# RULE 4703 STATIONARY GAS TURBINES

*(Adopted August 18, 1994)(Amended March 16, 1995; February 15, 1996; October 16, 1997; April 25, 2002; August 17, 2006; September 20, 2007)*

## 1.0 Purpose

The purpose of this rule is to limit oxides of nitrogen (NOx) emissions from stationary gas turbine systems.

## 2.0 Applicability

The provisions of this rule apply to all stationary gas turbine systems, which are subject to District permitting requirements, and with ratings equal to or greater than 0.3 megawatt (MW) or a maximum heat input rating of more than 3,000,000 Btu per hour, except as provided in Section 4.0.

## 3.0 Definitions

3.1 Auxiliary Burner: any fuel burning device that increases the heat content of exhaust gas from a gas turbine. Duct burners, fired waste heat boilers, and fired heat recovery steam generators are considered auxiliary burners.

3.2 Bypass Transition Period: the duration of time that a gas turbine's operation transitions between the heat recovery steam generator and bypass exhaust stacks, provided all of the following conditions are met:

3.2.1 The selective catalytic reduction catalyst is not within the required temperature range or the required ammonia saturation level has not yet been achieved.

3.2.2 The duration of a bypass transition period shall not exceed two hours.

3.2.3 NOx emissions shall not exceed 15 ppmvd, corrected to 15% $O_2$, averaged over two (2) hours.

3.2.4 The applicable CO Compliance Limits in Section 5.0 shall not be exceeded.

3.3 Combined Cycle unit: any stationary gas turbine which recovers heat from the gas turbine exhaust gases to heat water, generate steam, or preheat the inlet combustion air to the gas turbine.

3.4 Commercially Available: any control technology or equipment which is offered by at least one vendor and guaranteed by the vendor to achieve the required emission control performance for a regular or full-scale operation within the United States.

3.5 Compliance Limit: maximum allowable oxides of nitrogen (NOx) or carbon monoxide (CO) emission levels.

3.6 Control System Operating Parameters: operating parameters that the APCO deems necessary to analyze when determining compliance, such as ammonia and exhaust gas flow rates and exhaust gas temperature for selective catalytic reduction; or humidity, water injection rate, exhaust gas flow rate and temperature for water injection.

3.7 Dry Low-NOx Combustion Technology (DLN): any turbine combustor design which uses multiple staging, air/fuel premixing or other modifications to achieve lower levels of NOx emissions as compared to conventional combustors.

3.8 Emergency Standby Unit: a stationary gas turbine system that is limited by permit condition to be operated only as a mechanical or electrical power source for a facility when the primary power source for a facility has been rendered inoperable due to failure beyond the reasonable control of the operator, except due to power interruption pursuant to an interruptible power supply agreement. Electricity generated by such a unit cannot be sold.

3.9 Gas Turbine: an internal combustion engine consisting of a compressor, a combustor, and a power turbine, that is gas and/or liquid fueled, with or without power augmentation. Two or more gas turbines powering one shaft shall be treated as one gas turbine.

3.10 Gas Fuel: any of the following fuels or fuels containing any of the following fuels: natural gas, LPG, propane, digester gas, and landfill gas.

3.11 HHV: higher heating value of fuel.

3.12 LHV: lower heating value of fuel.

3.13 Liquid Fuel: any of the following fuels: kerosene, jet fuel, and distillate fuel oils. Sulfur content of the fuel oil shall be less than 0.05 percent, by weight.

3.14 Major Overhaul: taking a stationary gas turbine out of service to replace or repair major components of the turbine. Major overhaul does not include taking a stationary gas turbine out of service exclusively to install emission control equipment.

3.15 Measured CO Emissions Concentration: measured carbon monoxide emissions corrected to 15 percent oxygen on a dry basis, ppm.

3.16 Measured NOx Emissions Concentration: measured oxides of nitrogen emissions corrected to 15 percent oxygen on a dry basis, ppm.

3.17 Non-Steady State Period: for a 3 MW to 10 MW pipeline gas turbine, any 15-minute period in which the fuel rate to the turbine differs from the reference fuel rate by more than +/- 3,000 standard cubic feet per 15-minute period. For this rule, a 15-minute Non-Steady State Period shall be zero (0) to 15 minutes after the hour, 15 to 30 minutes after the hour, 30 to 45 minutes after the hour, or 45 to 60 minutes after the hour.

3.18 Pipeline Gas Turbine: a simple cycle stationary gas turbine used to transport gases or liquids in a pipeline.

3.19 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.

3.20 Primary Re-ignition Period: the duration of time during which a gas turbine is operated at less than rated capacity in order to reset the DLN combustion system following a primary re-ignition, provided all of the following conditions are met:

3.20.1 The duration of a primary re-ignition period shall not exceed one hour.

3.20.2 NOx emissions shall not exceed 15 ppmvd, corrected at 15% $O_2$, averaged over one (1) hour.

3.20.3 CO emissions shall not exceed 25 ppmvd, corrected at 15% $O_2$.

3.21 Public Service Unit: a stationary gas turbine system used to generate electricity for sale or for use in serving the public.

3.22 Rating: the continuous megawatt (MW) rating or mechanical equivalent by a manufacturer for a gas turbine without power augmentation.

3.23 Reduced Load Period: the time during which a gas turbine is operated at less than rated capacity in order to change the position of the exhaust gas diverter gate, not to exceed one hour.

3.24 Reference Fuel Rate: the fuel rate, to a turbine, measured during the preceding 15-minute period.

3.25 SCR: selective catalytic reduction.

3.26 Shutdown: 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.

3.27 Simple Cycle unit: any stationary gas turbine which does not recover heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine, to heat water, or to generate steam.

3.28 Standard Conditions: defined in Rule 1020 (Definitions).

3.29 Start-up: 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.

3.30 Stationary Gas Turbine: a gas turbine that is attached to a foundation, or a portable gas turbine that is operated at a facility for more than 90 days in any 12-month period.

3.31 Stationary Gas Turbine System: a stationary gas turbine, or a stationary gas turbine and the associated auxiliary burner.

3.32 Steady State Period: for a 3 MW to 10 MW pipeline gas turbine, the period which commences after any two consecutive 15-minute periods in which the fuel rate to the turbine does not differ from the reference fuel rate by more than +/- 3,000 standard cubic feet per 15-minute period and ends when a non-steady state period begins.

3.33 Transitional Operation Period: any of the following periods: bypass transition period, primary re-ignition period, reduced load period, start-up or shutdown.

3.34 Unit: a stationary gas turbine system.

4.0 Exemptions

4.1 The provisions of this rule, with the exception of Section 6.1, shall not apply to stationary gas turbine systems operated under the following conditions:

4.1.1 Laboratory units used in research and testing for the advancement of gas turbine technology,

4.1.2 Units limited by permit condition to be operated exclusively for firefighting and/or flood control.

4.2 The provisions of this rule, with the exception of Section 6.1 and the record keeping provisions of Section 6.2, shall not apply to emergency standby units limited by permit condition to operate less than 100 hours per calendar year for maintenance and testing purposes.

## 5.0 Requirements

### 5.1 NOx Emissions

NOx emissions concentrations measured for compliance with Section 5.0 shall be averaged, using consecutive 15-minute sampling periods, over a three-hour period. NOx emissions concentrations shall be measured in accordance with the applicable test method in Section 6.4 or, if continuous emission monitors are used, all applicable requirements of 40 CFR Part 60 as detailed in Section 6.2. Any variations from these measurement requirements are subject to APCO and EPA approval prior to implementation.

#### 5.1.1 Tier 1 NOx Compliance Limits

The owner or operator of any stationary gas turbine system shall not operate such unit under load conditions, except as allowed by Section 5.3, which results in the measured emissions concentration exceeding the applicable emission limits below, according to the Tier 1 Compliance Schedules listed in Section 7.0.

Table 5-1: Tier 1 NOx Compliance Limits

| Stationary Gas Turbine Rating | Operating hours per year | NOx Compliance Limit, ppmv at 15% $O_2$ | |
|---|---|---|---|
| | | Gas | Oil |
| 4 MW and greater | < 877 | 42 | 65 |
| > 0.3 MW but < 10.0 MW | ≥ 877 | 42 | 65 |
| 10.0 MW and greater, without SCR | ≥ 877 | 15 x EFF/25 | 42 x EFF/25 |
| 10.0 MW and greater, with SCR | ≥ 877 | 9 x EFF/25 | 25 x EFF/25 |
| General Electric Frame 7 with Quiet Combustors | Not applicable | 18 x EFF/25 | 42 x EFF/25 |
| Solar Saturn 1100 horsepower gas turbine powering centrifugal compressor | Not applicable | 50 | 50 |

Where EFF (efficiency) is the higher of $EFF_1$ or $EFF_2$ below. An EFF that is less than 25 shall be assigned a value of 25.

$$EFF_1 = \frac{3412 \text{ Btu / kW - hr}}{\text{Actual Heat Rate at HHV (Btu / kW - hr)}} \times 100\%$$

$EFF_1$ is the demonstrated percent efficiency of the gas turbine only, as calculated without consideration of any downstream energy recovery from the actual heat rate (Btu/KW-hr); corrected to HHV and standard conditions, as measured at peak load for that facility.

$$EFF_2 = EFF_{mfr} \times \frac{LHV}{HHV}$$

$EFF_2$ is $EFF_{mfr}$ after correction from LHV to HHV at peak load for that facility. $EFF_{mfr}$ is the manufacturer's continuous rated percent efficiency of the gas turbine with air pollution control equipment at LHV.

5.1.2 Tier 2 NOx Compliance Limits

The owner or operator of any stationary gas turbine system shall not operate such unit under load conditions, except as allowed by Section 5.3, which results in the measured emissions concentration exceeding the applicable emission limits below, according to the Tier 2 Compliance Schedules listed in Section 7.2.

Table 5-2: Tier 2 NOx Compliance Limits

| Turbine Classification Rating | Compliance Option (see Section 7.2) | NOx Compliance Limit, ppmvd at 15% $O_2$ | |
|---|---|---|---|
| | | Gas Fuel | Liquid Fuel |
| a) Less than 2.0 MW Solar Saturn, driving a centrifugal compressor | Standard | 50 | 50 |
| b) No greater than 10 MW, if a DLN System is commercially available for the specific unit, as of April 30, 2003. | Standard | 25 | 65 |
| c) No greater than 10 MW, if a DLN System is not commercially available for the specific unit, as of April 30, 2003. | Standard | 35 | 65 |
| d) Greater than 10 MW, Combined cycle. | Standard | 5 | 25 |
| | Enhanced | 3 | 25 |
| e) Greater than 10 MW, Simple cycle, and permit condition for greater than 877 hrs/yr operation. | Standard | 5 | 25 |
| | Enhanced | 3 | 25 |
| f) Greater than 10 MW, Simple cycle, and permit condition for no greater than 877 hr/yr operation. | Standard | 25 | 42 |
| | Enhanced | 5 | 25 |

5.1.2.1 For units with a Standard Option and an Enhanced Option shown in Table 5-2, the operator shall choose which option will apply and shall demonstrate and maintain compliance with that NOx Compliance limit according to the applicable Tier 2 Compliance Schedule shown in Section 7.2. Units failing to demonstrate compliance with the applicable Standard Option limit by the applicable Standard Option Compliance Date, shall be required to meet the Enhanced Option Limit by the applicable Enhanced Option Compliance Date.

5.1.2.2 Any stationary gas turbine system equipped with a NOx emission control device which results in emission reductions of at least 95%, shall be considered to meet the Tier 2 NOx Compliance Limit. Percent emission reductions, if used to comply with Section 5.1.2, shall be calculated as follows:

5.1.2.2.1 For units with exhaust gas NOx control devices, percent reduction shall be calculated using emission samples taken at the inlet and outlet of the control device.

5.1.2.2.2 For units without exhaust gas NOx control devices and for units with an exhaust gas NOx control device in combination with a second emission control device or technique, percent reduction shall be based on source test results for the uncontrolled unit and the unit after the control device(s) or technique(s) has been employed. When representative source sampling prior to the application of an emissions control technology or technique is not available, the APCO may approve the use of manufacturer's uncontrolled emissions information or source sampling from a similar, uncontrolled unit.

5.1.3 Tier 3 NOx Compliance Limits

5.1.3.1 The owner or operator of any stationary gas turbine system listed in Table 5-3 shall not operate such unit under load conditions, except as allowed by Section 5.3, which results in the measured emissions concentration exceeding the applicable emission limits in Table 5-3, according to the Tier 3 Compliance Schedule listed in Section 7.3.

Table 5-3: Tier 3 NOx Compliance Limits

| Turbine Classification Rating | NOx Compliance Limit, ppmvd at 15% $O_2$ | |
|---|---|---|
| | Gas Fuel | Liquid Fuel |
| a) Less than 3 MW. | 9 | 25 |
| b) 3 MW to 10 MW pipeline gas turbine. | 8 during steady state and 12 during non-steady state | 25 |
| c) 3 MW to 10 MW and permit condition for less than 877 hrs/yr operation and not listed above. | 9 | 25 |
| d) 3 MW to 10 MW and permit condition for 877 hrs/yr operation or greater and not listed above. | 5 | 25 |
| e) Greater than 10 MW, Simple cycle, and permit condition for no greater than 200 hrs/yr operation, except as provided in Section 5.1.3.3. | 25 | 42 |
| f) Greater than 10 MW, Simple cycle, and permit condition for greater than 200 hrs/yr operation but no greater than 877 hrs/yr operation. | 5 | 25 |

5.1.3.2 Any stationary gas turbine system equipped with a NOx emission control device which results in emission reductions of at least 95%, shall be considered to meet the Tier 3 NOx Compliance Limit. Percent emission reductions, if used to comply with Section 5.1.3, shall be calculated as follows:

5.1.3.2.1 For units with exhaust gas NOx control devices, percent reduction shall be calculated using emission samples taken at the inlet and outlet of the control device.

5.1.3.2.2 For units without exhaust gas NOx control devices and for units with an exhaust gas NOx control device in combination with a second emission control device or

technique, percent reduction shall be based on source test results for the uncontrolled unit and the unit after the control device(s) or technique(s) has been employed. When representative source sampling prior to the application of an emissions control technology or technique is not available, the APCO may approve the use of manufacturer's uncontrolled emissions information or source sampling from a similar, uncontrolled unit.

5.1.3.3 Operators of turbines subject to the provisions of Table 5-3, subsection (e), shall also comply with the following provisions:

5.1.3.3.1 Units may be operated in response to a California Independent System Operator (ISO) - declared Stage One, Two, or Three Emergency, or a Transmission Emergency, or a Turlock Irrigation District (TID) - declared Alert Level One, Two, or Three Energy Emergency, provided the unit is located in the local area transmission system of the emergency. The operations for ISO - declared or TID - declared emergencies hours shall not count against the unit's 200 hrs/year operating limit.

5.1.3.3.2 On and after January 1, 2009, no later than April 1 each year, an operator, with a unit operating during an ISO - declared or TID - declared emergency in accordance with Section 5.1.3.3.1, shall pay a fee to the District. That fee will be calculated according to the following formula:

Fee = ISO or TID hrs/yr x EF x FR

Where:

ISO or TID = Total hours operated in response to an ISO - declared or TID - declared emergency, during the preceding calendar year.

EF = The unit's emission factor, which is equal to the permitted emission rate of NOx, in lb/hr, divided by 2,000 lb/ton.

FR = The fee rate, which shall be $75,000 per ton of NOx until December 31, 2014 and shall be $100,000 per ton of NOx, thereafter.

5.1.3.3.3 Except as provided in Section 6.5.2, in no event shall total operations, for any purpose, exceed 877 hours in any calendar year. Any operation of such units in excess of 877 hrs/year shall require the operator to comply with the emission limit of Table 5-2, subsection (e) – Standard Compliance Option, according to the compliance schedule in Section 6.5.1.

5.1.3.3.4 Any fees received by the District, pursuant to Section 5.1.3.3.2 shall be deposited into the District's account to fund air quality improvement projects.

5.2 CO Emissions

The owner or operator of any stationary gas turbine system shall not operate such unit under load conditions, except as allowed by Section 5.3, which results in the measured CO emissions concentration exceeding the compliance limits listed below:

Table 5-4 : CO Compliance Limits

| Stationary Gas Turbine | CO Compliance Limit, ppmv at 15% $O_2$ |
|---|---|
| Units not identified below | 200 |
| General Electric Frame 7 | 25 |
| General Electric Frame 7 with Quiet Combustors | 52 |
| Less than 2.0 MW Solar Saturn gas turbine powering centrifugal compressor | 250 |

5.3 Transitional Operation Periods

On and after the date a unit is required, pursuant to Section 7.0, to be in compliance with the emission limits requirements of Section 5.1 or Section 5.2, the applicable emission limits of Section 5.1 and Section 5.2 shall not apply during a transitional operation period, as defined in Section 3.0, provided an operator complies with the applicable requirements specified in Sections 5.3.1 and 5.3.2.

5.3.1 Except as provided in Section 5.3.3, the operator shall meet the following conditions:

5.3.1.1 The duration of each start-up or each shutdown shall not exceed two hours.

5.3.1.2 For each bypass transition period, the requirements specified in Section 3.2 shall be met.

5.3.1.3 For each primary re-ignition period, the requirements specified in Section 3.20 shall be met.

5.3.1.4 Each reduced load period shall not exceed one hour.

5.3.2 The emission control system shall be in operation and emissions shall be minimized insofar as technologically feasible during each transitional operation period.

5.3.3 Notwithstanding the requirement of Section 5.3.1, an operator may submit an application for a Permit to Operate condition to allow more than the duration of time specified in Section 5.3.1 for each transitional operation period provided the operator meets all of the conditions specified in Section 5.3.3.1 through Section 5.3.3.2.

5.3.3.1 The maximum allowable duration of a transitional operation period will be determined by the APCO, ARB, and EPA. An operator seeking approval pursuant to Section 5.3.3 shall submit a written request and supporting information to the APCO. The District shall evaluate the request and if approved by the APCO, the District shall provide EPA and ARB with a copy of the evaluation and shall request EPA and ARB approval. The District evaluation and the APCO request shall be deemed approved unless EPA or ARB objects to such approval in writing within 45 days of the receipt of the APCO request.

5.3.3.2 At a minimum, a justification for the increased duration shall include the following:

5.3.3.2.1 A clear identification of the control technologies or strategies to be utilized; and

5.3.3.2.2 A description of what physical conditions prevail during the period that prevent the controls from being effective; and

5.3.3.2.3 A reasonably precise estimate as to when the physical conditions will have reached a state that allows for the effective control of emissions; and

5.3.3.2.4 A detailed list of activities to be performed during the period and a reasonable explanation for the length of time needed to complete each activity; and

5.3.3.2.5 A description of the material process flow rates and system operating parameters, etc., the operator plans to evaluate during the process optimization; and an explanation of how the activities and process flow affect the operation of the emissions control equipment; and

5.3.3.2.6 The basis for the requested additional duration.

5.4 For existing facilities, a replacement unit installed for the sole purpose of complying with the requirements of this rule shall be considered to be an emission control technique and may be exempt from the Best Available Control Technology (BACT) and Offsets requirements of District Rule 2201 (New and Modified Stationary Source Review Rule) provided that all other requirements of Rule 2201 are met.

6.0 Administrative Requirements

6.1 Emission Control Plan

The owner or operator of any existing stationary gas turbine system, unless exempted in Section 6.1.5, shall submit, to the APCO for approval, an emissions control plan of all actions, including a schedule of increments of progress, which will be taken to comply with the requirements of the applicable NOx Compliance Limit in Section 5.0 and Compliance Schedule in Section 7.0.

6.1.1 Such plan shall contain a list that provides the following for each stationary gas turbine system:

6.1.1.1 Permit or identification number,
6.1.1.2 Name of gas turbine manufacturer,
6.1.1.3 Gas turbine model designation,
6.1.1.4 Rated shaft power output, (MW),
6.1.1.5 Name of auxiliary burner manufacturer,
6.1.1.6 Auxiliary burner model designation,
6.1.1.7 Rated heat input of the auxiliary burner, (MMBtu/hr)
6.1.1.8 Type of liquid fuel and/or type of gaseous fuel,
6.1.1.9 Fuel consumption (cubic feet of gas or gallons of liquid) of turbine and/or auxiliary burner,
6.1.1.10 Hours of operation in the previous one-year period,
6.1.1.11 Heat rate (Btu/KW-hr), corrected to HHV for each type of fueling (liquid/gas),

6.1.1.12 HHV for each fuel.

6.1.2 Such plan shall contain a list of all stationary gas turbine systems to be controlled, identifying the type of emission control to be applied to each unit, applicable emission standard from Section 5.0, and documentation showing current emissions of oxides of nitrogen.

6.1.3 Such plan shall contain support documentation for any systems exempt under the provisions of Section 4.0.

6.1.4 Such plan shall identify the applicable compliance schedule for each unit, as specified in Section 7.0. Each emission control plan for a unit subject to Section 7.2.2 or Section 7.3 shall include the owner/operator's overhaul schedule.

6.1.5 The owner or operator of any existing stationary gas turbine system shall be exempt from the requirements of Section 6.1 provided all such turbines under his ownership or control have NOx and CO emissions limits which are shown on the current Permit to Operate and which do not exceed the applicable Compliance Limits in Section 5.0.

6.2 Monitoring and Recordkeeping

The owner or operator of any stationary gas turbine system subject to the provisions of this rule shall perform the following actions:

6.2.1 Except for units subject to Section 6.2.3, for turbines with exhaust gas NOx control devices, the owner or operator shall either install, operate, and maintain continuous emissions monitoring equipment for NOx and oxygen, as identified in Rule 1080 (Stack Monitoring), or install and maintain APCO-approved alternate monitoring consisting of one or more of the following:

6.2.1.1 periodic NOx emission concentrations,
6.2.1.2 turbine exhaust oxygen concentration,
6.2.1.3 air-to-fuel ratio,
6.2.1.4 flow rate of reducing agents added to turbine exhaust,
6.2.1.5 catalyst inlet and exhaust temperature,
6.2.1.6 catalyst inlet and exhaust oxygen concentration,
6.2.1.7 other operational characteristics.

6.2.2 Except for units subject to Section 6.2.3, for turbines without exhaust-gas NOx control devices and without continuous emissions monitoring equipment, the owner or operator shall monitor operational characteristics recommended by the turbine manufacturer or emission control system supplier, and approved by the APCO.

6.2.3 For units 10 MW and greater that operated an average of more than 4,000 hours per year over the last three years before August 18, 1994, the owner or operator shall monitor the exhaust gas NOx emissions. The NOx monitoring system shall meet EPA requirements as specified in 40 CFR Part 60 App. B, Spec. 2, 40 CFR Part 60 App. F, and 40 CFR Part 60.7 (c), 60.7 (d), and 60.13, or other systems that are acceptable to the EPA. The owner or operator shall submit to the APCO information demonstrating that the emission monitoring system has data gathering and retrieval capability.

6.2.4 The owner or operator shall maintain all records for a period of five years from the date of data entry and shall make such records available to the APCO upon request.

6.2.5 The owner or operator shall submit to the APCO, before issuance of the Permit to Operate, information correlating the control system operating parameters to the associated measured NOx output. This information may be used by the APCO to determine compliance when there is no continuous emission monitoring system for NOx available or when the continuous emission monitoring system is not operating properly.

6.2.6 The owner or operator shall maintain a stationary gas turbine system operating log that includes, on a daily basis, the actual local start-up time and stop time, length and reason for reduced load periods, total hours of operation, type and quantity of fuel used (liquid/gas).

6.2.7 The owner or operator shall maintain a stationary gas turbine system operating log for units exempt under Section 4.2 that includes, on a daily basis, the actual local start-up time and stop time, total hours of operation, and cumulative hours of operation to date for the calendar year.

6.2.8 The operator performing start-up or shutdown of a unit shall keep records of the duration of start-up or shutdown.

6.2.9 On and after January 1, 2008, an operator of a unit subject to Section 5.1.3.3 shall also keep the following records:

6.2.9.1 A stationary gas turbine system operating log, which identifies the date, start time, and end time that the unit was operated pursuant to Section 5.1.3.3,

6.2.9.2 A copy of the ISO or TID emergency declaration for that operation and

6.2.9.3 A copy of the information used to determine the applicable Annual Emission Fee.

6.2.10 The operator of a unit subject to Section 6.5.2 shall identify in the stationary gas turbine system operating log the date and start time and end time that the unit was operated pursuant to Section 6.5.2 and keep a copy of the emergency declaration.

6.2.11 The operator of a unit shall keep records of the date, time and duration of each bypass transition period and each primary re-ignition period.

6.2.12 The operator of a unit subject to subsection (b) of Table 5-3 shall keep records of the date, time and duration of each steady state period and non-steady state period and the quantity of fuel used during each period.

6.3 Compliance Testing

6.3.1 The owner or operator of any stationary gas turbine systems subject to the provisions of Section 5.0 of this rule shall provide source test information annually regarding the exhaust gas NOx and CO concentrations, and, if used as a basis for Tier 1 emission limit calculations, the demonstrated percent efficiency (EFF) of the stationary gas turbine, or, for turbines complying with Section 5.1.2.2 or Section 5.1.3.2, the control efficiency of the emission control device.

6.3.2 The owner or operator of any stationary gas turbine system operating less than 877 hours per year shall provide source test information biennially regarding the exhaust gas NOx concentrations at standard conditions and if used as a basis for Tier 1 emission limit calculations, the percent efficiency (EFF) of the stationary gas turbine.

6.3.3 The owner or operator of any unit with an intermittently operated auxiliary burner shall demonstrate compliance with the auxiliary burner both on and off.

6.4 Test Methods

The following test measures shall be used unless otherwise approved by the APCO and EPA.

6.4.1 Oxides of nitrogen emissions for compliance tests shall be determined by using EPA Method 7E or EPA Method 20.

6.4.2 Carbon monoxide emissions for compliance tests shall be determined by using EPA Test Methods 10 or 10B.

6.4.3 Oxygen content of the exhaust gas shall be determined by using EPA Methods 3, 3A, or 20.

6.4.4 HHV and LHV of distillate fuels shall be determined by using:

6.4.4.1 ASTM D240-87, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, or

6.4.4.2 ASTM D2382-88, Standard Test Method for Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-precision Method).

6.4.5 HHV and LHV of gaseous fuels shall be determined by using:

6.4.5.1 ASTM D3588-91, Standard Practice for Calculating Heat Value, Compressibility Factor, and Relative Density (Specific Gravity) of Gaseous Fuels, or

6.4.5.2 ASTM 1826-88, Standard Test Method for Calorific (Heating) Value of Gases in Natural Gas Range by Continuous Recording Calorimeter, or

6.4.5.3 ASTM 1945-81, Standard Method for Analysis of Natural Gas by Gas Chromatography.

6.4.6 Demonstrated percent efficiency of the stationary gas turbine shall be determined using the facility instrumentation for gas turbine fuel consumption and power output. Power output values used to determine gas turbine efficiency shall be either:

6.4.6.1 the electrical power output of the gas turbine, provided the gas turbine generates electricity; or

6.4.6.2 the mechanical power output of the gas turbine, provided the gas turbine does not generate electricity.

6.5 Exempt and Emergency Standby Units

6.5.1 The owner or operator of any unit with an hour-per-year operation limit pursuant to Sections 4.2 or 5.0 must notify the APCO within seven days if the hour-per-year limit is exceeded. Except as provided in Section 6.5.2, if the hour per-year-limit is exceeded, the exemption shall be permanently withdrawn. Within 30 days after the exceedance, the owner or operator must submit a permit application detailing a plan to meet the appropriate compliance limit within 24 months. Included in this permit application, the owner or operator must submit an emission control plan including a schedule of increments of progress for the installation of the required control equipment. This schedule shall be subject to the review and approval of the APCO.

6.5.2 A public service unit operating during a state of emergency, when such emergency is declared by proclamation of the Governor and when the unit is located in the specific geographic location identified in the proclamation, shall be excluded from loss of exemption due to exceeding the hour-per-year limit for the operation during the state of emergency. If the unit exceeds the hour-per-year limit based solely on operation outside of the state of emergency, then loss of exemption shall apply according to Section 6.5.1.

## 7.0 Compliance Schedule

### 7.1 Tier 1 Compliance Schedule

All owner/operators shall be in compliance with the applicable provisions of Sections 5.0 and 6.0 on and after August 18, 2000.

### 7.2 Tier 2 Compliance Schedule

Owners or operators of all applicable stationary gas turbine systems shall submit the emission control plan required by Section 6.1 to the District by April 30, 2003. All owner/operators shall demonstrate and maintain compliance with the applicable provisions of Sections 5.0 and 6.0 in accordance with the following Compliance Schedules:

7.2.1 Operators complying with the Standard Option of Table 5-2 shall demonstrate and maintain compliance by the applicable Compliance Date:

Table 7-1: Tier 2 Standard Option Compliance Schedule

| Turbine Classification Rating | Compliance Date |
|---|---|
| a) Less than 2.0 MW Solar Saturn, driving a centrifugal compressor | April 25, 2002 |
| b) No greater than 10 MW, if a DLN System is commercially available for the specific unit, as of April 30, 2003. | April 30, 2004 |
| c) No greater than 10 MW, if a DLN System is not commercially available for the specific unit, as of April 30, 2003. | April 30, 2003 |
| d) Greater than 10 MW, Combined Cycle. | April 30, 2004 |
| e) Greater than 10 MW, Simple cycle, and permit condition for greater than 877 hrs/yr operation. | April 30, 2005 |
| f) Greater than 10 MW, Simple cycle, and permit condition for no greater than 877 hr/yr operation. | April 30, 2003 |

7.2.2 Notwithstanding Table 7-1, for an operator with multiple units no greater than 10 MW which will comply with the 25 ppmv Standard DLN Option for those units,

7.2.2.1 By April 30, 2004, demonstrate full compliance on at least 62% of those units which will comply with the Standard DLN Option.

7.2.2.2 By April 30, 2005 or 30 days after the completion of the next Major Overhaul following April 30, 2004 whichever is earliest, demonstrate full compliance on all remaining units which will comply with the Standard DLN Option.

7.2.3 Notwithstanding Table 7-1, for an operator with multiple units greater than 10 MW, which will comply with the Standard Option for those units,

7.2.3.1 By April 30, 2004, demonstrate full compliance on at least 62% of those units which will comply with the Standard Option.

7.2.3.2 By April 30, 2005, or 30 days after the completion of the next Major Overhaul following April 30, 2004, whichever is earliest, demonstrate full compliance on all remaining units which will comply with the Standard Option.

7.2.4 Operators complying with the Enhanced Option of Table 5-2 shall demonstrate and maintain compliance by the earlier of either

7.2.4.1 April 30, 2008, or

7.2.4.2 within 90 days following the next Major Overhaul, if that overhaul occurs after April 30, 2004.

7.3 Tier 3 Compliance Schedule

Owners or operators of all stationary gas turbine systems subject to Section 5.1.3 (Tier 3) shall submit the emission control plan required by Section 6.1 to the District by January 1, 2009. All owner/operators shall demonstrate and maintain compliance with the applicable provisions of Section 4.0 on and after January 1, 2009. All owner/operators shall demonstrate and maintain compliance with the applicable provisions of Sections 5.0 and 6.0 in accordance with the following Compliance Schedules:

7.3.1 Operators with no more than two (2) units subject to Section 5.1.3 on September 20, 2007 shall demonstrate and maintain compliance by the earlier of either of the following dates (the compliance date for any particular unit shall be determined independently of any other unit):

7.3.1.1 October 1, 2011, or

7.3.1.2 Within 90 days following the next Major Overhaul on or after July 1, 2009.

7.3.2 Operators with more than two (2) units subject to Section 5.1.3 on September 20, 2007 shall demonstrate and maintain compliance in accordance with the following Compliance Schedule:

7.3.2.1 Within 90 days following the next Major Overhaul, any unit that is overhauled on or after July 1, 2009, and

7.3.2.2 By January 1, 2010, at least 25% of the total number of units on January 1, 2010 subject to Tier 3 Compliance Limits, and

7.3.2.3 By January 1, 2011, at least 62.5% of the total number of units on January 1, 2011 subject to Tier 3 Compliance Limits, and

7.3.2.4 By January 1, 2012, 100% of the total number of units on January 1, 2012 subject to Tier 3 Compliance Limits.

7.3.3 Operators of turbines subject to the provisions of Table 5-3, subsection (e), shall demonstrate and maintain compliance on and after January 1, 2008.

7.3.4 Permanent Removal of a Unit

In lieu of compliance with the emission limits of Section 5.1.3 (Tier 3), an owner of any unit may elect to permanently remove it from service. The owner of a unit who elects to permanently remove the unit from service shall comply with all of the following conditions:

7.3.4.1 Comply with all applicable requirements of this rule, except for the Section 5.1.3 (Tier 3) limits, until the unit is permanently removed from service.

7.3.4.2 Submit a letter to the APCO no later than July 1, 2009, stating the intent to permanently remove the unit from service.

7.3.4.3 Officially surrender the Permit-to-Operate to the APCO no later than January 1, 2012.

7.3.4.4 For the purposes of Section 7.3.4, emission reductions achieved by removal of a unit in lieu of compliance with the emission requirements of Section 5.1.3 (Tier 3) shall not be available for emission reduction credit (ERC).

8.0 Alternative Emission Control Plan (AECP)

8.1 General

The owner of two or more units may comply with Section 5.1 (or Section 5.2 for CO) by controlling units in operation at the same stationary source, or at two contiguous stationary sources, to achieve an aggregated NOx (or CO) emission factor no higher than 90 percent of the aggregated NOx (or CO) emission factor limit that would result if each unit in operation were individually in compliance with the applicable NOx (or CO) emission limits in Section 5.1 (or Section 5.2 for CO). An operator that is subject to the AECP requirements below shall also comply with the applicable requirements of Sections 5.0, 6.0, and 7.0.

8.2 Eligibility

A unit subject to Section 5.1 is eligible for inclusion in an AECP.

8.3 Exclusion

No unit subject to Section 4.0 shall be included in an AECP.

8.4 AECP Definitions

For the purposes of Section 8.0, the following definitions shall apply:

8.4.1 Aggregated NOx (or CO) emission factor limit: the sum of the NOx (or CO) emissions, over seven consecutive calendar days, that would result if all units in the AECP were in compliance with the ppmvd limits in Section 5.1 and operating at their actual firing rates, divided by the sum of the heat input of all units in the AECP over seven consecutive calendar days. Aggregated emission factor limit is calculated as:

$$L_A = \frac{\Sigma L_i F_i}{\Sigma F_i}$$

where: $L_A$ is the aggregated NOx emission factor limit (ppmvd)

$L_i$ is the applicable NOx (or CO) emission factor limit (ppmvd) specified in Section 5.1 (or Section 5.2 for CO) for each category of unit in the AECP,

$F_i$ is the total heat input (hhv basis) of fuel (MMBtu) combusted in each unit during seven consecutive calendar days, and

i identifies each unit in the AECP.

8.4.2 Aggregated NOx (or CO) emission factor: the sum of the actual NOx (or CO) emissions during seven consecutive calendar days from all units in the AECP, divided by the sum of the heat input of all units in the AECP during seven consecutive calendar days. The aggregated emission factor is calculated as:

$$E_A = \frac{\Sigma E_i F_i}{\Sigma F_i}$$

where: $E_A$ is the aggregated NOx (or CO) emission factor (ppmvd),

$E_i$ is the NOx (or CO) emission factor (ppmvd) for each unit in the AECP, established and verified by source testing or continuous emission monitors,

$F_i$ is the total heat input (hhv basis) of fuel (MMBtu) combusted in each unit during seven consecutive calendar days, and

i identifies each unit in the AECP.

8.5 AECP Requirements

8.5.1 The aggregated NOx (or CO) emission factor ($E_A$) shall not exceed 90 percent of the aggregated emission limit ($L_A$). The owner of any unit in an AECP shall notify the APCO within 24 hours of any violation of this section.

$$E_A <= 0.90 \times L_A$$

8.5.2 Only units in the AECP which were operated during seven consecutive calendar days shall be included in the calculations of the aggregated NOx (or CO) emission factor ($L_A$) and the aggregated NOx (or CO) emission limit ($E_A$).

8.5.3 During each seven consecutive calendar days of operation that the AECP is used, the operator shall calculate and record the aggregated NOx (or CO) emission factor ($L_A$) and the aggregate NOx (or CO) emission limit ($E_A$).

8.5.4 The operator shall submit a NOx (or CO) emission factor for each unit that is included in the AECP. The established NOx (or CO) emission factor of the unit shall be no less than the emission factor of the unit from the most recent source test conducted pursuant to Section 6.3 and approved by the APCO. The operator shall not operate any AECP unit in such a manner that the NOx (or CO) emissions exceed the established NOx (or CO) emission factor of the unit.

8.5.5 The operator shall submit the AECP, for approval by the APCO, by January 1, 2009 or at least 18 months before compliance with the applicable emission limits in Section 5.1 is required pursuant to Section 7.3, whichever is later. The AECP shall be submitted with an application for an Authority to Construct pursuant to complying with Section 7.3 as applicable. The operator shall obtain a written approval of the AECP from the APCO prior to implementation.

8.5.6 It is a violation of each and every day within the averaging period if a source does not meet the requirements of Section 8.5.1 of the AECP (have sufficient emission reductions, etc.) for that averaging period.

8.6 AECP Administrative Requirements

8.6.1 The AECP shall:

8.6.1.1 Contain all data, records, and other information necessary to determine eligibility of the units for alternative emission control, including but not limited to:

8.6.1.1.1 A list of units subject to alternative emission control,

8.6.1.1.2 Daily average and maximum hours of utilization for each unit,

8.6.1.1.3 Rated heat input of each unit, and

8.6.1.1.4 Fuel type for each unit.

8.6.1.2 Present the methodology for recordkeeping and reporting required by Sections 8.6.3 and 8.6.4.

8.6.1.3 Demonstrate that the aggregated emission factor will meet the requirements of Section 8.5.

8.6.1.4 Demonstrate that the schedule for achieving AECP NOx (or CO) emission levels is at least as expeditious as the schedule if applicable units were to comply individually with the applicable emission levels in Section 5.1 (or Section 5.2 for CO) and the increments of progress in Section 7.0.

8.6.2 Revision of AECP

Owners shall demonstrate APCO approval of the AECP prior to applying for a modification to said AECP.

8.6.3 AECP Recordkeeping

In addition to the records kept pursuant to Section 6.2, the operator shall maintain records, on a daily basis, of the parameters needed to demonstrate compliance with the applicable NOx (or CO) emission limits when operating under the AECP. The records shall be retained for at least five years and shall be made available to the APCO upon request. For each unit included in the AECP the owner shall maintain, for each day, the records that include, but are not limited to, the following:

8.6.3.1 The fuel type and amount used for each unit ($F_i$),

8.6.3.2 The actual emission factor for each unit ($E_i$),

8.6.3.3 The total emissions for all units ($\Sigma E_i F_i$),

8.6.3.4 The aggregated emission factor ($E_A$),

8.6.3.5 The aggregated emission factor limit ($L_A$), and

8.6.3.6 Any other parameters needed to demonstrate daily compliance with the applicable NOx (or CO) emissions when operating the units under the AECP.

8.6.4 Reporting and Annual Updates

Notifications of any violation pursuant to Section 8.5 shall include:

8.6.4.1 The name and location of the facility,

8.6.4.2 A list of applicable units,

8.6.4.3 The cause and expected duration of exceedance,

8.6.4.4 The amount of excess emissions, and

8.6.4.5 The proposed corrective actions and schedule.

8.7 Compliance Schedule

The AECP schedule for achieving reduced NOx (or CO) emission levels shall be at least as expeditious as the schedule if applicable units were to comply individually with the emissions limits specified in Sections 5.1 and 5.2 and the applicable compliance schedule required by Section 7.0.

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