(Adopted [Rule Adoption Date]) V120321

RULE 1147.2 NOX REDUCTIONS FROM METAL MELTING AND HEATING FURNACES

(a) Purpose

The purpose of this rule is to reduce emissions of Nitrogen Oxide (NOx) and Carbon Monoxide (CO) from Metal Melting Furnaces, Metal Heat Treating Furnaces, Metal Heating Furnaces, and Metal Forging Furnaces.

(b) Applicability

This rule applies to an owner or operator of a Metal Melting Furnace, Metal Heat Treating Furnace, Metal Heating Furnace, or Metal Forging Furnace that requires a South Coast AQMD permit.

- (c) Definitions
 - ALTERATION means any physical change or addition to an existing Unit requiring an application for Permit to Construct pursuant to Rule 201 – Permit to Construct.
 - (2) BTU means British thermal unit or units.
 - (3) CONTINUOUS EMISSION MONITORING SYSTEM (CEMS) means the total combined equipment and systems, including the sampling interface, analyzers, and data acquisition and handling system, used to continuously determine air contaminants and diluent gas concentrations and/or mass emission rate of a source effluent (as applicable).
 - (4) DECOMMISSIONED means a Unit that has been permanently shut down and has no source of fuel, air, electricity, or other utility source connected to it.
 - (5) FORMER RECLAIM FACILITY means a facility, or any of its successors, that was in the Regional Clean Air Incentives Market (RECLAIM) program as of January 5, 2018, as established in Regulation XX, that has received a final determination notification, and is no longer in the RECLAIM program.
 - (6) METAL FORGING FURNACE means a Unit which applies heat to a solid metal to allow for its further processing, forming, or shaping.
 - (7) METAL HEAT TREATING FURNACE means a Unit where heat is applied to a solid metal in order to alter its chemical properties, alter its microstructure to

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achieve desired mechanical properties (strength, hardness, toughness, ductility, and corrosion resistance), or alter its surface chemistry.

- (8) METAL HEATING FURNACE means a Unit where heat is applied to a solid metal in order to alter its physical properties.
- (9) METAL MELTING FURNACE means a Unit where metal is heated to a molten state.
- (10) NEW UNIT means a Unit that is installed, relocated, or replaced after [*Rule Adoption Date*].
- (11) NON-RECLAIM FACILITY means a facility, or any of its successors, that was not in the RECLAIM program as of January 5, 2018, as established in Regulation XX.
- (12) OPERATING HOURS means the number of hours in which fuel is burned by a UNIT.
- (13) OXIDES OF NITROGEN (NOX) EMISSIONS is the sum of nitrogen oxide and nitrogen dioxide emitted, collectively expressed as nitrogen dioxide emissions.
- (14) RADIANT-TUBE BURNER means an indirect-fired burner where combustion takes place in a tube to prevent contact between the products of combustion and the parts being heated.
- (15) RATED HEAT INPUT means the gross heat input of the Unit specified on a permanent rating plate attached by the manufacturer to the Unit, or as approved by the Executive Officer.
- (16) RECLAIM FACILITY means a facility, or any of its successors, that was in the RECLAIM program as of January 5, 2018, as established in Regulation XX.
- (17) REFRACTORY DRY-OUT means that period of time during which a Unit is either curing or drying-out refractory lining as a result of a New Unit installation, Existing Unit Alteration, or Existing Unit repair.
- (18) SHUTDOWN is as defined in Rule 429 Startup and Shutdown Exemption Provisions for Oxides of Nitrogen.
- (19) STARTUP is as defined in Rule 429 Startup and Shutdown Exemption Provisions for Oxides of Nitrogen.
- (20) THERM means 100,000 Btu.
- (21) UNIT means any Metal Melting Furnace, Metal Heat Treating Furnace, Metal Heating Furnace, or Metal Forging Furnace.

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- (d) Requirements
 - (1) Until an owner or operator is required to meet the NOx and CO concentration limits in Table 1 or the alternative NOx and CO concentration limits in Table 2 pursuant to subdivision (e), the owner or operator shall not operate a Unit that exceeds a NOx concentration limit of:
 - (A) 60 ppm, corrected to 3% oxygen, dry, for any Unit at a Non-RECLAIM Facility; or
 - (B) 102 ppm, corrected to 3% oxygen, dry, for any Unit at a Former RECLAIM Facility or RECLAIM Facility that does not have an existing NOx concentration limit on its Permit to Operate.
 - (2) An owner or operator of a Unit with a Rated Heat Input less than 40 MMBtu/hr shall not operate a Unit that exceeds the applicable NOx and CO concentration limits in Table 1 beyond the dates specified in the implementation schedule in paragraph (e)(1).

Table 1 NOX and CO Concentration Limits				
Unit Size	Furnace Type	Temperature	NOx Limit ¹	CO Limit ¹
. 40	Metal Melting	All Temperatures	40 ppm	
< 40 MMBtu/hr	Metal Heat Treating, Metal Heating, and Metal Forging	≤ 1,200 °F	40 ppm	1,000 ppm
		> 1,200 °F	50 ppm	
	Units with Radiant-Tube Burners	All Temperatures	50 ppm	
\geq 40 MMBtu/hr	All Units	All Temperatures	15 ppm ²	

Table 1 – NOx and CO Concentration Limits

¹ Corrected to 3% oxygen, dry

² Averaged over an 8-hour rolling interval

- (3) An owner or operator of a Unit with a Rated Heat Input less than 40 MMBtu/hr that elects to meet the NOx and CO concentration limits in Table 1 pursuant to the alternative implementation schedule in paragraph (e)(2), shall:
 - (A) Operate the Unit in compliance with the Permit to Operate if it has an existing condition that complies with the alternative NOx and CO concentration limits in Table 2; or
 - (B) For a Unit that does not have an existing condition pursuant to subparagraph (d)(3)(A),

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- Submit a permit application by July 1, 2022 to add a condition to the Permit to Operate that requires compliance with the alternative NOx and CO concentration limits in Table 2; and
- (ii) Demonstrate compliance with the alternative NOx and CO concentration limits in Table 2 by a source test approved by the Executive Officer pursuant to the implementation schedule in paragraph (e)(2).
- (C) For a Unit subject to subparagraph (d)(3)(B), that is denied a Permit to Operate, and the burner age of the Unit is greater than or equal to 12 years as of January 1, 2022, submit a permit application within 3 months of the denial of the Permit to Operate to replace the Unit to comply with the concentration limits in Table 3 or Alter the Unit and demonstrate compliance with the concentration limits in Table 1 pursuant to the implementation schedule in paragraph (e)(1).

Unit Size	Furnace Type	Temperature	NOx Limit ¹	CO Limit ¹	
< 40 MMBtu/hr	Metal Melting	All Temperatures	50 ppm		
	Metal Heat Treating, Metal Heating, and Metal Forging	≤ 1,200 °F	50 ppm	1,000 ppm	
		> 1,200 °F	60 ppm	1,000 ppm	
	Units with Radiant-Tube Burners	All Temperatures	60 ppm		

 Table 2 – Alternative NOx and CO Concentration Limits

Corrected to 3% oxygen, dry

- (4) An owner or operator of a Unit greater than or equal to 40 MMBtu/hr shall not operate a Unit that exceeds the applicable NOx and CO concentration limits in Table 1, averaged over an 8-hour rolling interval beyond the dates specified in the implementation schedule in paragraph (e)(3).
- (5) An owner or operator of a New Unit shall not operate a New Unit that exceeds the applicable NOx and CO concentration limits in Table 3.

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Unit Size	Furnace Type	Temperature	NOx Limit ¹	CO Limit ¹
< 40 MMBtu/hr	Metal Melting	All Temperatures	40 ppm	
	Metal Heat Treating,	≤ 1,200 °F	30 ppm	
	Metal Heating, and Metal Forging	> 1,200 °F	40 ppm	1 000 mmm
	Units with Radiant-Tube Burners	All Temperatures	40 ppm	1,000 ppm
≥40 MMBtu/hr	All Units	All Temperatures	15 ppm ²	

¹ Corrected to 3% oxygen, dry

² Averaged over an 8-hour rolling interval

(e) Implementation Schedules

- (1) An owner or operator of a Unit with a Rated Heat Input less than 40 MMBtu/hr that is required to meet the NOx and CO concentration limits in Table 1 pursuant to paragraph (d)(2) shall:
 - (A) Determine the burner age pursuant to subdivision (g);
 - (B) Submit a permit application that limits NOx and CO concentrations to a level not to exceed the concentration limits in Table 1:
 - On or before July 1, 2022 for any Unit where the burner age is 12 years or older as of January 1, 2022; or
 - (ii) On or before July 1 of the year a Unit's burner age reaches 12 years by January 1 of that year; and
 - (C) Not operate a Unit that exceeds the NOx and CO concentration limits in Table 1 on and after 12 months following issuance of a Permit to Construct.
- (2) An owner or operator of a Unit with a Rated Heat Input less than 40 MMBtu/hr that meets the requirements for use of an alternative implementation schedule pursuant to subparagraph (d)(3)(A) or (d)(3)(B), shall:
 - (A) Determine the burner age pursuant to subdivision (g);
 - (B) Submit a permit application that limits NOx and CO concentrations to a level not to exceed the concentration limits in Table 1:

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- (i) On or before July 1, 2022 for any Unit where the burner age is 32 years or older as of January 1, 2022; or
- (ii) On or before July 1 of the year a Unit's burner age reaches 32 years by January 1 of that year; and
- (C) Not operate a Unit that exceeds the NOx and CO concentration limits in Table 1, on and after 12 months following issuance of a Permit to Construct.
- (3) An owner or operator of a Unit with a Rated Heat Input greater than or equal to 40 MMBtu/hr shall:
 - (A) Submit a permit application that limits NOx and CO concentrations to a level not to exceed the concentration limits in Table 1 on or before July 1, 2022; and
 - (B) Not operate a Unit that exceeds the NOx and CO concentration limit in Table 1, on and after either the date the Permit to Operate is issued or 18 months from the date the Permit to Construct is issued, whichever is sooner.
- (4) An owner or operator of a Unit that fails to comply with the permit application submission requirements of paragraph (d)(2), (d)(3), or (d)(4) shall:
 - (A) For Units with a Rated Heat Input less than 40 MMBtu/hr, not operate the Unit unless the Unit meets the concentration limits in Table 1 or Table 2 on and after 30 months following the permit application submittal date in paragraph (e)(1) or (e)(2); or
 - (B) For Units with a rated heat input greater than or equal to 40 MMBtu/hr, not operate the Unit unless the Unit meets the concentration limits in Table 1 no later than 36 months following the permit application submittal date in (e)(3).
- (5) An owner or operator of a Unit that is subject to the concentration limit and implementation schedule requirements of paragraph (d)(2), (d)(3), or (d)(4) without any physical Alteration to the Unit and without a permit condition requiring compliance with the NOx and CO concentration limits specified in Table 1 or Table 2 shall submit a permit application to modify the existing Permit to Operate pursuant to the applicable permit application submittal date in paragraph (e)(1), (e)(2), or (e)(3).

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- (6) An owner or operator that elects to Decommission a Unit, in lieu of meeting the concentration limit and implementation schedule requirements of paragraph (d)(2), (d)(3), or (d)(4) shall:
 - (A) Notify the Executive Officer in writing on or before the permit application submittal date pursuant to the implementation schedule in paragraph (e)(1), (e)(2), or (e)(3) that the Unit will be Decommissioned no later than 30 months following the permit application submittal date pursuant to the implementation schedule in paragraph (e)(1), (e)(2), or (e)(3); and
 - (B) Decommission the Unit no later than 30 months following the permit application submittal date pursuant to the implementation schedule in paragraph (e)(1), (e)(2), or (e)(3) by disconnecting all fuel, air, and electricity to the Unit.
- (7) An owner or operator of a Unit that notifies the Executive Officer pursuant to the Decommission requirements of paragraph (e)(6) and fails to Decommission the Unit within 30 months following the permit application submittal date pursuant to the implementation schedule in paragraph (e)(1), (e)(2), or (e)(3) shall not operate the Unit unless:
 - (A) The owner or operator notifies the Executive Officer in writing no later than 30 months following the permit application submittal date pursuant to the implementation schedule in paragraph (e)(1), (e)(2), or (e)(3) that the Unit subject to the Decommission requirements of paragraph (e)(6) will not be Decommissioned; and
 - (B) The owner or operator of a Unit subject to the Decommission requirements of paragraph (e)(6) demonstrates compliance with the NOx and CO concentration limits in Table 1 no later than 30 months following the permit application submittal date pursuant to the implementation schedule in paragraph (e)(1), (e)(2), or (e)(3).
- (8) Implementation Schedule for Facilities with Two or More Units An owner or operator of a facility with two or more Units subject to paragraphs (d)(2), (d)(3), or (d)(4) with a July 1, 2022 permit application submittal date pursuant to the implementation schedule in paragraph (e)(1) or (e)(2), may elect to comply with the multiple unit implementation schedule pursuant to Table 4, in lieu of the implementation schedule in paragraph (e)(1) or (e)(2), provided:

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- (A) The owner or operator submits permit application(s) for Unit(s) subject to the minimum percentage of the total Rated Heat Input, rounded up to the nearest whole number of Units, to comply with the concentration limits in Table 1 by the implementation schedule specified in Table 4;
- (B) The Units meet the concentration limits in Table 1 no later than 12 months following the Permit to Construct is issued; and
- (C) The owner or operator that elects to meet the permit application submission requirements of subparagraph (e)(8)(A) by Decommissioning a Unit shall:
 - (i) Notify the Executive Officer in writing on or before the permit application submittal date in Table 4;
 - (ii) Decommission the Unit within 30 days of the notification requirement of clause (e)(8)(C)(i); and
 - (iii) Identify the Unit as having complied with the permit application submission requirements of subparagraph (e)(8)(A).

to Meet Concentration Limits in Table 1			
Permit Application Submittal Date	2 – 9 Units (% of total Rated Heat Input)	10 – 19 Units (% of total Rated Heat Input)	20 or More Units (% of total Rated Heat Input)
July 1, 2022	50%	-	-
July 1, 2023	100%	50%	50%
July 1, 2024	Not Applicable	100%	-
July 1, 2025	Not Applicable	Not Applicable	100%

to Meet Concentration Limits in Table 1

- (9) An owner or operator of a Unit that is subject to more than one NOx concentration limit may comply with the higher NOx concentration limit.
- (f) Demonstration of Less than 1 Pound NOx per Day
 - (1) An owner or operator demonstrating compliance with NOx emissions of less than 1 pound per day shall:

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 (A) Install and maintain in service a non-resettable totalizing time meter on the Unit and operate the Unit no more than the specified number of hours per month in Table 5 calculated using Equation 1; or

Monthly Operating Hours = $1 \div [R \ x \ (EF \div HHV)] \ x \ 30$ (Eq. 1) Where,

- R = Rated Heat Input (MMBtu/hr),
- EF = Emission Factor (lb NOx/MMScf natural gas)
- HHV = Higher Heating Value of Natural Gas (1,050 MMBtu/MMScf)
 - 30 = Conversion to monthly hours

Table 5 – Less than 1 Pound per Day Monthly Operating Limits

Unit Rated Heat Input (Btu/hr)	Monthly Operating Hour Limit
< 1,000,000	265
\geq 1,000,000 to < 1,500,000	175
\geq 1,500,000 to \leq 2,000,000	145

(B) Install and maintain in service a non-resettable totalizing fuel meter on the Unit and consume no more than the Therms of fuel per month calculated using Equation 2.

Monthly Therms of Fuel = $(1 \div EF) x HHV x 300$ (Eq. 2) Where,

EF = Emission Factor for the Unit

HHV = Higher Heating Value of Fuel

300 = Conversion to monthly average from MMBtu to Therms

- (2) An owner or operator of a Unit that is exempt pursuant to paragraph (k)(3), that exceeds 1 pound NOx per day for any given month, shall:
 - (A) Submit a permit application to meet the concentration limits in Table 1 within 6 months of the exceedance of 1 pound NOx per day; and
 - (B) Meet the concentration limits in Table 1 within 12 months after a Permit to Construct is issued.

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- (g) Determination of Burner Age
 - (1) Burner age for Units with a Rated Heat Input of less than 40 MMBtu/hr and equipped with burners of varying ages shall be based on the oldest burner.
 - (2) Burner age shall be based on the original date of installation determined by:
 - (A) Invoice from burner manufacturer for purchase of burner equipment;
 - (B) Information submitted to the South Coast AQMD with prior applications for permit for the specific burner;
 - (C) Original Unit manufacturer's identification or rating plate permanently affixed to the Unit; or
 - (D) Any other method of determining burner age that can be substantiated through sufficient written information as approved by the Executive Officer; or
 - (3) The burner shall be deemed to be 32 years old as of January 1, 2022 for any Unit where the Burner age cannot be determined pursuant to paragraph (g)(2).
- (h) Monitoring and Source Testing Requirements
 - An owner or operator of a Unit subject to the concentration limit and implementation schedule requirements in paragraph (d)(1), (d)(2), (d)(3), or (d)(4) shall:
 - (A) For Units with a Rated Heat Input of less than 10 MMBtu/hr, conduct a source test no later than 60 calendar months from the previous source test; or
 - (B) For Units with a Rated Heat Input greater than or equal to 10 MMBtu/hr, conduct a source test no later than:
 - (i) 60 calendar months from the previous source test for Units with an annual heat input of less than or equal to 23 billion Btu per year; or
 - (ii) 36 calendar months from the previous source test for Units with an annual heat input of greater than 23 billion Btu per year in any year.
 - (2) An owner or operator of a Unit shall conduct an initial source test within 12 months of [*Date of Rule Adoption*] or use the results of a South Coast AQMD-approved source test conducted between January 1, 2018 and [*Date of Rule*]

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Adoption] and establish the date of this source test as the basis for subsequent source testing frequency.

- (3) An owner or operator of a Unit shall submit a source test protocol to the Executive Officer for approval no later than 90 days prior to the scheduled source test and conduct the source test within the 90-day period, or within 30 days following the source test protocol approval, whichever is later.
- (4) An owner or operator of a Unit that has a previously approved protocol pursuant to the protocol submission requirements of paragraph (h)(3) may submit the previously approved protocol if the burner and Unit have not been Altered, unless the Executive Officer determines that the previously approved protocol is no longer applicable or requires modification and a new source test protocol is required to be submitted.
- (5) Any compliance demonstration shall be made in the 25%-100% firing range of the Rated Heat Input of the Unit.
- (6) Any compliance demonstration shall use a South Coast AQMD-approved contractor under the Laboratory Approval Program according to the following procedures:
 - (A) South Coast AQMD Source Test Method 100.1 Instrumental Analyzer Procedures for Continuous Gaseous Emission Sampling (March 1989);
 - (B) South Coast AQMD Source Test Method 7.1 Determination of Nitrogen Oxide Emissions from Stationary Sources (March 1989) and South Coast AQMD Source Test Method 10.1 - Carbon Monoxide and Carbon Dioxide by Gas Chromatograph/Non-Dispersive Infrared Detector (GC/NDIR) - Oxygen by Gas Chromatograph-Thermal Conductivity (GC/TCD) (March 1989);
 - (C) EPA Test Method 19 Sulfur Dioxide Removal and Particulate, Sulfur Dioxide and Nitrogen Oxides from Electric Utility Steam Generators (August 2017); or
 - (D) Any alternative test method submitted in writing to, and pre-approved by, the Executive Officer of the South Coast AQMD, the California Air Resources Board, and the United States Environmental Protection Agency.

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- (7) Source test reports, including a description of the equipment tested, shall be submitted to the Executive Officer within 60 days of completion of the source test.
- (8) An owner or operator of a Unit conducting a source test shall:
 - (A) Not perform any Unit tuning, including modifying the air-to-fuel ratio and excess air content, subsequent to the beginning of a source test, except to maintain the burner settings set during the Unit tuning;
 - (B) Conduct the source within the calendar month that the source test is due pursuant to the source testing frequency requirements in paragraph (h)(1); and
 - (C) For a Unit that is not in operation on the date the source test is required, conduct the source test by the end of seven consecutive days, or 15 cumulative days, of resumed operation.
- (9) An owner or operator of a Unit with a Rated Heat Input greater than or equal to 40 MMBtu/hr shall:
 - (A) For Units located at a Non-RECLAIM Facility or Former RECLAIM Facility, install, certify, operate, and maintain a CEMS to measure NOx and oxygen pursuant to the applicable Rule 218.2 and Rule 218.3 requirements to demonstrate compliance with the concentration limits in Table 1 at the corresponding oxygen correction and averaging times;
 - (B) An owner or operator of a Unit equipped with a certified CEMS to measure NOx emissions shall be exempt from NOx source testing requirements;
 - (C) An owner or operator of a Unit equipped with a certified CEMS to measure CO emissions shall be exempt from CO source testing requirements; and
 - (D) Conduct an annual relative accuracy test audit (RATA) required by any applicable South Coast AQMD rule or certification procedure for CEMS certification, operation, monitoring, reporting, and notification; 40 CFR Part 75 Subpart E; or 40 CFR Part 60 Appendix B Specification 2, for those pollutants monitored by a CEMS.
- (10) An owner or operator of a Unit with an exhaust emission control system that utilizes ammonia shall:

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- (A) Demonstrate compliance quarterly with any ammonia limit established in the permit of the Unit, according to the procedures in South Coast AQMD Source Test Method 207.1 – Determination of Ammonia Emissions from Stationary Sources, as specified by an existing permit condition or beginning within 12 months of a new Permit to Operate being issued, whichever is sooner;
- (B) Demonstrate compliance annually with any ammonia limit established in the permit of the Unit, if the Unit has demonstrated compliance with the quarterly source test requirements of subparagraph (h)(10)(A) for four consecutive quarterly source tests;
- (C) Return to the original schedule to conduct source tests quarterly pursuant to subparagraph (h)(10)(A) if a Unit fails to demonstrate compliance with the annual source test requirements of subparagraph (h)(10)(B); or
- (D) For Units located at a Non-RECLAIM Facility or Former RECLAIM Facility, install, certify, operate, and maintain a CEMS to measure ammonia and oxygen pursuant to any applicable South Coast AQMD rule or certification procedure for CEMS certification, operation, monitoring, reporting, and notification to demonstrate compliance with the ammonia permit limit of the Unit at the corresponding oxygen correction and averaging times; or
- (E) For Units located at a RECLAIM Facility install, certify, and operate a CEMS to measure ammonia and oxygen pursuant to Rule 2012 to demonstrate compliance with the ammonia permit limit of the Unit at the corresponding oxygen correction and averaging times.
- (11) Any compliance determination approved by the Executive Officer shall be used to establish the basis for subsequent source testing frequency.
- (i) Labelling Requirements
 - (1) An owner or operator of a Unit shall display the model number and Rated Heat Input of the Unit burner on a permanent rating plate.
 - (2) The owner or operator of a Unit that is Altered shall:
 - (A) Display the new Rated Heat Input on a new permanent supplemental rating plate installed in an accessible location on the Unit or burner; and

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- (B) Determine the date of Unit Alteration pursuant to the burner age determination requirements of subdivision (g).
- (j) Recordkeeping Requirements
 - (1) An owner or operator shall maintain on-site, for at least 5 years and make available to the Executive Officer upon request, source test reports and, if applicable, monthly records demonstrating compliance with the 1 pound NOx per day demonstration requirements of subdivision (f).
 - (2) An owner or operator shall maintain sufficient operating records to demonstrate that a Unit complies with the requirements for extension of the source test deadline in subparagraph (h)(8)(C).
 - (3) An owner or operator shall maintain records on-site identifying the Rated Heat Input for any Unit subject to this rule and make such records available to the Executive Officer upon request.
 - (4) An owner or operator of a Unit that is Altered and subject to this rule shall maintain records on-site to include the name of the company and person Altering the Unit, a description of all Alterations, the date(s) the Unit was Altered, and a calculation of the Rated Heat Input and make such records available to the Executive Officer upon request.
 - (5) An owner or operator of a Unit equipped with a CEMS shall maintain records on-site in compliance with any applicable South Coast AQMD Rule for CEMS certification, operation, monitoring, reporting, and notification or any applicable permit condition, for at least 5 years and make records available to the Executive Officer upon request.
- (k) Exemptions
 - (1) The concentration limits of subdivision (d) shall not apply to Units during periods of Refractory Dry-Out.
 - (2) The provisions of this rule shall not apply to Units during periods of Startup or Shutdown.
 - (3) The provisions of this rule shall not apply to electrically-powered Units.
 - (4) Units emitting less than 1 pound per day of NOx pursuant to subdivision (f) shall only be subject to subdivisions (i) and (j).