RULE 4306 BOILERS, STEAM GENERATORS, AND PROCESS HEATERS – PHASE 3

(Adopted September 18, 2003; Amended March 17, 2005; Amended October 16, 2008; Amended (rule adoption date))

1.0 Purpose

The purpose of this rule is to limit emissions of oxides of nitrogen (NOx) and carbon monoxide (CO) from boilers, steam generators, and process heaters.

2.0 Applicability

This rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input greater than 5 million Btu per hour.

3.0 Definitions

3.1 Annual Capacity Factor: the ratio of the amount of fuel burned by the unit in a calendar year to the amount of fuel that the unit could have burned if it had operated at its maximum rated capacity for 8,760 hours during the calendar year.

3.2 Annual Heat Input: the actual, total heat input of fuels burned by a unit in a calendar year, as determined from the higher heating value and cumulative annual usage of each fuel.

3.3 Boiler or Steam Generator: any external combustion equipment, except oilfield steam generators, fired with any fuel used to produce hot water or steam.

3.4 British Thermal Unit (Btu): the amount of heat required to raise the temperature of one pound of water from 59°F to 60°F at one atmosphere.

3.5 Digester Gas: gas derived from the decomposition of organic matter in a digester.

3.~~5~~6 Dryer: any unit in which material is dried in direct contact with the products of combustion.

3.7 Fire Tube Boiler: any boiler that passes hot gases from a fire box through one or more tubes running through a sealed container of water. The heat of the gases is transferred through the walls of the tubes by thermal conduction, heating the water and ultimately creating steam or hot water.

3.~~6~~8 Gaseous Fuel: any fuel which is a gas at standard conditions.

3.~~7~~9 Gas Liquids Processing Facility: a facility that is engaged in the catalytic processing of gas liquids to produce finished products.

3.~~8~~10 Heat Input: the heat (hhv basis) released due to fuel combustion in a unit, not including the sensible heat of incoming combustion air and fuel.

3.~~9~~11 Higher Heating Value (hhv): the total heat liberated per mass of fuel burned (Btu per pound), when fuel and dry air at standard conditions undergo complete combustion and all resulting products are brought to their standard states at standard conditions.

3.12~~0~~ Liquid Fuel: any fuel which is a liquid at standard conditions.

~~3.11 Load-following Unit: for the purposes of this rule, a load-following unit is defined as a unit with normal operational load fluctuations and requirements which exceed the operational response range of an Ultra-Low-NOx burner system(s) operating at 9 ppmv NOx. The operator shall designated load-following units on the Permit to Operate.~~

3.13 Normal Operation: the period of operating time during which a unit is not in a startup or a shutdown event.

3.14~~2~~ NOx Emissions: the sum of oxides of nitrogen expressed as NO_2 in the flue gas.

3.15~~3~~ Oilfield Steam Generator: an external combustion equipment which converts water to dry steam or to a mixture of water vapor and steam, with an absolute pressure of more than 30 psia, and which is used exclusively in thermally enhanced crude oil production.

3.16~~4~~ Parts Per Million by Volume (ppmv): the ratio of the number of gas molecules of a given species, or group of species, to the number of millions of total gas molecules.

3.17~~5~~ Process Heater: any combustion equipment fired with liquid and/or gaseous fuel and which transfers heat from combustion gases to water or process streams. This definition excludes: kilns or ovens used for drying, baking, cooking, calcining, or vitrifying; and unfired waste heat recovery heaters used to recover sensible heat from the exhaust of combustion equipment.

3.18~~6~~ Public Utilities Commission (PUC) Quality Natural Gas: any gaseous fuel, gas-containing fuel where the sulfur content is no more than one-fourth (0.25) grain of hydrogen sulfide per one hundred (100) standard cubic feet and no more than five (5) grains of total sulfur per one hundred (100) standard cubic feet. PUC quality natural gas also means high methane gas (at least 80% methane by volume) as specified in PUC General order 58-A.

3.19~~7~~ PUC Quality Natural Gas Curtailment: means a shortage in the supply of Public Utility Commission (PUC) quality natural gas, due solely to supply limitations or restrictions in distribution pipelines by the utility supplying the gas, and not due to the cost of natural gas.

3.20~~18~~ Qualified Technician: a stationary source employee or any personnel contracted by a stationary source operator who has a documented training and a demonstrated experience performing tune-ups on a unit to the satisfaction of the APCO. The documentation of tune-up training and experience shall be made available to the APCO upon request.

3.21~~19~~ Rated Heat Input (million Btu per hour): the heat input capacity specified on the nameplate of the unit. If the unit has been physically modified such that its maximum heat input differs from what is specified on the nameplate, the modified maximum heat input shall be considered as the rated heat input and made enforceable by Permit to Operate.

3.22~~0~~ Refinery Unit: a unit that is permanently installed and operated at a petroleum refinery or a gas liquids processing facility.

3.23~~1~~ Re-ignition: the relighting of a unit after an unscheduled and unavoidable interruption or shut off of the fuel flow or electrical power, for a period of less than 30 minutes, due to reasons outside the control of the operator.

3.24 Replacement Unit: the replacement of a boiler, steam generator, oil field steam generator, or process heater. The retrofit of an existing unit does not qualify as a replacement.

3.25 School: any public or private school used for the purpose of education and instruction of school pupils in Kindergarten through Grade 12, and any college or university which provides postsecondary education and has the authority to confer Associate, Bachelors, or Graduate/Professional level degrees. This does not include any private school in which education and instruction are primarily conducted in private homes.

3.26~~2~~ 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~~3~~ Solid Fuel: any fuel which is a solid at standard conditions.

3.28~~4~~ Standard Conditions: standard conditions as defined in Rule 1020 (Definitions).

3.29~~5~~ 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 Thermal Fluid Heater: a natural gas fired process heater in which a process stream is heated indirectly by a heated fluid other than water.

3.31~~26~~ Unit: any boiler, steam generator, oilfield steam generator, or process heater as defined in this rule.

4.0 Exemptions

4.1 This rule shall not apply to:

4.1.1 Solid fuel fired units.

4.1.2 Dryers and glass melting furnaces.

4.1.3 Kilns and smelters where the products of combustion come into direct contact with the material to be heated.

4.1.4 Unfired or fired waste heat recovery boilers that are used to recover or augment heat from the exhaust of combustion turbines or internal combustion engines.

4.2 The requirements of Sections 5.1.1 and 5.1.2 shall not apply to a unit when burning any fuel other than PUC quality natural gas during PUC quality natural gas curtailment provided all of the following conditions are met:

4.2.1 Fuels other than PUC quality natural gas are burned no more than 168 cumulative hours in a calendar year plus 48 hours per calendar year for equipment testing, as limited by Permit to Operate.

4.2.2 NOx emission shall not exceed 150 ppmv or 0.215 lb/MMBtu. Demonstration of compliance with this limit shall be made by either source testing, continuous emission monitoring system (CEMS), an APCO approved Alternate Monitoring System, or an APCO approved portable NOx analyzer.

5.0 Requirements

All ppmv emission limits specified in this section are referenced at dry stack gas conditions and 3.00 percent by volume stack gas oxygen. Emission concentrations shall be corrected to 3.00 percent oxygen in accordance with Section 8.1.

5.1 NOx and CO Emission Limits

5.1.1 Except for units subject to Sections 5.2, on and after the Compliance Deadline specified in Section 7, units shall not be operated in a manner which exceeds the applicable NOx and carbon monoxide (CO) emissions limits specified in Table 1 (until December 30, 2023) and Table 2 (on and after December 31, 2023).~~shall not exceed the limits specified in Table 1 on and after the dates specified in Tables 2 and 3.~~

Table 1: Tier 1 NOx and CO Limits					
Category	Operated on Gaseous Fuel			Operated on Liquid Fuel	
	NOx Limit		CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
	Standard Option	Enhanced Option			
A. Units with a rated heat input equal to or less than 20.0 MMBtu/hour, except for Categories C, D, E, F, G, H, and I units	15 ppmv or 0.018 lb/MMBtu	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
B. Units with a rated heat input greater than 20.0 MMBtu/hour, except for Categories C, D, E, F, G, H, and I units	9 ppmv or 0.011 lb/MMBtu	6 ppmv or 0.007 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
C. Oilfield Steam Generators	15 ppmv or 0.018 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400
D. Refinery units with a rated heat input greater than 5 MMBtu/hr up to 65 MMBtu/hr	30 ppmv or 0.036 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400
E. Refinery units with a rated heat input greater than 65 MMBtu/hr up to 110 MMBtu/hr	25 ppmv or 0.031 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400
F. Refinery units with a rated heat input greater than 110 MMBtu/hr	5 ppmv or 0.0062 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400
G. Load-following units	15 ppmv or 0.018 lb/MMBtu	9 ppmv or 0.011 lb/MMbtu	400	40 ppmv or 0.052 lb/MMBtu	400
H. Units limited by a Permit to Operate to an annual heat input of 9 billion Btu/year to 30 billion Btu/year	30 ppmv or 0.036 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400

Table 1: Tier 1 NOx and CO Limits					
Category	Operated on Gaseous Fuel			Operated on Liquid Fuel	
	NOx Limit		CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
	Standard Option	Enhanced Option			
I. Units in which the rated heat input of each burner is less than or equal to 5 MMBtu/hr but the total rated heat input of all the burners in a unit is greater than 5 MMBtu/hr, as specified in the Permit to Operate, and in which the products of combustion do not come in contact with the products of combustion of any other burner.	30 ppmv or 0.036 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400

Table 2: Tier 2 NOx and CO Limits				
Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NOx Limit	CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
A. Units with a total rated heat input > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr, except for Categories C through G unit				
1. Fire Tube Boilers	7 ppmv or 0.0085 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
2. Units at Schools	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
3. Units fired on Digester Gas	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
4. Thermal Fluid Heaters	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
5. All other units	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
B. Units with a total rated heat input > 20.0 MMBtu/hr, except for Categories C through G units				
1. Fire Tube Boilers with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour	7 ppmv or 0.0085 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400

Table 2: Tier 2 NOx and CO Limits				
Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NOx Limit	CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
2. All other units with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour	7 ppmv or 0.0085 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
3. Units with a rated heat input > 75 MMBtu/hour	5 ppmv or 0.0061 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
C. Oilfield Steam Generators				
1. Units with a total rated heat input > 5.0 MMBtu/hr and ≤ 20.0 MMBtu/hr	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
2. Units with a total rated heat input > 20.0 MMBtu/hr and ≤ 75.0 MMBtu/hr	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
3. Units with a total rated heat input > 75.0 MMBtu/hr	7 ppmv or 0.0085 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
4. Units firing on less than 50%, by volume, PUC quality gas	15 ppmv or 0.018 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
D. Refinery Units				
1. Boilers with a total rated heat input > 5.0 MMBtu/hr and ≤ 40.0 MMBtu/hr	30 ppmv or 0.036 lb/MMBtu 5 ppmv or 0.0061 lb/MMBtu for replacement units	400	40 ppmv or 0.052 lb/MMBtu	400
2. Boilers with a total rated heat input > 40.0 MMBtu/hr and ≤110 MMBtu/hr	9 ppmv or 0.011 lb/MMBtu 5 ppmv or 0.0061 lb/MMBtu for replacement units	400	40 ppmv or 0.052 lb/MMBtu	400
3. Boilers with a total rated heat input >110 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400

Table 2: Tier 2 NOx and CO Limits				
Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NOx Limit	CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
4. Process Heaters with a total rated heat input > 5.0 MMBtu/hr and ≤ 40.0 MMBtu/hr	30 ppmv or 0.036 lb/MMBtu 9 ppmv or 0.011 lb/MMBtu for replacement units	400	40 ppmv or 0.052 lb/MMBtu	400
5. Process Heaters with a total rated heat input > 40.0 MMBtu/hr and ≤110 MMBtu/hr	15 ppmv or 0.018 lb/MMBtu 9 ppmv or 0.011 lb/MMBtu for replacement units	400	40 ppmv or 0.052 lb/MMBtu	400
6. Process Heaters with a total rated heat input >110 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
E. Units limited by a Permit to Operate to an annual heat input of 9 billion Btu/year to 30 billion Btu/year	30 ppmv or 0.036 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400

5.1.2 When a unit is operated on combinations of gaseous fuel and liquid fuel, the NOx limit shall be the heat input weighted average of the applicable limits specified in Sections 5.1.1, as calculated by the following equation:

$$\text{Weighted Average Limit} = \frac{(\text{NOx limit for gaseous fuel} \times G) + (\text{NOx limit for liquid fuel} \times L)}{G + L}$$

Where: G = annual heat input from gaseous fuel
L = annual heat input from liquid fuel

5.2 For each unit that is limited to less than 9 billion Btu per calendar year heat input pursuant to a Permit to Operate, the operator shall comply with the requirement of Section 7.4 and one of the following:

5.2.1 Tune the unit at least twice per calendar year, (from four to eight months apart) by a qualified technician in accordance with the procedure described in Rule 4304 (Equipment Tuning Procedure for Boilers, Steam Generators, and Process Heaters). If the unit does not operate throughout a continuous six-month period within a calendar year, only one tune-up is required for that calendar year. No tune-up is required for any unit that is not operated during that calendar year; this unit may be test fired to verify availability of the unit

for its intended use, but once the test firing is completed the unit shall be shutdown; or

5.2.2 Ooperate the unit in a manner that maintains exhaust oxygen concentrations at less than or equal to 3.00 percent by volume on a dry basis; or

5.2.3 Ooperate the unit in compliance with the applicable emission limits of Sections 5.1.1 or 5.1.2.

5.3 On and after the full compliance schedule specified in Section 7.1, the applicable emission limits of Sections 5.1, 5.2.2 and 5.2.3 shall not apply during start-up or shutdown provided an operator complies with the requirements specified below.

5.3.1 The duration of each start-up or each shutdown shall not exceed two hours, except as provided in Section 5.3.3.

5.3.2 The emission control system shall be in operation and emissions shall be minimized insofar as technologically feasible during start-up or shutdown.

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 two hours for each start-up or each shutdown provided the operator meets all of the conditions in specified in Sections 5.3.3.1 through 5.3.3.3.

5.3.3.1 The maximum allowable duration of start-up or shutdown will be determined by the APCO. The allowable duration of start-up shall not exceed twelve hours and the allowable duration of shutdown shall not exceed nine hours.

5.3.3.2 The APCO will only approve start-up or shutdown duration longer than two hours when the application meets the following conditions:

5.3.3.2.1 Cclearly identifies the control technologies or strategies to be utilized; and

5.3.3.2.2 Ddescribes what physical conditions prevail during start-up or shutdown periods that prevent the controls from being effective; and

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

5.3.3.3 The operator shall submit to the APCO any information deemed necessary by the APCO to determine the appropriate length of

start-up or shutdown. The information shall include, but is not limited to the following:

5.3.3.3.1 A~~a~~ detailed list of activities to be performed during start-up or shutdown and a reasonable explanation for the length of time needed to complete each activity; and

5.3.3.3.2 A~~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

5.3.3.3.3 B~~b~~asis for the requested additional duration of start-up or shutdown.

5.3.4 Permit to Operate (PTO) modifications solely to include start-up or shutdown conditions may be exempt from Best Available Control Technology (BACT) and emission offset requirements if the PTO modifications meet the requirements of Rule 2201 (New or Modified Stationary Source Review Rule) Section 4.2 (BACT Exemptions) and Rule 2201 Section 4.6 (Offset Exemptions).

5.4 Monitoring Provisions

5.4.1 The operator of any unit which simultaneously fires gaseous and liquid fuels, and is subject to the requirements of Section 5.1, shall install and maintain an operational non-resettable, totalizing mass or volumetric flow meter in each fuel line to each unit. Volumetric flow measurements shall be periodically compensated for temperature and pressure.

5.4.2 The operator of any unit subject to the applicable emission limits in Sections 5.1 shall install and maintain an operational APCO approved Continuous Emissions Monitoring System (CEMS) for NOx, CO, and oxygen, or implement an APCO-approved Alternate Monitoring System. An APCO approved CEMS shall comply with the requirements of 40 Code of Federal Regulations (CFR) Part 51, 40 CFR Parts 60.7 and 60.13 (except subsection h), 40 CFR Part 60 Appendix B (Performance Specifications) and 40 CFR Part 60 Appendix F (Quality Assurance Procedures, and applicable provisions of Rule 1080 (Stack Monitoring). An APCO approved Alternate Monitoring System shall monitor one or more of the following:

5.4.2.1 P~~p~~eriodic NOx and CO exhaust emission concentrations,
5.4.2.2 P~~p~~eriodic exhaust oxygen concentration,
5.4.2.3 F~~f~~low rate of reducing agent added to exhaust,

5.4.2.4 Ceatalyst inlet and exhaust temperature,
5.4.2.5 Ceatalyst inlet and exhaust oxygen concentration,
5.4.2.6 Ppperiodic flue gas recirculation rate,
5.4.2.7 Ootther operational characteristics.

5.4.3 For units subject to the requirements of Section 5.2.1 or 5.2.2, the operator shall monitor, at least on a monthly basis, the operational characteristics recommended by the manufacturer and approved by the APCO.

5.4.4 The operator of any Category H unit ~~listed~~ in ~~Section 5.1.1~~ Table 1, Category E unit in Table 2, and any unit subject to Section 5.2.1 or 5.2.2 shall install and maintain an operational non-resettable, totalizing mass or volumetric flow meter in each fuel line to each unit. Volumetric flow measurements shall be periodically compensated for temperature and pressure. A master meter, which measures fuel to all units in a group of similar units, may satisfy these requirements if approved by the APCO in writing. The cumulative annual fuel usage may be verified from utility service meters, purchase or tank fill records, or other acceptable methods, as approved by the APCO.

5.4.5 The APCO shall not approve an alternative monitoring system unless it is documented that continued operation within ranges of specified emissions-related performance indicators or operational characteristics provides a reasonable assurance of compliance with applicable emission limits. The operator shall source test over the proposed range of surrogate operating parameters to demonstrate compliance with the applicable emission standards.

5.5 Compliance Determination

5.5.1 The operator of any unit shall have the option of complying with either the applicable heat input (lb/MMBtu) emission limits or the concentration (ppmv) emission limits specified in Section 5.1. The emission limits selected to demonstrate compliance shall be specified in the source test proposal pursuant to Rule 1081 (Source Sampling).

5.5.2 All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. Unless otherwise specified in the Permit to Operate no determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0.

5.5.3 All Continuous Emissions Monitoring System (CEMS) emissions measurements shall be averaged over a period of 15 consecutive minutes to demonstrate compliance with the applicable emission limits of this rule. Any 15-consecutive-minute block average CEMS measurement exceeding the applicable emission limits of this rule shall constitute a violation of this rule.

5.5.4 For emissions monitoring pursuant to Sections 5.4.2, 5.4.2.1, and 6.3.1 using a portable NOx analyzer as part of an APCO approved Alternate Emissions Monitoring System, emission readings shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15-consecutive-minute sample reading or by taking at least five (5) readings evenly spaced out over the 15-consecutive-minute period.

5.5.5 For emissions source testing performed pursuant to Section 6.3.1 for the purpose of determining compliance with an applicable standard or numerical limitation of this rule, the arithmetic average of three (3) 30-consecutive-minute test runs shall apply. If two (2) of three (3) runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit.

6.0 Administrative Requirements

6.1 Recordkeeping

The records required by Sections 6.1.1 through 6.1.~~4~~ shall be maintained for five calendar years and shall be made available to the APCO upon request. Failure to maintain records or information contained in the records that demonstrate noncompliance with the applicable requirements of this rule shall constitute a violation of this rule.

6.1.1 The operator of any unit operated under the exemption of Section 4.2 shall monitor and record for each unit the cumulative annual hours of operation on each fuel other than natural gas during periods of natural gas curtailment and equipment testing. The NOx emission concentration (in ppmv or lb/MMBtu) for each unit that is operated during periods of natural gas curtailment shall be recorded. Failure to maintain records required by Section 6.1.1 or information contained in the records that demonstrates noncompliance with the conditions for exemption under Section 4.2 will result in loss of exemption status. On and after the applicable compliance schedule specified in Section 7.0, any unit losing an exemption status shall be brought into full compliance with this rule as specified in Section 7.3.

6.1.2 The operator of any Category H unit ~~listed~~ in ~~Section 5.1.1~~ Table 1, or Category E unit in Table 2 and any unit that is subject to the requirements of Section 5.2 shall record the amount of fuel use at least on a monthly basis for each unit, or for a group of units as specified in Section 5.4.4. On and after the applicable compliance schedule specified in Section 7.0, in the event that such unit exceeds the applicable annual heat input limit ~~specified~~ in ~~Sections 5.1.1~~ Table 1 Category H, Table 2 Category E, and Section 5.2, the unit shall be brought into full compliance with this rule as specified in Section 7.4.

6.1.3 The operator of any unit subject to Section 5.2.1 or Section 6.3.1 shall maintain records to verify that the required tune-up and the required monitoring of the operational characteristics of the unit have been performed.

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

6.2 Test Methods

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

6.2.1 Fuel hhv shall be certified by third party fuel supplier or determined by:

6.2.1.1 ASTM D 240~~-87~~ or D 4809~~2382-88~~ for liquid hydrocarbon fuels;

6.2.1.2 ASTM D 1826~~-88~~ or D 1945~~-81~~ in conjunction with ASTM D 3588~~-89~~ for gaseous fuels.

6.2.2 Oxides of nitrogen (ppmv) - EPA Method 7E, or ARB Method 100.

6.2.3 Carbon monoxide (ppmv) - EPA Method 10, or ARB Method 100.

6.2.4 Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100.

6.2.5 NOx Emission Rate (Heat Input Basis) - EPA Method 19.

6.2.6 Stack gas velocities - EPA Method 2.

6.2.7 Stack gas moisture content - EPA Method 4.

6.3 Compliance Testing

6.3.1 Each unit subject to the requirements in Sections 5.1 or 5.2.3 shall be source tested to determine compliance with the applicable emission limits at least once every 12 months, (no more than 30 days before or after the required annual source test date). Units that demonstrate compliance on two consecutive 12-month source tests may defer the following 12-month source test for up to 36 months (no more than 30 days before or after the required 36-month source test date). –During the 36-month source testing interval, the operator shall tune the unit in accordance with the provisions of Section 5.2.1, and shall monitor, on a monthly basis, the unit's operational characteristics recommended by the manufacturer to ensure compliance with the applicable emission limits specified in Sections 5.1 or 5.2.3. –Tune-ups required by Sections 5.2.1 and 6.3.1 do not need to be performed for units that operate and maintain an APCO approved CEMS or an APCO approved Alternate

Monitoring System where the applicable emission limits are periodically monitored. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits specified in Sections 5.1 or 5.2.3, the source testing frequency shall revert to at least once every 12 months. Failure to comply with the requirements Section 6.3.1, or any source test results that exceed the applicable emission limits in Sections 5.1 or 5.2.3 shall constitute a violation of this rule.

6.3.2 In lieu of compliance with Section 6.3.1, compliance with the applicable emission limits in Sections 5.1 or 5.2.3 shall be demonstrated by submittal of annual emissions test results to the District from a unit or units that represents a group of units, provided:

6.3.2.1 All units in the group are initially source tested. The emissions from all test runs from units within the group are less than 90% of the permitted value, and the emissions do not vary greater than 25% from the average of all test runs; and

6.3.2.2 All units in a group are similar in terms of rated heat input, make and series, operational conditions, fuel used, and control method. No unit with a rated heat input greater than 100 MMBtu shall be considered as part of the group; and

6.3.2.3 The group is owned by a single owner and is located at a single stationary source; and

6.3.2.4 Selection of the representative unit(s) is approved by the APCO prior to testing; and

6.3.2.5 The number of representative units source tested shall be at least 30% of the total number of units in the group. The representative tests shall rotate each year so that within three years all units in the group have been tested at least once.

6.3.2.6 All units in the group shall have received the similar maintenance and tune-up procedures as the representative unit(s) as listed in the Permit to Operate. The operator shall submit to the APCO the specific maintenance procedures to be performed on each unit that will be included in the group for representative testing. Such maintenance procedures shall be specified in the Permit to Operate for units that are included in the group for representative testing. Any maintenance work on a unit which has no effect on emissions standards and which is not specified in the maintenance procedures shall be submitted to the APCO for approval before such unit can be included as part of the group for representative testing. Any unit that necessitates any maintenance work which

has an effect on emission standards and is beyond the maintenance procedures identified in the Permit to Operate, shall not be included as part of the group for representative testing. The unit shall be source tested in accordance with the provisions of Section 6.3.1; and

6.3.2.7 Should any of the representative units exceed the required emission limits, each of the units in the group shall demonstrate compliance by emissions testing. Failure to complete emissions testing within 90 days of the failed test shall result in the untested units being in violation of this rule. After compliance with the requirements of Section 6.3.2.7 has been demonstrated, subsequent source testing shall be performed pursuant to Sections 6.3.1 or 6.3.2.

6.4 Emission Control Plan (ECP)

6.4.1 The operator of any unit shall submit to the APCO for approval an Emissions Control Plan according to the compliance schedule in Section 7.0. For each unit, the plan shall contain the following:

6.4.1.1 Permit to Operate number,
6.4.1.2 Fuel type and hhv,
6.4.1.3 Annual fuel consumption (Btu/yr),
6.4.1.4 Current emission level, including method used to determine emission level,
6.4.1.4 Applicable Table 1 and Table 2 Category for each unit ~~NOx limit to be satisfied, either Standard Option or Enhanced Option~~, and
6.4.1.6 Plan of actions~~, including a schedule of increments of progress,~~ which will be taken to satisfy the requirements of Section 5.0 and the compliance schedule in Section 7.0.

~~6.4.2 The operator shall submit to the APCO for approval, as part of the ECP, a list of units which are to be designated as load-following units. The APCO shall only designate, as load-following, units for which the following information has been provided to demonstrate that the units qualify as load-following:~~

~~6.4.2.1 Technical data such as steam demand charts or other information to demonstrate the normal operational load fluctuations and requirements of the unit,~~
~~6.4.2.2 Technical data about the operational response range of an Ultra-Low NOx burner system(s) operating at 9 ppmv NOx, and~~
~~6.4.2.3 Technical data demonstrating that the unit(s) are designed and operated to optimize the use of base-loaded units in conjunction with the load-following unit(s).~~

7.0 Compliance Schedule

7.1 An operator ~~with multiple units at a stationary source~~ shall comply with this rule in accordance with the schedule specified in Table ~~2~~3, Table 4, and Table 5. ~~A stationary source with only one unit shall comply with the schedule specified in Table 2 Group 1 for standard option or Table 3 Group 1 for enhanced option.~~

Table~~ABLE~~ ~~2~~3: Tier 1 – Standard Option Compliance Schedule			
Units to be in Compliance at a Stationary Source	Emission Control Plan	Authority to Construct	Full Compliance
Group 1: 25% or more of the total number of units subject to this rule on June 1, 2005, excluding Group 4	June 1, 2004	June 1, 2004	June 1, 2005
Group 2: 62.5% or more of the total number of units subject to this rule on June 1, 2006, excluding Group 4	June 1, 2004	January 2, 2005	June 1, 2006
Group 3: 100% of the total number of units subject to this rule on June 1, 2007	June 1, 2004	January 2, 2006	June 1, 2007
Group 4: A. Load-following units B. Units limited by Permit to Operate to an annual capacity factor of 10% or less as of June 1, 2005 C. Category I units at any stationary source that has no more than two units subject to this rule.	June 1, 2004	January 2, 2006	June 1, 2007

Units are considered to be subject to this rule if the rule is applicable to the units pursuant to Section 2.0 and the units are not exempt pursuant to Section 4.1.

Table~~ABLE~~ 3~~4~~: Tier 1 – Enhanced Option Compliance Schedule			
Units to be in Compliance at a Stationary Source	Emission Control Plan	Authority to Construct	Full Compliance
Group 1: 25% or more of the total number of units subject to this rule on June 1, 2005, excluding Group 4	December 1, 2005	December 1, 2005	December 1, 2006
Group 2: 62.5% or more of the total number of units subject to this rule on June 1, 2006, excluding Group 4	December 1, 2005	July 1, 2006	December 1, 2007
Group 3: 100% of the total number of units subject to this rule on June 1, 2007	December 1, 2005	July 1, 2007	December 1, 2008
Group 4: A. Load-following units	December 1, 2005	July 1, 2007	December 1, 2008

Table 5: Tier 2 - Compliance Schedule			
Category	Emission Control Plan	Authority to Construct	Compliance Deadline
A. Units with a total rated heat input > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr, except for Categories C through G unit			
1a. Fire Tube Units permitted greater than 9 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
1b. Fire Tube Units permitted less than or equal to 9 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029
2. Units at Schools	May 1, 2022	May 1, 2022	December 31, 2023
3. Units fired on Digester Gas	May 1, 2022	May 1, 2022	December 31, 2023
4. Thermal Fluid Heaters	May 1, 2022	May 1, 2022	December 31, 2023
5a. All other units permitted greater than 12 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
5b. All other units permitted less than or equal to 12 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029
B. Units with a total rated heat input > 20.0 MMBtu/hr, except for Categories C through G units			
1a. Fire Tube Boilers with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour permitted greater than 9 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
1b. Fire Tube Boilers with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour permitted less than or equal to 9 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029
2a. All other units with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour permitted greater than 9 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
2b. All other units with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour permitted less than or equal to 9 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029
3a. Units with a rated heat input > 75 MMBtu/hour permitted greater than 7 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
3b. Units with a rated heat input > 75 MMBtu/hour permitted less than or equal to 7 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029
C. Oilfield Steam Generators			

Table 5: Tier 2 - Compliance Schedule			
Category	Emission Control Plan	Authority to Construct	Compliance Deadline
1. Units with a total rated heat input > 5.0 MMBtu/hr and ≤ 20.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
2. Units with a total rated heat input > 20.0 MMBtu/hr and ≤ 75.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
3. Units with a total rated heat input > 75.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
4. Units firing on less than 50%, by volume, PUC quality gas	May 1, 2022	May 1, 2022	December 31, 2023
D. Refinery Units			
1. Boilers with a total heat input > 5.0 MMBtu/hr to ≤ 40.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
2. Boilers with a total rated heat input > 40.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
3. Heaters with a total heat input > 5.0 MMBtu/hr to ≤ 40.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
4. Heaters with a total rated heat input > 40.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
E. Units limited by a Permit to Operate to an annual heat input of 9 billion Btu/year to 30 billion Btu/year	May 1, 2022	May 1, 2022	December 31, 2023

Units are considered to be subject to this rule if the rule is applicable to the units pursuant to Section 2.0 and the units are not exempt pursuant to Section 4.1.

7.2 As shown in ~~Table 2 and~~ Table 3, Table 4, and Table 5 the column labeled:

7.2.1 "Emission Control Plan" identifies the date by which the operator shall submit an Emission Control Plan pursuant to Section 6.4. The Emission Control Plan shall identify all units subject to this rule. ~~-~~The Emission Control Plan shall identify steps to be taken to comply with this rule.

7.2.2 “Authority to Construct” identifies the date by with the operator shall submit an Application for Authority to Construct for each unit subject to the rule.

7.2.3 "Full Compliance" identifies the date by which the owner shall demonstrate that each unit is in compliance with this rule.

7.3 Any unit that is exempted under Section 4.2 that becomes subject to the emission limits of this rule through the loss of exemption status, shall be in full compliance with this rule on and after the date the exemption status is lost.

7.4 Any unit that becomes subject to the emission limits of this rule as a result of exceeding the applicable annual heat input limit specified in either ~~Section 5.1.1~~ Table 1 Category H, ~~or~~ Table 2 Category E, or Section 5.2, shall be in compliance with the applicable ~~standard option~~ emission limits ~~for Category A and B units~~ in Section 5.1.1 on and after the date the annual heat input limit is exceeded.

8.0 Calculations

8.1 All ppmv emission limits specified in Section 5.1 are referenced at dry stack gas conditions and 3.00 percent by volume stack gas oxygen. Emission concentrations shall be corrected to 3.00 percent oxygen as follows:

$$[\text{ppm NOx}]_{\text{corrected}} = \frac{17.95\%}{20.95\% - [\%O2]_{\text{measured}}} \text{ x } [\text{ppm NOx}]_{\text{measured}}$$

$$[\text{ppm CO}]_{\text{corrected}} = \frac{17.95\%}{20.95\% - [\%O2]_{\text{measured}}} \text{ x } [\text{ppm CO}]_{\text{measured}}$$

8.2 All pounds per million Btu NOx emission rates shall be calculated as pounds of nitrogen dioxide per million Btu of heat input (hhv).

9.0 Alternative Emission Control

9.1 General

The single owner of two or more units may comply with Section 5.1 by controlling units in operation at the same stationary source, or at two contiguous stationary sources, to achieve an aggregated NOx emission factor no higher than 90 percent of the aggregated NOx emission factor limit that would result if each unit in operation were individually in compliance with the applicable NOx emission limits in Section 5.1. An operator that is subject to the Alternative Emission Control Plan (AECP) requirements below shall also comply with the applicable requirements of Sections 5.0, 6.0, 7.0 and 8.0.

9.2 Eligibility

A unit not subject to Section 5.1 or Section 5.2.3 is not eligible for inclusion in an AECP.

9.3 Exclusion

No unit subject to Sections 5.2.1 or 5.2.2 shall be included in an AECP.

9.4 AECP Definitions

For the purposes of Section 9.0, the following definitions shall apply:

9.4.1 Aggregated NOx emission factor limit: the sum of the NOx emissions, over seven consecutive calendar days, that would result if all units in the AECP were in compliance with the lb/MMBtu 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 (lb/MMBtu)

L_i is the applicable NOx emission factor limit (lb/MMBtu) specified in Section 5.1.1 Table 1, Table 2, or Section 5.1.2 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.

9.4.2 Aggregated NOx emission factor: the sum of the actual NOx 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 emission factor (lb/MMBtu),

E_i is the NOx emission factor (lb/MMBtu) 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.

9.5 AECP Requirements

9.5.1 The aggregated NOx 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. A violation of E_A is a violation for every day in the averaging period.

E_A must be $\leq 0.90 \times L_A$

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

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

9.5.4 The operator shall submit a NOx emission factor for each unit that is included in the AECP. The established NOx 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 emissions exceed the established NOx emission factor of the unit.

9.5.5 The operator shall submit the AECP, for approval by the APCO, ~~by June 1, 2004 or~~ at least 24 months before compliance with the applicable emission limits in Section 5.1 is required, pursuant to the Section 7.1~~, whichever is later~~. The AECP shall be submitted with an application for an Authority to Construct pursuant to complying with Section 7.1 as applicable. The operator shall obtain a written approval of the AECP from the APCO prior to implementation.

9.6 AECP Administrative Requirements

9.6.1 The AECP shall:

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

9.6.1.1.1 A list of units subject to alternative emission control,
9.6.1.1.2 Daily average and maximum hours of utilization for each unit,
9.6.1.1.3 Rated heat input of each unit, and
9.6.1.1.4 Fuel type for each unit.

9.6.1.2 Present the methodology for recordkeeping and reporting required by Sections 9.6.4 and 9.6.5.

9.6.1.3 Specify which NOx limit~~, either Standard Option or Enhanced Option,~~ will be satisfied by the units under the AECP.

9.6.1.4 Demonstrate that the aggregated emission factor will meet the requirements of Section 9.5.

9.6.1.5 Demonstrate that the schedule for achieving AECP NOx 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 and the ~~increments of progress~~ Compliance Schedule in Section 7.0.

9.6.2 Revision of AECP

The owner shall submit an application for an Authority to Construct to revise an existing AECP, and shall obtain APCO approval of the revised AECP prior to implementing the revised AECP. ~~Owners shall demonstrate APCO approval of the AECP prior to applying for a modification to said AECP.~~

9.6.3 AECP Recordkeeping

In addition to the records kept pursuant to Section 6.1, the operator shall maintain records, on a daily basis, of the parameters needed to demonstrate compliance with the applicable NOx 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. The records shall include, but are not limited to, the following:

9.6.3.1 For each unit included in the AECP the owner shall maintain the following records for each day:

9.6.3.1.1 F~~f~~uel type and amount used for each unit (F_i),
9.6.3.1.2 T~~t~~he actual emission factor for each unit (E_i),
9.6.3.1.3 T~~t~~he total emissions for all units ($\Sigma E_i F_i$),
9.6.3.1.4 T~~t~~he aggregated emission factor (E_A),
9.6.3.1.5 T~~t~~he aggregated emission factor limit (L_A), and
9.6.3.1.6 A~~a~~ny other parameters needed to demonstrate daily compliance with the applicable NOx emissions when operating the units under the AECP.

9.6.4 Reporting and Annual Updates

Notifications of any violation pursuant to Section 9.5 shall include:
9.6.4.1 N~~n~~ame and location of facility,
9.6.4.2 L~~l~~ist of applicable units,
9.6.4.3 C~~c~~ause and expected duration of exceedance,

9.6.4.4 The amount of excess emissions, and

9.6.4.5 Proposed corrective actions and schedule.

9.7 Compliance Schedule

The AECP schedule for achieving reduced NOx 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 5.1.1 and 5.1.2 and the applicable compliance schedule required by Section 7.0.

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