate parameter is adequate to determine compliance with Subsection (d)(3). In this event, the final determination of compliance for a calendar day shall be based on mass emissions calculated pursuant to the approved protocol and the records maintained pursuant to Subsection (e)(10)(ii).

(11) For peaking units subject to Subsection (d)(3), the owner or operator shall maintain records that indicate if a day on which the peaking unit operates is a day that the Air Pollution Control Officer had predicted an exceedance of the federal eight-hour ozone standard and, if an exceedance of the federal eight-hour ozone standard was predicted, if a System Emergency as specified in Subsection (b)(5) was declared.

(12) An owner or operator of any unit subject to Subsection (d)(3)(i) shall maintain records of dates and times liquid fuel is used as a result of a force majeure natural gas curtailment.

**(f) TEST METHODS**

(1) To determine compliance with Section (d), measurement of NO<sub>x</sub> 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 as approved by the 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 D240-09 or D4809-09 for liquid fuels, and

(ii) ASTM Test Method D1826-94(2003), or D1945-03, in conjunction with ASTM Test Method D3588-98(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 unit subject to the requirements of Section (d) shall be tested for compliance at least once annually in the twelve-calendar-month period ending on the last day of the Permit to Operate expiration month, unless more frequent testing is specified 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), subject to the requirements of Section (d), and subject to the provisions of the federal Acid Rain Program pursuant to 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.

(5) Test reports shall include the operational characteristics, as described in Subsection (e)(1), of the unit and of all add-on NO<sub>x</sub> control systems.

(6) For the purposes of a compliance determination based on source testing, the NO<sub>x</sub> emissions concentration shall be calculated as an average of three subtests.

(7) For the purposes of a compliance determination based on CEMS data, the averaging period to calculate NO<sub>x</sub> emissions concentration shall be one clock hour. For the purposes of compliance determination, the clock hour average NO<sub>x</sub> 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 at any time.

**(h) COMPLIANCE SCHEDULE**

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.