MONTEREY BAY AIR RESOURCES DISTRICT
REGULATION IV
PROHIBITIONS

RULE 441. BOILERS, STEAM GENERATORS, AND PROCESS HEATERS

(Adopted 2-19-20.)

CONTENTS

PART 1 GENERAL

1.1 Purpose

To reduce emissions of oxides of nitrogen (NO_x) from boilers, steam generators, and process heaters at subject industrial sources per Health and Safety Code §40920.6 (c)(2).

1.2 Applicability

This rule applies to AB 617 industrial sources that have boilers, steam generators, and process heaters with a rated heat input greater than or equal to 2 million British Thermal Units (BTU) per hour.

1.3 Exemptions

The requirements of this Rule shall not apply to the following:

1.3.1 Any unit that is exclusively used by an electric utility to generate electricity.

1.3.2 Waste heat recovery boilers.

1.3.3 Afterburners, vapor incinerators, or thermal or catalytic oxidizers used as an emission control device.

1.3.4 Kilns, ovens, open heated tanks, dehydrators, dryers, crematories, calciners, cookers, roasters, furnaces, or smelters.

1.3.5 Solid fuel fired units.

The requirements of Section 3.1 of this Rule shall not apply to the following:

1.3.6 Any unit when under curtailment conditions, provided that the curtailment fuels are not burned for more than 200 cumulative hours in a calendar year, including testing and maintenance.

1.3.7 Low Fuel Usage Exemption

1.3.7.1 Any unit that uses less than 90,000 therms or 9 billion BTU per year of fuel provided that the owner or operator complies with one of the requirements listed in Section 3.2, the requirements of Section 3.3.2, and the Compliance Schedule of Section 4.4.2. If the fuel usage for any unit claiming this exemption exceeds or equals 90,000 therms or 9 billion BTU in any calendar year, then the unit must be operated in compliance with the applicable NO_x emission limits in Section 3.1. within the timeline defined by Section 4.3.3.

1.3.7.2 Any unit that uses less than 10% of its maximum heat input capacity in any calendar year and does not exceed a NO_x exhaust concentration of 30 ppmv and a Carbon Monoxide (CO) concentration of 400 ppmv at 3 percent oxygen. If the fuel usage or the concentration limits are exceeded, then the unit must be operated in compliance with the applicable NO_x emission limits in Section 3.1 within the timeline defined by Section 4.3.3.

1.3.8 Any non-operational unit, as defined in Section 2.11, provided that the owner or operator complies with the Compliance Schedule of Section 4.4.3.

1.3.9 Any unit, that provides emission reduction credits per Rule 215 in lieu of meeting the emission standards in Section 3.1, provided that the owner or operator complies with the Compliance Schedule of Section 4.4.

1.4 Effective Date

This Rule is effective on February 19, 2020.

PART 2 DEFINITIONS

For the purpose of this Rule, the definitions below shall apply.

2.1 AB 617 Industrial Source

Means any source located at a facility that, as of January 1, 2017, was subject to a market-based compliance mechanism adopted by the state board pursuant to Health and Safety Code §38562(c).

2.2 Annual Heat Input

Means the 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.

2.3 Best Available Retrofit Control Technology (BARCT)

Best available retrofit control technology as defined in Health and Safety Code §40406 is "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 sources." These limits are specified in Table 1 of this Rule.

2.4 Boiler or Steam Generator

Any external combustion equipment fired with any fuel used to produce hot water or steam, excluding waste heat recovery boilers.

2.5 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.

2.6 Curtailment Conditions

Periods in which a unit that normally burns Public Utilities Commission (PUC) quality natural gas instead burns a nongaseous fuel only during emergency interruption of natural gas delivery by the serving utility.

2.7 Dryer

Any unit where the material being dried comes into direct contact with the product of combustion.

2.8 Gaseous Fuel

Any fuel which is a gas at standard conditions.

2.9 Heat Input

The chemical heat released due to fuel combustion in a combustion unit, using the higher heating value of the fuel. This does not include the sensible heat of incoming combustion air.

2.10 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 resultant products are brought to their standard states at standard conditions. HHV shall be determined by one of the following test methods:

208.1 ASTM D 2015 for solids fuel; or

208.2 ASTM D 240 or ASTM D 2382 for liquid hydrocarbon fuels; or

208.3 ASTM D 1826 or ASTM D 1945 in conjunction with ASTM D 3588 for gaseous fuels.

2.11 Non-Operational Unit

Any unit not in operation during calendar year 2019, provided that the unit is physically located at the affected AB 617 Industrial Source.

2.12 NO_x Emissions (NO_x)

The sum of nitric oxide and nitrogen dioxide in the flue gas.

2.13 Nongaseous Fuel

Any fuel which is not a gas at standard conditions.

2.14 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.

2.15 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.

2.16 Process Heater

Any combustion equipment fired with any fuel, and which transfers heat from combustion gases to water or process streams. For the purpose of this rule applicability, process heater does not include any of the following combustion sources:

a. Kilns, ovens, open heated tanks, dehydrators, dryers, crematories, incinerators, calciners, cookers, roasters, furnaces, or smelters.

b. Afterburners, vapor incinerators, or thermal or catalytic oxidizers used as an emission control device.

2.17 Public Utilities Commission (PUC) Quality Natural Gas

Any gaseous fuel or 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) grain 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 the most current PUC General Order for Gas Service in California.

2.18 Rated Heat Input Capacity

The heat input capacity, in million BTU per hour, specified on the nameplate of the

combustion unit. If the combustion unit has been altered or modified such that its combined maximum heat input is different than the heat input capacity specified on the nameplate, the combined maximum heat input shall be considered as the rated heat input.

2.19 Solid Fuel

Any fuel which is a solid at standard conditions.

2.20 Standard Conditions

For the purpose of this rule, standard conditions are 68˚F and one atmosphere.

2.21 Therm

One hundred thousand (100,000) BTUs.

2.22 Unit

Any boiler, steam generator, or process heater as defined in Section 2.4, 2.14 and 2.16.

2.23 Waste Heat Recovery Boiler

A device that recovers normally unused energy and converts it to usable heat. Waste heat recovery boilers incorporating duct or supplemental burners that are designed to supply 50 percent or more of the total rated heat input capacity of the waste heat recovery boiler are not considered waste heat recovery boilers, but are considered boilers. Waste heat recovery boilers are also referred to as heat recovery steam generators.

PART 3 STANDARDS

All ppmv emission limits specified in Part 3 shall be measured as ppmv on a dry basis, as determined pursuant to Section 4.5.2, and corrected to three percent oxygen. Any unit subject to this Rule shall be subject to the following NO_x and CO requirements:

3.1 BARCT Emission Limits

NO_x and CO emissions shall not exceed the following levels:

Table 1. Emission Limits for AB 617 Industrial Units

Source Category	Total Unit Rated Heat Input/Description (MMBTU/hr)	Fuel	NO_x Limit (ppmv @ 3% O_2)	CO Limit (ppmv @ 3% O_2)
Boilers & Process Heaters	≥ 2 to < 5	Gaseous	30	400
	≥ 5 to < 20		15	400
	≥ 20		9	400
Oilfield Steam Generators	≥ 2	Gaseous	15	400

3.2 Low Fuel Usage

Any unit exempted pursuant to Section 1.3.7 shall meet one of the following conditions:

3.2.1 The unit shall be operated in a manner that maintains stack-gas oxygen concentration at less than or equal to 3.00% by volume on a dry basis; or

3.2.2 The unit shall be tuned at least once per year by a qualified technician. If the unit did not operate for the entire calendar year, the tune-up must be conducted within 30 days of startup. The tune-up shall be performed in accordance with manufacturer's recommendations or EPA 40 CFR 63, Subpart JJJJJJ guidance.

3.3 Monitoring Equipment

3.3.1 Owners or operators of units exempt from the emission requirements pursuant to Section 1.3.6 because of curtailment conditions shall install and maintain a non-totalizing hour meter on each unit, or shall install a computerized tracking system that maintains a continuous daily record of hours of operation.

3.3.2 Owners or operators of units exempt from the emission requirements pursuant to Section 1.3.7 because of low fuel usage shall install and maintain a dedicated totalizing fuel meter in each fuel line. If a volumetric flow rate meter is installed, it must compensate for temperature and pressure using integral gauges.

3.4 Performance Testing

Any unit subject to Section 3.1 shall perform testing to demonstrate compliance with the emission limitation in accordance with the following frequency:

Table 2. Performance Testing

Section	Source Category	Total Unit Rated Heat Input/Description (MMBTU/hr)	Testing Method & Frequency
3.4.1	Boiler & Process Heaters	≥ 2 to < 5	Portable analyzer test at least once every calendar year
3.4.2		≥ 5 to < 20	
3.4.3	Boiler & Process Heaters	≥ 20	Source test at least once every calendar year
3.4.4	Oilfield Steam Generator	≥ 2	Source test at least once every calendar year

PART 4 ADMINISTRATIVE REQUIREMENTS

4.1 Reporting Tune-Up Verification

The owner or operator of units subject to the requirements in Section 3.2.2 of this Rule shall submit to the Air Pollution Control Officer a tune-up verification report or a verification of inactivity not less than once every calendar year for each unit.

4.2 Source Testing Protocol

4.2.1 **Source Tests:** The owner or operator of units subject to Section 3.4.3 and 3.4.4 in Table 2 of this Rule shall submit a written testing protocol to the District no later than 30 days prior to the test event, and District notification at least 10 days prior to the actual date of testing shall be provided so that a District observer can be present. The owner or operator shall furnish the District written results of such performance tests within 60 days of the source test date.

4.2.2 **Portable Analyzer:** Emission readings shall be taken from each exhaust stack using a portable analyzer pursuant to Section 3.4.1 through 3.4.2 in Table 2 of this Rule 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 over the 15-consecutive-minute period. If the results of

the portable analyzer show that the NO_x emissions from the unit exceed the allowable limits in Table 1 of this Rule, then the unit will be required to be source tested no later than 60 days from the date of discovering such exceedance.

4.3 Loss of Exemption

Any owner or operator of any existing unit that qualified for the Section 1.3.7 low fuel usage exemption and exceeded the low fuel usage limits of Section 1.3.7.1 or 1.3.7.2 shall comply with the following:

4.3.1 Within 30 days of the exceedance notify the District in writing of the unit's loss of exemption.

4.3.2 Within 90 days submit an Authority to Construct permit application to comply with Section 3.1 of this Rule.

4.3.3 Within 18 months after the end of calendar year during which the unit exceeded the low fuel usage exemption level, conduct an initial performance test and demonstrate compliance with Section 3.1 of this Rule. The unit will subsequently not qualify for exemption pursuant to Section 1.3.7.

4.4 Compliance Schedule

4.4.1 An owner or operator of any unit subject to Table 1 of this Rule shall fulfill the following requirements:

4.4.1.1 By December 31, 2020, submit a written plan containing a description of the method the owner or operator will use to comply with the emission limits listed in Table 1 of this Rule.

4.4.1.2 By December 31, 2021, submit an application for Authority to Construct for any modification required to achieve compliance with the requirements of Table 1 of this Rule, or submit an application to surrender emission reduction credits.

4.4.1.3 By December 31, 2023, all owners or operators subject to this Rule shall demonstrate final compliance with all applicable standards and requirements of this Rule.

4.4.2 Any owner or operator of any unit claiming the low usage exemption of Section 1.3.7 shall fulfill the following requirements:

4.4.2.1 By July 1, 2020, submit an application for Authority to Construct for any existing unit for which the low usage exemption pursuant to Section 1.3.7 will be claimed.

4.4.2.2 If the unit loses its exemption, the owner or operator must follow the requirements of Section 4.3.

4.4.3 An owner or operator of any unit claiming non-operational equipment shall fulfill the following requirements:

4.4.3.1 By July 1, 2020, submit a Permit to Operate modification application for any existing unit for which the non-operational status will be claimed. The unit will be required to meet the requirements of Table 1 of this Rule prior to the unit becoming operational.

4.5 Compliance Determination

4.5.1 All emission determinations shall be made during conditions representative of normal operations. No determination of compliance with the requirement of Section 3.1 shall be established during startup, shutdown, or under breakdown conditions.

4.5.2 All ppmv emission limits specified in Section 1.3.7.2 and 3.1 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:

$$[ppm\ \ NO_x]_{corrected} = \frac{20.9\% - 3.0\%}{20.9\% - [\%O_2]_{measured}} * [ppm\ \ NO_x]_{measured}$$

PART 5 RECORDKEEPING REQUIREMENTS

5.1 The records required by Sections 5.1.1 through 5.1.3 shall be maintained for five (5) calendar years and shall be made available to District staff upon request.

5.1.1 The operator of any unit operated under the exemption of Section 1.3.6 shall

monitor and record for each unit the cumulative annual hours of operation on each fuel other than PUC quality natural gas during periods of natural gas curtailment and equipment testing and maintenance.

5.1.2 The operator of any unit operated under the exemption of Section 1.3.7 shall record the amount of fuel used at least on a monthly basis for each unit.

5.1.3 The operator of any unit subject to Section 3.2.1 or 3.2.2 shall maintain records to verify that the required tune-up and the required monitoring of the operational characteristics of the unit have been performed.

PART 6 TEST METHODS

6.1 Compliance with NOx emission and oxygen requirements of Section 3.1 shall be determined using the following test methods:

6.1.1 Oxides of Nitrogen – ARB Method 100 or EPA Method 7E

6.1.2 Stack Gas Oxygen – ARB Method 100 or EPA Method 3A

6.1.3 Carbon Monoxide – ARB Method 100 or EPA Method 10

6.2 Test methods other than those specified in Section 6.1 for oxides of nitrogen and stack-gas oxygen, may be used to determine compliance so long as they are functionally equivalent and approved by the Air Pollution Control Officer and EPA.

6.3 For source testing performed pursuant to Section 3.4, compliance with an applicable standard or numerical limitation of this Rule shall be determined as defined by the test methods listed in Section 6.1 of this Rule.