

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report

Proposed Amended Rule 429 – Startup and Shutdown Provisions for Oxides of Nitrogen

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Deputy Executive Officer

Planning, Rule Development, and Area Sources
Sarah L. Rees, Ph.D.

Assistant Deputy Executive Officer

Planning, Rule Development, and Area Sources
Michael Krause

Planning and Rules Manager

Planning, Rule Development, and Area Sources
Michael Morris

Author: Isabelle Shine – Air Quality Specialist

Contributors: Shah Dabirian – Program Supervisor
Lizabeth Gomez – Air Quality Specialist
James McCreary – Air Quality Specialist
Kevin Ni – Air Quality Specialist
Barbara Radlein – Program Supervisor
Brian Vlasich – Air Quality Specialist
Shawn Wang – Air Quality Specialist
Lisa Wong – Air Quality Specialist

Reviewed By: Rodolfo Chacon – Program Supervisor
Mary Reichert – Senior Deputy District Counsel

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EXECUTIVE OFFICER:

WAYNE NASTRI

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EXECUTIVE SUMMARY

Control Measure CMB-05 of the Final 2016 Air Quality Management Plan (2016 AQMP) included a five tons per day nitrogen oxides (NO_x) emission reduction as soon as feasible but no later than 2025, and a direction to transition the Regional Clean Air Incentives Market (RECLAIM) program to a command-and-control regulatory structure requiring Best Available Retrofit Control Technology (BARCT) as soon as practicable. California State Assembly Bill 617 (AB 617), approved by the Governor on July 26, 2017, requires Air Districts to develop, by January 1, 2019, an expedited schedule for the implementation of BARCT no later than December 31, 2023 for facilities that are in the state greenhouse gas cap-and-trade program.

Proposed Amended Rule 429 – Startup and Shutdown Provisions for Oxides of Nitrogen (PAR 429) is a companion rule to Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines (Rule 1134), Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Rule 1146), Rule 1147 – NO_x Reductions from Miscellaneous Sources (Rule 1147), Rule 1147.1 – NO_x Reductions from Aggregate Dryers (Rule 1147.1), and Proposed Rule 1147.2 – NO_x Reductions from Metal Melting and Heating Furnaces (PR 1147.2). PAR 429, Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and PR 1147.2 facilitate the transition of the RECLAIM program to a command-and-control regulatory structure.

Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and PR 1147.2 establish NO_x and CO emission limits. However, NO_x and CO concentration limits will not apply during startup and shutdown events. PAR 429 is needed to establish requirements during startup and shutdown pursuant to U.S. EPA policies to regulate startup, shutdown, and malfunction.

A total of 60 units at twenty-five facilities will be affected by PAR 429. PAR 429 limits the duration of startup and shutdown events and the frequency of scheduled startups. PAR 429 also establishes best management practices for startup and shutdown events as well as notification and recordkeeping requirements.

PAR 429 was developed through a public process. Staff held a Working Group Meeting on January 6, 2022. In addition, a Public Workshop will be held on February 18, 2022.

CHAPTER 1: BACKGROUND

INTRODUCTION

BACKGROUND

U.S. EPA'S POLICY ON STARTUP, SHUTDOWN, AND MALFUNCTION

**SOUTH COAST AQMD STARTUP AND SHUTDOWN PERMIT
CONDITIONS**

**NO_x CONCENTRATION AND MASS EMISSIONS DURING STARTUP
AND SHUTDOWN**

REGULATORY HISTORY

AFFECTED FACILITIES AND EQUIPMENT

PUBLIC PROCESS

INTRODUCTION

PAR 429 is a companion rule to Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and PR 1147.2. Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and PR 1147.2 establish NO_x and CO emission limits for combustion equipment. PAR 429 exempts units from NO_x and CO concentration limits and applicable rolling average provisions during startup and shutdown. PAR 429 also establishes requirements during startup and shutdown pursuant to U.S. EPA policies to regulate startup, shutdown, and malfunction. PAR 429 limits the duration of startup and shutdown events and the frequency of scheduled startups. Additionally, PAR 429 establishes best management practices for startup and shutdown events and notification and recordkeeping requirements.

BACKGROUND

2016 AQMP Control Measure CMB-05

The 2016 AQMP includes control measure CMB-05 which committed to identifying approaches to make the RECLAIM program more effective. During the adoption of the 2016 AQMP, staff was directed to modify CMB-05 to achieve the five tons per day of NO_x emission reduction commitment as soon as feasible, but no later than 2025, and to transition the RECLAIM program to a command-and-control regulatory structure requiring BARCT level controls as soon as practicable. A command-and-control regulatory structure establishes emission limits for each individual piece of equipment, in contrast to a market-based program, such as RECLAIM, where an emission target is established in the aggregate. A command-and-control regulatory structure directly regulates an industry with requirements that state what is permitted and what is prohibited. The ‘command’ is the presentation of standards that must be complied with by facilities. The ‘control’ part signifies the negative sanctions that may result from non-compliance. In this instance, NO_x landing rules prescribe emission limits and other requirements for specific equipment or industries.

Startup and Shutdown

Under the RECLAIM program, facilities are required to hold sufficient RECLAIM Trading Credits (RTCs) to reconcile actual emissions at the end of each annual compliance cycle, including the emissions that occur during startup and shutdown. A unit and/or associated control equipment is not operating under steady-state conditions during startup or shutdown, which may result in greater emissions. For example, during startup and shutdown of combustion equipment, the temperature of the unit and/or associated controls is in transition and requires the addition of excess air. This process results in increased NO_x formation.

Under a command-and-control regulatory structure, an owner or operator is required to meet emission limits on each individual piece of equipment on a continuous basis. Consequently, units that can otherwise meet lower NO_x concentration limits during steady-state conditions, may be unable to do so during periods of startup and shutdown. Therefore, provisions are needed to exclude emissions that occur during startup and shutdown from compliance determination with BARCT concentration limit(s).

U.S. EPA POLICY ON STARTUP, SHUTDOWN, AND MALFUNCTION (SSM)

U.S. EPA issued startup, shutdown, and malfunction (SSM) policies in 2015 and 2020, which provided differing guidance on the requirements necessary for State Implementation Plan (SIP) approval. The 2015 policy stated that an emission limitation must be applicable to the source continuously to be permissible in a SIP, whereas the 2020 policy stated that a SIP may contain exemption provisions to emission limits during SSM events if the SIP is composed of numerous planning requirements that collectively protect the National Ambient Air Quality Standards (NAAQS). PAR 429 is designed to meet the requirements for startup and shutdown provisions described in the 2015 SSM SIP Policy.

On September 30, 2021, U.S. EPA issued a guidance memorandum to withdraw the 2020 SSM SIP Policy and reinstate the 2015 SSM SIP Policy¹.

2015 Startup, Shutdown, and Malfunction State Implementation Plan Policy

In 2015, U.S. EPA issued a SSM SIP Policy which stated that exemptions from emission limitations during startup and shutdown events and affirmative defense provisions were inconsistent with the federal Clean Air Act (CAA)². U.S. EPA asserted that an emission limitation must be applicable to the source continuously to be permissible in a SIP pursuant to CAA section 302(k). U.S. EPA's 2015 SSM SIP Policy stated that SIP emission limitations do not need to be numerical in format, do not have to apply the same limitation (e.g. numerical level) at all times, and may include alternative numerical limitations, other technological control requirements, or work practice requirements during startup and shutdown events, so long as those components of the emission limitations meet applicable federal CAA requirements.

U.S. EPA issued SIP calls to 36 states with SIP provisions that were substantially inadequate in meeting the CAA requirements. Subsequently, petitions for review were filed with the D.C. Circuit Court of Appeals regarding U.S. EPA's 2015 SSM Policy. In 2017, the D.C. Circuit postponed oral arguments at the request of U.S. EPA because U.S. EPA was reviewing the 2015 SSM SIP Policy. U.S. EPA then issued its October 9, 2020 Memorandum Inclusion of Provisions Governing Periods of Startup, Shutdown, and Malfunctions in State Implementation Plans (2020 SSM SIP Policy)³. However, on September 30, 2021, U.S. EPA withdrew the 2020 SSM SIP Policy and reinstated the 2015 SSM SIP Policy. Thus the 2015 SSM SIP Policy is the operative guidance document.

SOUTH COAST AQMD STARTUP AND SHUTDOWN PERMIT CONDITIONS

South Coast AQMD permits often contain startup and shutdown requirements. The permit conditions are tailored for specific equipment and may include limits to the frequency and duration of startups and shutdowns, in addition to mass emission limits, monitoring, and recordkeeping

¹ [2021 SSM Guidance Memorandum | U.S. EPA](#)

² [2015 SSM Policy | U.S. EPA](#)

³ [2020 SSM Policy | U.S. EPA](#)

requirements for startups and shutdowns. Staff initially sought to rely on permit conditions to limit startup and shutdown events. However, U.S. EPA recommended that startup and shutdown be included in rules to facilitate enforceability and ensure SIP approval. PAR 429 will include general restrictions for startup and shutdown events while permit conditions will provide tailored requirements and remain in effect after PAR 429 is amended. If a permit contains more stringent requirements than PAR 429, the more stringent permit requirements will continue to be applicable.

NO_x CONCENTRATION AND MASS EMISSIONS DURING STARTUP AND SHUTDOWN

NO_x mass emissions for major NO_x sources such as process heaters and boilers that have a maximum rated capacity greater than or equal to 40 million Btu per hour are calculated using a certified Continuous Emissions Monitoring System (CEMS). CEMS measures several variables to calculate the mass flow rate of NO_x in units of lb/hour. Standard gas conditions are defined as a gas temperature of 60°F and a gas pressure of 760 mm Hg (14.7 pounds per square inch) absolute. Table 1-1 contains the measured variables generally used to determine NO_x mass emissions.

**TABLE 1-1
NO_x MASS EMISSIONS VARIABLES FOR CEMS CALCULATIONS**

Measured Variables
1. Stack NO _x concentration and exhaust flow rate; OR
2. Stack NO _x concentration, O ₂ concentrations, and fuel rate

From the measured variables, an hourly mass emissions flow rate is calculated and total daily mass emissions from each source is reported. Fuel flow measuring devices can be used for approximating stack flow in conjunction with F-factors. Each CEMS is required to conduct semi-annual or annual assessment test of each CEMS known as a Relative Accuracy Test Audit (RATA).

Fundamentally, NO_x mass emissions are calculated from the measured NO_x concentration and measured stack gas volumetric flow rate. Alternatively, the stack gas volumetric flow rate can also be approximated from measured fuel flow rate for each type of fuel used. Below are general equations to determine NO_x mass emissions.

NO_x mass emissions are calculated according to the following:

$$\text{lbs/hour} = (\text{Stack Gas Concentration}) \times (\text{Stack Gas Volumetric Flow Rate}) \times (1.195 \times 10^{-7})$$

- Stack Gas NO_x concentration as measured in ppmvd
- Stack Gas Volumetric Flow Rate in dscfh

Alternatively, determination of stack flow rate from fuel flow is based on the following equation:

$$\text{Stack Flow Rate} = [20.9 / (20.9 - \text{O}_2 \text{ concentration})] \times (\text{dry F-factor} \times \text{Fuel flow rate} \times \text{HHV})$$

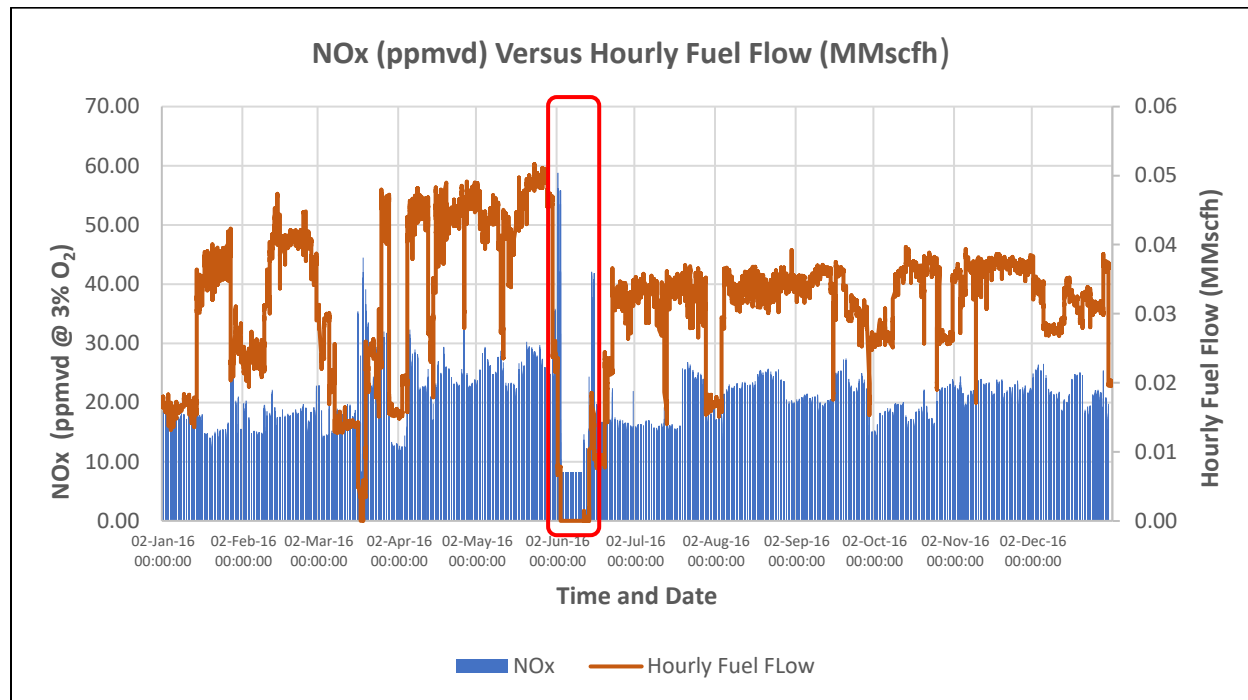
- O₂ Concentration is measured at the stack in percent
 - Oxygen based dry F-factor of the fuel in dscf/MMBtu
 - Fuel flow rate*
 - Higher heating value of fuel, HHV*
- *The product of the fuel flow rate and HHV in MMBTU/hr

Low NO_x concentration limits for stationary combustion sources can be achievable through steady-state, controlled operation of the combustion equipment. Emissions from startup and shutdown of combustion equipment, on the other hand, are not steady-state emissions and fluctuate more compared to emissions under normal controlled operations. NO_x emissions are not well characterized during periods of startup and shutdown. These periods serve as transitional periods to help thermally stabilize the unit prior to and after full operation. For example, during startup and shutdown of combustion equipment, the temperature of the unit and/or associated controls is in transition and requires the addition of excess air. This process results in increased NO_x formation. While NO_x concentration can be higher than normal, this does not necessarily translate to higher NO_x mass emissions since fuel rates are typically lower than normal operation since the units are not operating at full operational capacity. As mentioned earlier, a lower fuel rate will result in lower stack volumetric flow rate which is one of the factors in determining overall NO_x mass emissions.

Below are two examples of startup/shutdown periods and associated NO_x emissions for units equipped with NO_x controls. The first example is of a process heater with low-NO_x burners (LNB) only and the second example is of a boiler with a LNB and selective catalytic reduction (SCR).

Example One: 82 MMBtu/hr Process Heater with LNB

Figure 1-1 is an example of CEMS data that staff analyzed for a 82 MMBtu/hr process heater equipped with LNB. To show relationship between NO_x and fuel, the primary y-axis represents NO_x emissions in ppmvd and secondary y-axis represents fuel flow in MMscfh. Based on CEMS data, staff identified several periods as potential startup/shutdown scenarios – typically characterized by the ramping down and up of fuel. According to the data there are instances of NO_x excursions, but the corresponding fuel usage was dramatically lower, so overall NO_x mass emissions were also lower. Fuel usage can be up to 80% less than normal operation during these startup/shutdown periods. NO_x excursions during these periods only occurred for short durations where the unit was in a transitional state. This excursion is expected since manufacturer guarantees for combustion control equipment performance are at steady-state operations and not transitional or startup/shutdown periods.

Figure 1-1 – CEMS and fuel data for 82 MMBtu/hr process heater with low NOx burners

Please note the data analyzed by staff was raw unaudited CEMS data that was not annotated with events specifying startup or shutdown periods. Table 1-2 contains a sample NOx emissions calculation comparison based on the process heater in Example 1.

TABLE 1-2
NO_x EMISSION CALCULATION FOR 82 MMBTU/HR
PROCESS HEATER WITH LNB

	Steady-State Operation	Startup/Shutdown
NO_x Concentration @ 3% O₂ (ppmvd)	14.7	55.8
Hourly Fuel Flow (MMscfh)	0.03807	0.00738
HHV(Btu/scf)	1,294	1,220
Measured O₂ (%)	5.3	10.1
Calculated Stack Flow rate (dscfh)	574,853	151,760
NO_x Emissions (lb/hr)	1.01	1.0009

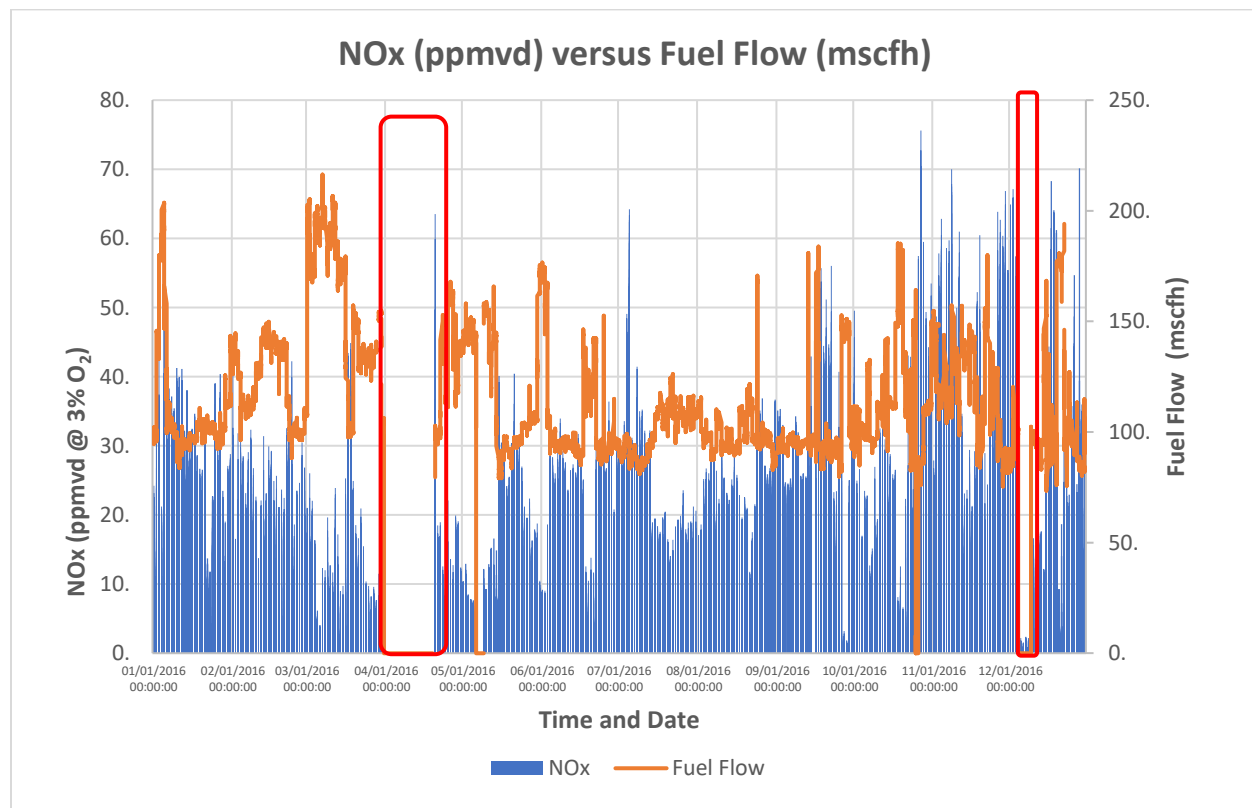
Based on the CEMS data for the example process heater with LNB only, the NO_x concentration calculation during a potential startup/shutdown period does not necessarily equate to a higher mass emission of NO_x. Other measured variables, such as flow rate also contribute to the overall calculation. In the example above, there was nearly four times more NO_x based on concentration in ppmvd during the potential startup/shutdown period but the corresponding mass emission rate did not translate to four times more NO_x mass emissions.

Example Two: 304 MMBtu/hr Boiler with LNB and SCR

NO_x emissions for units equipped with NO_x post-combustion control equipment such as SCR can potentially show a higher deviation in overall NO_x mass emissions during startup/shutdown periods. This is primarily due to the SCR not being in optimal operation. Modern SCR designs can achieve up to 95% reduction and achieve very low NO_x concentrations, however there is an optimal temperature range where the high NO_x reduction can occur. If the unit is not at optimal temperature, the SCR cannot achieve maximum NO_x reductions – general temperature window is approximately 550 °F to 1000 °F and will vary based on catalyst type and manufacturer. During startup periods the temperature of flue gas leaving the unit may not be high enough for optimal SCR performance and will require time to reach optimal temperature. Furthermore, older SCRs (installed in the early to mid-1990's) do not perform as well as modern SCR design and removal efficiencies can be lower in the 50 to 60% range.

Figure 1-2 is an example of CEMS data for a 304 MMBtu/hr boiler with first generation LNB and an older SCR for NO_x control. The boiler currently has a 0.015 lb/MMBtu NO_x limit under RECLAIM. Similar to Example One above, the relationship between NO_x and fuel is shown. The primary y-axis represents NO_x emissions in ppmvd and secondary y-axis represents fuel flow in mscfh. Based on CEMS data, staff identified two periods as potential start-up/shutdown scenarios which are highlighted by the red boxes.

Figure 1-2 – CEMS and fuel data for 304 MMBtu/hr Boiler with LNB and SCR



Based on the CEMS data that staff analyzed for the boiler, NO_x concentrations can be up to three times as high during startup; this is expected since the SCR is not at optimal temperature for maximum NO_x removal efficiency. However, this high NO_x mass emission rate event only occurred for a limited amount of hours and is highlighted in yellow in Table 1-3 below. The assumption can be made that once the SCR reached optimal temperature and its proper operation was achieved, the NO_x mass emission dropped by approximately 50% and if it was a modern or upgraded SCR, the reduction can be even greater within a short period of time.

**TABLE 1-3
STARTUP PERIOD AND STEADY-STATE CEMS DATA FOR BOILER**

Date/Time	NO _x (ppmvd)	NO _x @3% (ppmvd)	O ₂ (%)	Stack Flow (mscfh)	Fuel Flow (mscfh)	NO _x (lbs/hr)	HHV 1 (Btu/scf)
STARTUP							
04/20/2016 12:59:59	9.598	36.712	6.825	1481.349	79.521	1.7	1423.098
04/20/2016 13:59:59	21.129	49.717	5.353	1718.691	101.182	4.4	1435.702
04/20/2016 14:59:59	29.847	63.514	5.128	1768.25	102.788	6.31	1473.157
04/20/2016 15:59:59	25.811	59.907	5.321	1679.679	97.276	5.18	1460.168
04/20/2016 16:59:59	12.956	29.501	5.277	1702.361	100.359	2.63	1438.495
04/20/2016 17:59:59	10.723	24.491	5.284	1698.026	102.195	2.18	1408.337
04/20/2016 18:59:59	10.726	24.23	5.259	1695.41	102.184	2.17	1408.552
04/20/2016 19:59:59	10.095	23.552	5.333	1661.187	101.33	2.01	1385.474
04/20/2016 20:59:59	7.772	20.083	5.584	1610.468	96.606	1.5	1385.709
04/20/2016 21:59:59	7.003	18.369	5.623	1602.834	97.491	1.34	1363.175
04/20/2016 22:59:59	6.758	17.679	5.616	1603.367	97.569	1.29	1363.398
12/09/2016 09:59:59	0.115	-79.615	21.026	0.	0.	0.	1278.705
12/09/2016 10:59:59	4.432	38.116	18.907	0.	0.	0.	1304.594
12/09/2016 11:59:59	20.721	55.371	14.264	0.	0.	0.	1309.392
12/09/2016 12:59:59	16.299	33.094	12.135	0.	0.	0.	1298.104
12/09/2016 13:59:59	47.855	52.797	4.685	1754.493	88.013	10.19	1301.049
12/09/2016 14:59:59	18.715	20.73	4.75	2043.689	101.386	4.58	1308.846
12/09/2016 15:59:59	11.314	12.767	5.048	1950.424	95.915	2.63	1296.179
12/09/2016 16:59:59	9.344	10.322	4.706	2047.318	102.413	2.29	1301.559

For comparison, the Table 1-4 below shows the typical NO_x concentrations and NO_x mass emissions during a period of normal steady-state operations for the boiler in Example 2.

**TABLE 1-4
STEADY-STATE CEMS DATA FOR BOILER**

Date/Time	NO _x (ppmvd)	NO _x @3% (ppmvd)	O ₂ (%)	Stack Flow (mscfh)	Fuel Flow (mscfh)	NO _x (lbs/hr)	HHV 1 (Btu/scf)
STEADY-STATE							
09/18/2016 23:59:59	9.053	12.098	7.531	2280.177	85.121	2.47	1482.556
09/19/2016 00:59:59	9.202	12.271	7.502	2307.62	83.744	2.54	1541.083
09/19/2016 01:59:59	9.385	12.541	7.53	2318.878	83.332	2.6	1556.373
09/19/2016 02:59:59	9.106	12.166	7.527	2301.028	83.773	2.5	1520.396
09/19/2016 03:59:59	9.964	13.071	7.279	2294.182	87.997	2.74	1458.136
09/19/2016 04:59:59	10.639	13.766	7.089	2339.046	89.019	2.98	1511.721
09/19/2016 05:59:59	10.688	13.806	7.065	2311.644	89.495	2.95	1480.086
09/19/2016 06:59:59	10.701	13.815	7.057	2308.005	90.352	2.95	1451.861
09/19/2016 07:59:59	9.951	12.509	6.681	2362.826	95.677	2.81	1413.167
09/19/2016 08:59:59	9.533	12.254	6.997	2311.638	91.588	2.64	1411.058
09/19/2016 09:59:59	9.585	12.153	6.804	2402.644	93.827	2.75	1451.252
09/19/2016 10:59:59	9.451	11.988	6.809	2406.33	93.128	2.72	1463.91
09/19/2016 11:59:59	9.413	11.999	6.879	2400.68	92.648	2.7	1460.66
09/19/2016 12:59:59	10.827	13.748	6.824	2413.017	92.247	3.12	1480.524
09/19/2016 13:59:59	10.176	12.907	6.809	2398.985	93.444	2.92	1454.725
09/19/2016 14:59:59	9.626	12.206	6.805	2375.061	95.558	2.73	1409.008

REGULATORY HISTORY

Rule 429 – Start-Up and Shutdown Exemption Provisions for Oxides of Nitrogen

South Coast AQMD Rule 429 was adopted on May 5, 1989 and last amended on December 21, 1990. Rule 429 applies to equipment subject to Rule 1109, Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines (Rule 1134), Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Rule 1146), and Rule 1159 – Nitric Acid Units - Oxides of Nitrogen (Rule 1159). Rule 429 established an exemption from NO_x emission limits during scheduled startup and shutdown events, as well as limitations to the number and duration of scheduled startup and shutdown events and notification and recordkeeping requirements.

RECLAIM Program

The RECLAIM program is a market-based program that was adopted on October 15, 1993 and applies to facilities with annual emissions four tons per year or more of NO_x or SO_x. The RECLAIM program was designed to achieve emission reductions in aggregate equivalent to what would occur under a command-and-control regulatory approach. As listed in Rule 2001–Applicability, subdivision (j), facilities subject to NO_x RECLAIM are exempted from meeting the requirements of Rule 429.

Under the RECLAIM program, an owner or operator is required to hold RTCs at the end of each annual compliance cycle that are representative of all actual emissions, except for breakdowns which meet specific criteria under Rule 2004 – Requirements. Emissions that occur under typical operations, as well as emissions that occur from startups and shutdowns, are counted toward the actual emissions that are required to be reconciled.

In a command-and-control regulatory structure, as opposed to the RECLAIM program, an owner or operator is required to meet emission limits on each individual piece of equipment on a continuous basis. Staff recognizes that during startup and shutdown activities, where total mass emissions may be low relative to normal operation, the concentration values may exceed the limits set in Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and PR 1147.2. Therefore, PAR 429 is needed to establish requirements during startup and shutdown pursuant to U.S. EPA policies to regulate startup, shutdown, and malfunction.

AFFECTED FACILITIES AND EQUIPMENT

PAR 429 applies to equipment utilizing CEMS, ACEMS, or SCEMS that are subject to Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and PR 1147.2. Based on permitting data and South Coast AQMD databases, staff identified 60 units at 25 facilities that meet the applicability requirements of PAR 429. Table 1-5 contains the equipment affected by PAR 429.

**TABLE 1-5
PAR 429 AFFECTED EQUIPMENT**

Equipment Type	Number of Units
Boilers and Process Heaters > 40 MM Btu/hour rated heat input	23
Boilers and Process Heaters ≤ 40 MM Btu/hour rated heat input	2
Simple Cycle Gas Turbines	17
Cogeneration, Combined Cycle, Compressor and Recuperative Gas Turbines	11
Kilns	1
Aggregate Dryers	2
Furnaces	4

PUBLIC PROCESS

The development of PAR 429 was conducted through a public process. One Working Group Meeting was held on January 6, 2022. The Working Group Meeting included representatives from affected facilities, environmental and community groups, other agencies, consultants, and interested parties. The purpose of Working Group Meetings is to discuss details of the proposed amended rule and to listen to concerns and issues with the objective to build consensus and resolve key issues.

In addition, one Public Workshop will be held on February 18, 2022. The purpose of the Public Workshop is to present the proposed amended rule language to the general public and to stakeholders and to solicit comments.

CHAPTER 2: SUMMARY OF PROPOSAL

INTRODUCTION

PROPOSED AMENDED RULE 429

INTRODUCTION

PAR 429 will establish requirements during periods of startup and shutdown. The proposed amended rule will be applicable to equipment utilizing continuous emissions monitoring systems (CEMS), alternative continuous emission monitoring systems (ACEMS), or semi-continuous emission monitoring systems (SCEMS) that are subject to PAR 429. The following provides a discussion of provisions under PAR 429.

PROPOSED AMENDED RULE 429

Subdivision (a) – Purpose

The purpose of this rule is to provide an exemption from oxides of nitrogen (NO_x) and carbon monoxide (CO) concentration limits during periods of startup and shutdown and establish requirements during startup and shutdown to limit NO_x and CO emissions. PAR 429 is needed to establish requirements during startup and shutdown pursuant to U.S. EPA policies to regulate startup, shutdown, and malfunction.

Subdivision (b) – Applicability

PAR 429 applies to an owner or operator of equipment utilizing CEMS, ACEMS, or SCEMS that are subject to Rules 1134, 1146, 1147, 1147.1, and 1147.2. Equipment is used as a general term in PAR 429, whereas unit is a defined rule term in PAR 429 that is used to refer to specific types of equipment.

Subdivision (c) – Definitions

PAR 429 incorporates definitions from source-specific rules to define types of facilities, equipment, and other rule terms. New or modified key definitions added to PAR 429 include:

- **SCHEDULED STARTUP** means a planned startup that is specified by January 1 of each year.

Scheduled startup events include, but are not limited to, those planned for maintenance, testing, tuning, or construction. A startup is only considered a scheduled startup if it is specified by January 1 each year. Scheduled startups do not include change in status due to demand loads, unplanned maintenance, breakdowns, malfunctions, or other events not scheduled prior to January 1 for the upcoming calendar year.

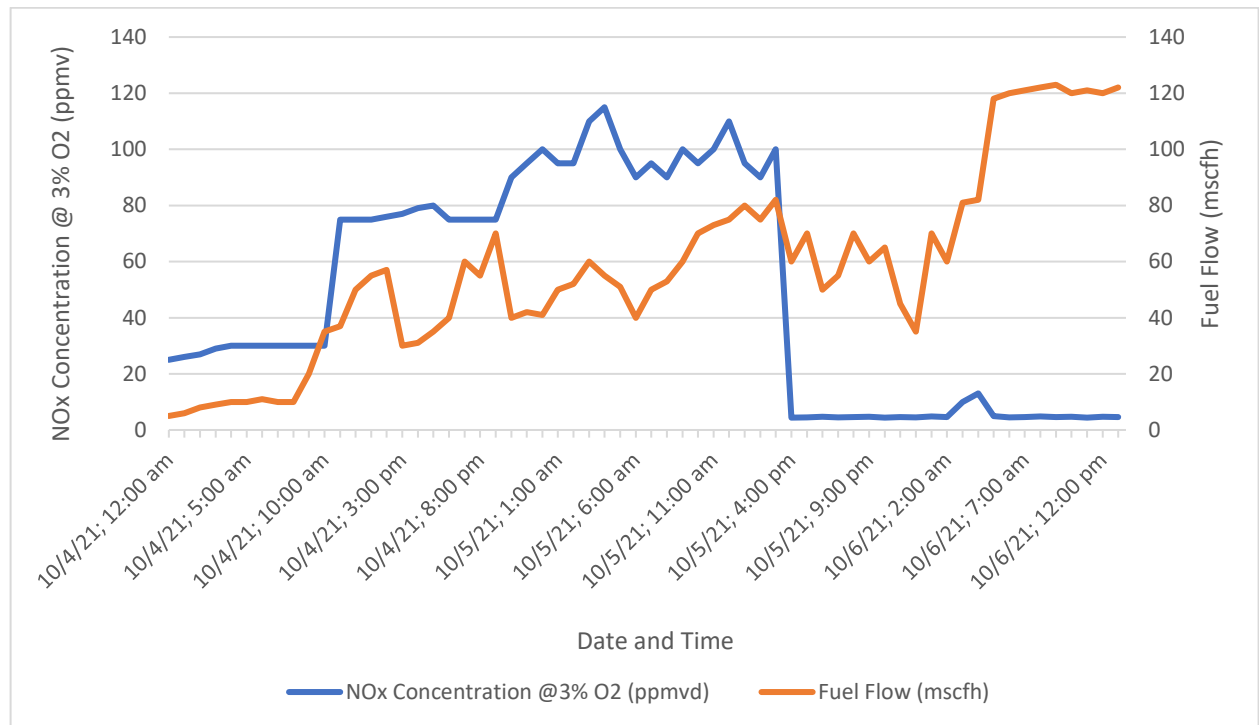
- **STABLE CONDITIONS** means that the fuel flow and fuel composition to a unit, is consistent and allows for normal operations.

This proposed definition provides clarification for compliance determination under subparagraph (d)(2)(A), as well as the definition of startup. A unit may stabilize and destabilize multiple times during a complex startup procedure. Stable conditions are only determined after all startup procedures for a unit are complete.

Staff provides an example of when evaluating the time stable conditions are met is essential for determining compliance with the startup and shutdown duration limits specified in paragraph (d)(2) (Figure 2-1). This example was created by staff for clarification purposes and is not based on actual CEMS data. This example is for a process heater equipped with NO_x post-combustion control equipment, which has a startup duration limit of 48 hours.

In this example, startup begins on October 4, 2021, at 12:00 am. On October 5, 2021, at 4:00 pm the flue gas temperature reaches the minimum operating temperature of the NO_x post-combustion control equipment, the NO_x post-combustion equipment begins operating, and the NO_x concentration limit of 5 ppmv is met. The process heater took 40 hours to reach the minimum operating temperature of the NO_x post-combustion control equipment and meet the concentration limit. The process heater continues to meet the 5 ppmv NO_x concentration limit until October 6, 2021 at 3:00 am, where it exceeds the concentration limit for 2 hours, before meeting 5 ppmv NO_x again on October 6, 2021 at 5:00 am when fuel flow stabilizes. In this example, the process heater used 42 hours of the 48-hour startup duration limit specified in paragraph (d)(2) and is in compliance with paragraph (d)(2). The 11 hours that the unit was meeting the concentration limit before reaching stable fuel flow is not counted towards the startup duration limit pursuant to paragraph (d)(2).

Figure 2-1 – Startup Example for Process Heater with NO_x Post-combustion Control Equipment



Subdivision (d) – Requirements

Exemption from Concentration Limits During Startup and Shutdown

Paragraph (d)(1) specifies that NO_x and CO concentration limits and applicable rolling average provisions in Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2 do not apply during startup and shutdown. Paragraph (d)(1) applies to facilities in RECLAIM, former RECLAIM facilities, and non-RECLAIM facilities.

Paragraph (d)(1) applies to all equipment types subject to Rules 1134, 1146, 1147, 1147.1, and 1147.2 that are utilizing CEMS, ACEMS, or SCEMS, regardless if the equipment type is specified in the PAR 429 definition of unit. Startup and shutdown provisions in PAR 429 are based on existing Rule 429 requirements and startup and shutdown information from existing units. Other equipment types that install CEMS, ACEMS, or SCEMS in the future will have startup and shutdown requirements through the permitting process until PAR 429 can be amended to reflect appropriate startup and shutdown requirements for that individual equipment type.

If a unit has a permit condition limiting the time of startup or shutdown, the unit is only exempt from the NO_x and CO concentration limits and applicable rolling average provisions in Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2 for the time specified in the permit condition. While in RECLAIM, a PAR 429 facility will continue to be required to reconcile emissions under the RECLAIM program during startup and shutdown.

PAR 429 specifies requirements during startup and shutdown for non-RECLAIM facilities and former RECLAIM facilities. The startup and shutdown allowances specified in Table 1 (Table 2-1 in Staff Report) can be excluded from the applicable rolling average regardless of whether Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2 concentration limits were being met during startup or shutdown. If the startup or shutdown exceeds the duration limits allowed pursuant to Table 1, the owner or operator is subject to the concentration limitations and applicable rolling average provisions in Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2. Refractory dryout do not count towards the duration limits pursuant to paragraph (g)(2) and are not subject to the NO_x and CO concentration limits and applicable rolling average provisions in Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2; however the unit is only exempt for the time specified in a permit condition, if applicable. A unit operating only the pilot is not subject to the NO_x and CO concentration limits and applicable rolling average provisions in Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2 pursuant to paragraph (g)(1).

Startup and Shutdown Duration Limits

Paragraph (d)(2) includes Table 1 (Table 2-1 in Staff Report), which contains the startup and shutdown duration limits for units at former RECLAIM facilities and non-RECLAIM facilities. Startup and shutdown duration limits only apply when a unit exceeds the applicable NO_x or CO concentration limits in Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2. The following examples are provided to clarify certain startup and shutdown situations.

During the startup or shutdown of a unit, exhaust emission concentrations may fluctuate due to the nature of startups and shutdowns. Therefore, the time counted towards the startup and shutdown duration limits in PAR 429 may be non-continuous. For example, a unit may meet the applicable NO_x and CO concentration limits temporarily during a startup or shutdown but then experience operational swings where the applicable concentration limits are not met due to instability. The time counted towards Table 1 duration limits does not start anew if Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2 concentration limits are temporarily met during the startup or shutdown, but then fluctuations result in an emission increase which exceeds applicable concentration limits.

However, in a situation where the owner or operator of a unit has initiated a startup of a unit but then had to shutdown the unit and will startup the unit again, then the Table 1 duration limits would apply anew.

A unit with permit conditions which specifies more stringent startup or shutdown duration limits than PAR 429 will continue to be restricted by its existing permit conditions. The duration limits in Table 1 specify the hour limitation for each individual startup or shutdown; it is not the combined time allowance for startup and shutdown. For example, a combined cycle gas turbine has 2 hours to startup and 2 hours to shutdown.

The startup and shutdown duration limits are based on existing Rule 429 limits for Rule 1146 and Rule 1134 units. Startup and shutdown duration limits for units subject to Rules 1147, 1147.1, and 1147.2 are based on facility provided startup and shutdown information, including CEMS data from the affected units.

PAR 429 provides limited relief from the concentration limits assigned per Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2 for startup and shutdown. If there are periods of time during startup and shutdown where emissions comply with the limits established in Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2, then the limited relief is not needed for that amount of time in compliance nor is the compliant time to be deducted from the amount of time of relief established in PAR 429.

**TABLE 2-1
STARTUP AND SHUTDOWN DURATION LIMITS**

Unit Type	Not to Exceed per Startup or Shutdown
Boilers and Process Heaters > 40 MM Btu/hour Rated Heat Input	8 hours
Boilers and Process Heaters ≤ 40 MM Btu/hour Rated Heat Input	6 hours
Simple Cycle Gas Turbines	15 minutes
Cogeneration, Combined Cycle, Compressor and Recuperative Gas Turbines	2 hours
Furnaces	24 hours
Aggregate Dryers	45 minutes
Tunnel Kilns	2 hours

Best Management Practices

Best management practices are contained in subparagraph (d)(2)(A). If a unit reaches stable conditions and reaches the minimum operating temperature of the NO_x post-combustion control equipment, if applicable, before reaching the duration limit specified in Table 1, the startup period is considered to be over, and the unit is required to meet applicable NO_x and CO concentration limits in Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2. Stable conditions and minimum operating temperature are defined in PAR 429. Subparagraph (d)(2)(A) will further limit excess emissions from startup events.

Limit to the Number of Scheduled Startups

Paragraph (d)(3) limits each unit to 10 scheduled startups per calendar year. Limiting the frequency of scheduled startups provides further bounds to the startup and shutdown provisions. Unscheduled startups are not limited by PAR 429 because they may be driven by operational demand, emergencies, or maintenance needs. The number of scheduled startups allowed for each unit per calendar year is specified in Table 2 (Table 2-2 in Staff Report).

The limits to the frequency of scheduled startups are based on existing Rule 429 requirements. The frequency of scheduled startups for boilers and process heaters ≤ 40 MM Btu/hour rated heat input was reduced from 10 scheduled startups per month to 10 scheduled startups per year to further bound startup and shutdown provisions. Staff did not hear from any stakeholders that more scheduled startups are necessary for boilers and process heaters ≤ 40 MM Btu/hour rated heat input. The scheduled startup frequency for furnaces is based on facility provided startup and shutdown information.

**TABLE 2-2
MAXIMUM NUMBER OF SCHEDULED STARTUPS**

Unit Type	Maximum Number of Scheduled Startups per Calendar Year
Furnaces	35
All Other Units	10

General Duty Requirements

Paragraph (d)(4) was modified from an existing Rule 429 provision and requires that an owner or operator of a unit at a former RECLAIM facility or non-RECLAIM facility that exceeds applicable Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2 NO_x and CO concentration limits during startup or shutdown to take all reasonable and prudent steps to minimize emissions to meet applicable concentration limits. Reasonable and prudent steps to minimize emissions include, but are not limited to, equipment repairs and adjusting the temperatures of post-combustion controls.

Requirements for Units with NO_x Post-Combustion Control Equipment

Paragraph (d)(5) requires each unit equipped with NO_x post-combustion control equipment to install and maintain in operation a temperature measuring device that is calibrated annually at the

inlet of the NO_x post-combustion control equipment. Temperature measuring devices include thermocouples and temperature gauges. Most existing units with NO_x post-combustion control equipment are already equipped with temperature measuring devices. It is standard practice to include a temperature measuring device requirement for units with NO_x post-combustion control equipment in South Coast AQMD permits, and any future units would be expected to install and maintain a temperature measuring device through the permitting process. A temperature measuring device is necessary to determine the temperature of the gas stream entering the NO_x post-combustion control equipment and when the catalyst in the NO_x post-combustion control equipment will effectively control NO_x emissions.

NO_x Post-Combustion Control Equipment Operating Temperature

Paragraph (d)(6) requires the operation of NO_x post-combustion control equipment during startup and shutdown events, including the injection of any associated chemical reagent into the exhaust stream to control NO_x, if the temperature of the gas to the inlet of the emission control system is greater than or equal to the minimum operating temperature of the NO_x post-combustion control equipment and the temperature of the exhaust gas is stable. Minimum operating temperature is defined in PAR 429.

Subdivision (e) – Notification

Subdivision (e) provides notification requirements for scheduled startups. Notifications are required to be made on or before January 1 each year by calling 1-800-CUT-SMOG or by using other approved methods of notification as approved by the Executive Officer. Advanced notification of these events is considered important because it gives the South Coast AQMD time to allocate resources if necessary to monitor the startup and information to respond to inquiries from the community should they arise.

Subdivision (f) – Recordkeeping

Records assist in verifying compliance with Rule 429. Paragraph (f)(1) provides recordkeeping requirements for owners and operators of units at a former RECLAIM facility and non-RECLAIM facilities. Records are required to be maintained on-site for 5 years and made available to the South Coast AQMD upon request. The provision in subparagraph (f)(1)(A) requires the operating log to contain the date, time, duration, and reason for each startup, shutdown, and refractory dryout event. An operating log may also contain but is not limited to operator signed-off procedures and graphical trends showing key variables of the unit such as temperatures and flow rates. Staff notes that it is the responsibility of the operator to demonstrate to the Executive Officer and their representative that compliance with duration limits or with specified exempt activities under PAR 429 is met. For startups, the reason provided in the operating log must specify if the startup was scheduled. Subparagraphs (f)(1)(B) requires a list of scheduled startups.

Paragraph (f)(2) requires an owner or operator of a unit at a former RECLAIM facility or a non-RECLAIM facility equipped with NO_x post-combustion control equipment to maintain documentation from the manufacturer of the minimum operating temperature of the NO_x post-combustion control equipment, unless the applicable permit issued by the South Coast AQMD specifies the required minimum operating temperature of the NO_x post-combustion control

equipment. Documentation from the manufacturer may include, but is not limited to, an equipment manual or technical reports. Records are required to be on-site and made available to the South Coast AQMD upon request for compliance verification.

Subdivision (g) – Exemptions

Paragraph (g)(1) exempts units burning fuel exclusively in a pilot light from the startup and shutdown duration limits contained in paragraph (d)(2) and recordkeeping requirements specified in paragraph (f)(1). Fuel burned in a pilot light contributes relatively minimal emissions and is not the primary NO_x emission source in combustion equipment.

Paragraph (g)(2) exempts units from the startup and shutdown duration limits contained in paragraph (d)(2) during refractory dryouts. Refractory dryouts are usually required when refractory is installed or when the refractory requires partial replacement or repair. The purpose of refractory dryouts is to cure the material from entrained moisture to avoid undue cracking when the unit is in operation. During typical refractory dryouts, the amount of heat used is low compared to normal operation and exhaust gas temperatures from a furnace are not high enough for NO_x post-combustion control equipment to be operated properly. Furthermore, refractory dryouts are infrequent processes during which the expected mass emissions of NO_x are low.

CHAPTER 3: IMPACT ASSESSMENTS

INTRODUCTION

COSTS

EMISSION REDUCTIONS

COST-EFFECTIVENESS

INCREMENTAL COST-EFFECTIVENESS

SOCIOECONOMIC ASSESSMENT

CALIFORNIA ENVIRONMENTAL QUALITY ACT ANALYSIS

**DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE
SECTION 40727**

COMPARATIVE ANALYSIS

INTRODUCTION

Impact assessments were conducted during PAR 429 rule development to assess the environmental and socioeconomic implications of PAR 429. California Health & Safety Code (H&SC) requirements for cost-effectiveness analysis and incremental cost-effectiveness analysis were evaluated during rule development of PAR 429. Draft findings and comparative analyses were prepared pursuant to California Health and Safety Code Section (H&SC) 40727 and H&SC 40727.2, respectively. Staff will prepare a California Environmental Quality Act (CEQA) analysis at least 30 days prior to the South Coast AQMD Governing Board Hearing on PAR 429 which is anticipated to be heard on June 3, 2022.

COSTS

The provisions in PAR 429 are not expected to impose any additional costs.

EMISSION REDUCTIONS

There will not be additional emission reductions from combustion equipment subject to PAR 429; any emission reductions for these units are a result of Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and PR 1147.2.

COST-EFFECTIVENESS

The H&SC Section 40920.6 requires a cost-effectiveness analysis when establishing BARCT requirements. PAR 429 does not include new BARCT requirements nor is it expected to impose any additional costs. Therefore, this provision does not apply to the proposed amended rule.

INCREMENTAL COST-EFFECTIVENESS

H&SC Section 40920.6 requires an incremental cost-effectiveness analysis for BARCT rules or emission reduction strategies when there is more than one control option which would achieve the emission reduction objective of the proposed amendments, relative to ozone, CO, SO_x, NO_x, and their precursors. PAR 429 does not include new BARCT requirements nor does it include any requirements for additional control options. So, there is no more stringent control option upon which an incremental cost-effectiveness would be calculated. Therefore, this provision does not apply to PAR 429.

SOCIOECONOMIC ASSESSMENT

PAR 429 does not impose any additional costs to the affected facilities and does not result in any adverse socioeconomic impacts.

CALIFORNIA ENVIRONMENTAL QUALITY ACT ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA) and South Coast AQMD's certified regulatory program (Public Resources Code Section 21080.5, CEQA Guidelines Section 15251(l) and South Coast AQMD Rule 110), the South Coast AQMD, as lead agency for the proposed project, is currently reviewing PAR 429 to determine if it will result in any potential adverse environmental impacts. Appropriate CEQA documentation will be prepared based on the analysis.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

Requirements to Make Findings

H&SC 40727 requires that prior to adopting, amending or repealing a rule or regulation, the South Coast AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report. The draft findings are as follows:

Necessity

PAR 429 is needed to establish limits on duration and frequency of startup and shutdown events for units that exceed the applicable NO_x or CO concentration limits in Rules 1134, 1146, 1147, 1147.1 and 1147.2.

Authority

The South Coast AQMD obtains its authority to adopt, amend, or repeal rules and regulations pursuant to H&SC Sections 39002, 39616, 40000, 40001, 40440, 40702, 40725 through 40728, 40920.6, and 41508, as well as the federal Clean Air Act.

Clarity

PAR 429 is written or displayed so that its meaning can be easily understood by the persons directly affected by them.

Consistency

PAR 429 is in harmony with and not in conflict with or contradictory to, existing statutes, court decisions or state or federal regulations.

Non-Duplication

PAR 429 will not impose the same requirements as any existing state or federal regulations. The proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD.

Reference

In adopting this rule, the following statutes which the South Coast AQMD hereby implements, interprets or makes specific are referenced: H&SC Sections 39002, 40001, 40702, 40440(a), and 40725 through 40728.5, and the federal Clean Air Act.

COMPARATIVE ANALYSIS

Under H&SC Section 40727.2, the South Coast AQMD is required to perform a comparative written analysis when adopting, amending, or repealing a rule or regulation. The comparative analysis is relative to existing federal air pollution control requirements, existing or proposed South Coast AQMD rules and regulations, and all air pollution control requirements and guidelines which are applicable to the same equipment or source type. A comparative analysis is presented below in Table 3-1.

**TABLE 3-1
PAR 429 COMPARATIVE ANALYSIS**

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
Applicability	Equipment utilizing CEMS, ACEMS, or SCEMS and subject to Rule 1134, Rule 1146, Rule 1147, Rule 1147.1, and Rule 1147.2.	Stationary gas turbines with ≥ 0.3 MW except those located electric generating facilities (Rule 1135), landfills, petroleum refineries, and publicly owned treatment works or fueled with landfill gas	Boilers, steam generators, and process heaters of equal to or greater than 5 million Btu per hour rated heat input capacity used in all industrial, institutional, and commercial operations	Ovens, dryers, dehydrators, heaters, kilns, calciners, furnaces, crematories, incinerators, heated pots, cookers, roasters, fryers, closed and open heated tanks and evaporators, distillation units, afterburners, degassing units, vapor incinerators, catalytic or thermal oxidizers, soil and water remediation units and other combustion equipment with NOx emissions that require permit and are not regulated by another Regulation XI rule	Aggregate dryers with maximum rated heat input capacities greater than or equal to 2 MMBtu/hr	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.	Facilities up until January 5, 2018, unless otherwise exempted, if emission fee data for 1990 or any subsequent year filed pursuant to Rule 301, shows 4 or more tons per year of NOx or SOx emissions	Gas turbines with heat input of ≥ 10 MMBtu/hr that commenced construction, modification or re-construction on or before 2/18/2005	Gas turbines with heat input of ≥ 10 MMBtu/hr that commenced construction, modification or re-construction after 2/18/2005	Steam generating units that commenced construction, modification, or re-construction after 6/19/1984 and that has a heat input capacity of >29 MW (100 MMBtu/hr)	Steam generating units that commenced construction, modification, or re-construction after 6/9/1989 and that has a heat input capacity of 29 MW or less, but ≥ 2.9 MW (10 MMBtu/Hr)	New or modified minor source hot asphalt plants in tribal territory.

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
Requirements	<p>Startup and shutdown duration limits:</p> <ul style="list-style-type: none"> Boilers and Process Heaters > 40 MMBtu/hr rated heat input – 8 hours Boilers and Process Heaters ≤ 40 MMBtu/hr rated heat input – 6 hours Simple Cycle Gas Turbines – 15 minutes Cogeneration, Combined Cycle, Compressor and Recuperative Gas Turbines – 2 hours Tunnel Kilns – 2 hours Aggregate Dryers – 45 minutes 	<p>NOx emission limits @ 15% O₂:</p> <ul style="list-style-type: none"> Liquid fuel, located on outer continental shelf – 30 ppmv Natural gas, combined cycle- 2 ppmv Natural Gas, simple cycle- 2.5 ppmv Produced gas- 9 ppmv Produced gas, located on outer continental shelf – 15 ppmv Other – 12.5 ppmv <p>Stationary gas turbines installed</p>	<p>NOx limits @ 3% O₂ averaged over 15 minutes:</p> <ul style="list-style-type: none"> Digester gas: 15 ppmv Landfill gas: 25 ppmv Natural gas: 5 ppmv for ≥75 MMBtu/hr, 7 or 9 ppmv for 20–75 MMBtu/hr, 12 ppm for atmospheric, and 12 ppm for thermal fluid heaters <p>For other types of fuels: 30 ppmv for other gaseous fuels; 40 ppmv for nongaseous fuels</p> <p>CO limit @ 3% O₂ averaged</p>	<p>NOx ppm limits at 3% O₂ for gaseous fuel-fired equipment:</p> <ul style="list-style-type: none"> Asphalt manufacturing operation: 40 ppm Afterburner, Degassing Unit, Remediation Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator: 60 ppm or 0.073 lb/mmBtu Burn-off Furnace, Burnout Oven, Incinerator or Crematory with or without Integrated Afterburner minutes: 60 ppm or 0.073 lb/mmBtu Evaporator, Fryer, Heated Process Tank, or Parts Washer: 60 ppm or 	<p>NOx limits: 30 ppm</p> <p>CO Limit: 1,000 ppm</p> <p>All parts per million (ppm) emission limits are referenced at 3 percent volume stack gas oxygen on a dry basis averaged over a period of 15 consecutive minutes</p>	<p>Interim NOx limits: 60 ppm, corrected to 3% oxygen, dry, for any Unit at a Non-RECLAIM Facility; or 102 ppm, corrected to 3% oxygen, dry, for any Unit at a Former RECLAIM Facility that does not have an existing NOx concentration limit on its Permit to Operate.</p> <p>NOx emission limit for existing units corrected to 3% oxygen, dry:</p> <ul style="list-style-type: none"> Metal melting furnace < 40 MMBtu/hr: 40 ppm Metal Heat Treating, Metal 	<ul style="list-style-type: none"> Comply with all applicable rules and permit conditions as specified in the Facility Permit Prohibition of emissions in excess of annual allocation Modeling if actual NOx or SOx emissions exceed its initial allocation by ≥ 40 tons per year Effective 11/15/1998 each new, modified, and existing electric utility and industrial and commercial boiler which emits > 25 tons per year of NOx shall burn as its primary fuel natural gas, 	<p>NOx limit @ 15% O₂, where Y = Manufacture's rated heat input and F = NOx emission allowance for fuel-bound nitrogen:</p> <ul style="list-style-type: none"> 0.0075* (14.4/Y) +F 0.0150* (14.4/Y) +F <p>SO₂ limit @ 15% O₂:</p> <ul style="list-style-type: none"> 0.015% by volume 	<p>NOx limit @ 15% O₂:</p> <ul style="list-style-type: none"> ≤ 50 MMBtu/hr – 42 ppm new, firing natural gas, electric generating ≤ 50 MMBtu – 100 ppm new, firing natural gas, mechanical drive > 50 MMBtu/hr and ≤ 850 MMBtu/hr – 25 ppm new, firing natural gas > 850 MMBtu/hr – 15 ppm new, modified, or reconstructed, firing natural gas ≤ 50 MMBtu/hr – 96 ppm new, firing fuels other than natural gas, electric generating ≤ 50 MMBtu/hr – 150 ppm new, 	<p>SO₂ limits (30-day rolling average, except as provided in paragraph (f), apply at all times including SSM, except as provided in paragraph (i))* of this section and §60.45b(a):</p> <ul style="list-style-type: none"> Affected facility that commenced construction, reconstruction, or modification on or before February 28, 2005 that combusts coal or oil: 87 ng/J or 10% of the potential SO₂ emission rate and $E_s = \frac{(K_s H_s + K_r H_r)}{(H_s + H_r)}$ <ul style="list-style-type: none"> Affected facility that commenced construction, reconstruction, or modification on or before February 28, 2005 that combusts coal refuse alone in 	<p>SO₂ limits (30-day rolling average, apply at all times including startup, shutdown, and malfunction) :</p> <ul style="list-style-type: none"> Affected facility that combusts only coal or coal with coal refuse: 87 ng/J (0.20 lb/MMBTU) heat input or 10% of the potential SO₂ emission rate and 520 ng/J (1.2 lb/MMBTU) heat input Affected facility that combusts coal or coal refuse with other fuels: 87 ng/J (0.20 lb/MMBTU) heat input or 10% of the potential SO₂ emission rate 	<p>NOx limits: 36 ppm</p> <p>CO Limit: 400 ppm</p> <p>*All parts per million (ppm) emission limits are referenced at 3 percent volume stack gas oxygen on a dry basis averaged over a period of 15 consecutive minutes.</p>

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
	<ul style="list-style-type: none"> Furnaces – 24 hours Scheduled startups limited to 35 per calendar year for furnaces and 10 per calendar year for all other units Work practice requirements: <ul style="list-style-type: none"> Take all reasonable and prudent steps to minimize emissions during startup and shutdown Operate NOx post-combustion control equipment if the temperature to the gas at the inlet of the NOx post-combustion control 	prior to April 5, 2019 shall comply with the averaging time requirements specified on the SCAQM D permit to operate as of April 5, 2019, not to exceed 3 hours.	over 15 minutes: 400 ppmv	0.073 lb/mmBtu <ul style="list-style-type: none"> Metal Heat Treating, Metal Melting Furnace, Metal Pot, or Tar Pot: 60 ppm or 0.073 lb/mmBtu Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank: 30 ppm or 0.036 lb/mmBtu for process temperatures $\geq 800^{\circ}\text{F}$ and $< 1200^{\circ}\text{F}$ and 60 ppm or 0.073 lb/mmBtu for process temperatures $\geq 1200^{\circ}\text{F}$ Make-Up Air Heater or other Air Heater located outside of building with temperature 		Heating, and Metal Forging furnaces < 40 MMBtu/hr and $\leq 1,200^{\circ}\text{F}$: 40 ppm <ul style="list-style-type: none"> Metal Heat Treating, Metal Heating, and Metal Forging furnaces < 40 MMBtu/hr and $> 1,200^{\circ}\text{F}$: 50 ppm Units with Radiant-Tube Burners < 40 MMBtu/hr: 50 ppm All units ≥ 40 MMBtu/hr: 15 ppm (averaged over an 8-hour rolling interval) NOx emission limit for new units corrected to 3% oxygen, dry: <ul style="list-style-type: none"> Metal melting furnace < 40 MMBtu/hr: 40 ppm Metal Heat Treating, Metal 	methanol, or ethanol (or a comparably low polluting fuel); or use advanced control technology	Emission Limits: <ul style="list-style-type: none"> FCCU – 25 ppm SOx, dry @ 0% oxygen on a 365-day rolling average Emission Factors NOx: <ul style="list-style-type: none"> Refinery boiler > 40 MMBtu/hr – 2 ppm FCCU – 2 ppm Gas turbines – 2 ppm Calciner – 10 ppm SRU/TG unit – 95% reduction, 2 ppm 	firing fuels other than natural gas, mechanical drive <ul style="list-style-type: none"> > 50 MMBtu/hr and ≤ 850 MMBtu/hr – 74 ppm new, firing fuels other than natural gas > 850 MMBtu/hr – 42 ppm new, modified, or reconstructed, firing fuels other than natural gas ≤ 50 MMBtu/hr – 150 ppm modified or reconstructed > 50 MMBtu/hr and ≤ 850 MMBtu/hr – 42 ppm modified or reconstructed, firing natural gas > 50 MMBtu/hr and ≤ 850 MMBtu/hr – 96 ppm 	a fluidized bed combustion steam generating unit: 87 ng/J or 20% of the potential SO ₂ emission rate and 520 ng/J heat input <ul style="list-style-type: none"> Affected facility that combusts coal or oil, either alone or in combination with any other fuel, and that uses an emerging technology to control SO₂: 50% of the potential SO₂ emission rate and $E_s = \frac{(K_s H_s + K_o H_o)}{(H_s + H_o)}$ Affected facility that commenced construction, reconstruction, or modification on or before February 28, 2005 that: have an annual capacity factor for coal and oil of $\leq 30\%$ and a 	and $E_s = \frac{(K_s H_s + K_o H_o)}{(H_s + H_o)}$ <ul style="list-style-type: none"> Affected facility that combusts only coal refuse alone in a fluidized bed combustion steam generating unit: 87 ng/J (0.20 lb/MMBTU) heat input or 20% of the potential SO₂ emission rate and 520 ng/J (1.2 lb/MMBTU) heat input Affected facility that combusts only coal and that uses an emerging technology for the control of SO₂ emissions: 50% of the potential SO₂ emission rate and 260 ng/J (0.60 	

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
	<p>equipment is \geq the minimum operating temperature</p> <p>Install and maintain in operation a calibrated temperature measuring device on all units with NOx post-combustion control equipment</p>	<p>or gas turbines installed after April 5, 2019 shall average the NOx and ammonia emissions limits in Table II over a three-hour rolling average.</p>		<p>controlled zone inside building: 30 ppm or 0.036 lb/mmBtu</p> <ul style="list-style-type: none"> • Tenter Frame or Fabric or Carpet Dryer: 30 ppm or 0.036 lb/mmBtu • Other Unit or Process Temperature: 30 ppm or 0.036 lb/mmBtu for process temperatures $\geq 800^{\circ}\text{F}$ and $< 1200^{\circ}\text{F}$ and 60 ppm or 0.073 lb/mmBtu for process temperatures $\geq 1200^{\circ}\text{F}$ <p>NOx ppm limits at 3% O2 for liquid fuel-fired equipment: 40 ppm or 0.053 lb/mmBtu for process temperatures $\geq 800^{\circ}\text{F}$ and $< 1200^{\circ}\text{F}$ and 60 ppm or</p>		<p>Heating, and Metal Forging furnaces < 40 MMBtu/hr and $\leq 1,200^{\circ}\text{F}$: 30 ppm</p> <ul style="list-style-type: none"> • Metal Heat Treating, Metal Heating, and Metal Forging furnaces < 40 MMBtu/hr and $> 1,200^{\circ}\text{F}$: 40 ppm • Units with Radiant-Tube Burners < 40 MMBtu/hr: 40 ppm • All units ≥ 40 MMBtu/hr: 15 ppm (averaged over an 8-hour rolling interval) <p>CO emission limit corrected to 3% oxygen, dry: 1000 ppm</p> <p>An owner or operator demonstrating compliance with NOx emissions of less than 1 pound per day</p>	<p>Emission Standards SOx:</p> <ul style="list-style-type: none"> • Calciner – 10 ppmv • FCCU – 5 ppmv • Refinery boiler/heater – 40 ppmv • SRU/TG unit – 5 ppmv • Sulfuric acid manufacturing – 10 ppmv 		<p>modified or reconstructed, firing fuels other than natural gas</p> <p>SO₂ limit:</p> <ul style="list-style-type: none"> • 110 ng/J • 65 ng/J for turbines burning at least 50% biogas in a calendar month <p>Operate and maintain stationary combustion turbine, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.</p>	<p>federally enforceable permit limiting operation; is located in a noncontinental area; combusts coal and oil, alone or in combination with a duct burner as part of a combined cycle system where $\leq 30\%$ of the heat entering the steam generating unit is from combustion of coal and oil in the duct burner and $\geq 70\%$ of the heat entering the steam generating unit is from the exhaust gases entering the duct burner; or burns coke oven gas alone or in combination with natural gas or very low sulfur distillate oil: 520 ng/J if the facility</p>	<p>lb/MMBtu) heat input</p> <ul style="list-style-type: none"> • Affected facility that combusts coal with other fuels and that uses an emerging technology for the control of SO₂ emissions: 50% of the potential SO₂ emission rate and $E_e = \frac{(K_e H_e + K_s H_s + K_o H_o)}{(H_e + H_s + H_o)}$ <ul style="list-style-type: none"> • Affected facility that combusts coal alone or in combination with another fuel that has a heat input capacity of ≤ 22 MW, is subject to a federally enforceable requirement of an annual capacity factor for coal of $\leq 55\%$, located in a 	

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
				<p>0.080 lb/mmBtu for process temperatures $\geq 1200^{\circ}\text{F}$</p> <p>Perform combustion system maintenance in accordance with the manufacturer's schedule and specifications as identified in the manual and other written materials supplied by the manufacturer or distributor.</p>		<p>shall 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 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</p>			<p>combusts coal or 215 ng/J if the facility combusts oil other than very low sulfur oil</p> <ul style="list-style-type: none"> Affected facility that commenced construction, reconstruction, or modification after February 28, 2005 and that combusts coal, oil, natural gas, a mixture of these fuels, or a mixture of these fuels with any other fuels: 87 ng/J or 8% of the potential SO₂ emissions and 520 ng/J <p>* An affected facility subject to paragraph (a), (b), or (c) of this section may combust very low sulfur oil or natural gas when the SO₂ control system is not being operated because of malfunction or maintenance of</p>	<p>noncontiguous area, or combusts coal in a duct burner as part of a combined cycle system where $\leq 30\%$ of the heat entering the steam generating unit is from combustion of coal in the duct burner and $\geq 70\%$ of the heat entering the steam generating unit is from exhaust gases entering the duct burner:</p> $E_i = \frac{(K_1 H_1 + K_2 H_2 + K_3 H_3)}{(H_1 + H_2 + H_3)}$ <p>PM and Opacity Limits (apply at all times except during startup, shutdown, and malfunction)</p>		

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
										the SO ₂ control system Facilities burning coke oven gas alone or in combination with any other gaseous fuels or distillate oil are allowed to exceed the limit 30 operating days per calendar year for SO ₂ control system maintenance. PM and Opacity Limits (apply at all times except startup, shutdown, or malfunction, 24 hour average): • Affected facility that commenced construction, reconstruction, or modification on or before February 28, 2005 and that combusts coal or combusts mixtures of coal with other	• Affected facility that commenced construction, reconstruction, or modification on or before February 28, 2005, combusts coal or coal with other fuels, a heat input capacity ≥ 8.7 MW: 22 ng/J PM (annual capacity factor for the other fuels of 10% or less) or 43 ng/J PM (annual capacity factor for the other fuels >10%, and subject to a federally enforceable requirement) • Affected facility that commenced construction, reconstruction, or modification on or before	

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
										fuels: 22 ng/J (only coal or if the affected facility combusts coal and other fuels and has an annual capacity factor for the other fuels of $\leq 10\%$), 43 ng/J (affected facility combusts coal and other fuels and has an annual capacity factor for the other fuels > 10 percent% and is subject to a federally enforceable requirement), 86 ng/J (combusts coal or other fuels and has an annual capacity factor for coal or coal and other fuels of $\leq 30\%$, has a maximum heat input of ≤ 73 MW, has a federally enforceable limit ,construction of the affected	February 28, 2005, combusts wood or wood with other fuels (except coal), a heat input capacity ≥ 8.7 MW: 43 ng/J PM (annual capacity factor for wood >30%) or 130 ng/J PM (annual capacity factor for wood $\leq 30\%$ and federally enforceable limit) <ul style="list-style-type: none"> Affected facility that combusts coal, wood or oil, a heat input capacity ≥ 8.7 MW: 20% opacity (6 minute average) Affected facility that commenced construction, reconstruction, or 	

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
										facility commenced after June 19, 1984, and before November 25, 1986) <ul style="list-style-type: none"> Affected facility that commenced construction, reconstruction, or modification on or before February 28, 2005 that combusts oil (or mixture of oil with other fuels) and uses a SO2 control technology: 43 ng/J Affected facility that commenced construction, reconstruction, or modification on or before February 28, 2005 that combusts wood, or wood with other fuels, except coal: 43 ng/J (annual capacity factor >30% for wood) or 86 ng/J (annual 	modification on or before February 28, 2005, combusts wood, oil, coal, or a mixture of these fuels, wood with other fuels with any other fuels, a heat input capacity ≥ 8.7 MW; 13 ng/J PM	

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
										capacity factor $\leq 30\%$ for wood and subject to a federally enforceable annual capacity limit and a heat input capacity of ≤ 73 MW) <ul style="list-style-type: none"> Affected facility that combusts municipal-type solid waste or mixtures of municipal-type solid waste with other fuels: 43 ng/J (only municipal-type solid waste or combusts municipal type solid waste and other fuels and has an annual capacity factor for the other fuels of $\leq 10\%$), 86 ng/J (has an annual capacity factor for municipal-type solid waste and other fuels of $\leq 30\%$, a maximum heat input of ≤ 73 MW, a federally enforceable 		

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
										annual capacity limit, and construction of the affected facility commenced after June 19, 1984, but on or before November 25, 1986) <ul style="list-style-type: none"> • Affected facility that combusts coal, oil, wood, or mixture of these fuels with other fuels: 20% opacity (6 minute average) • Affected facility that commenced construction, reconstruction, or modification on or before February 28, 2005 that combusts coal, oil, wood, a mixture of these fuels, or a mixture of these fuels with any other fuels except as provided in paragraphs (h)(2), (h)(3), (h)(4), (h)(5). 		

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
										and (h)(6): 13 ng/J NOx limits (apply at all times including startup, shutdown, and malfunction, 30-day rolling average, except as provided in paragraph (j)): <ul style="list-style-type: none"> • Natural gas and distillate oil, except duct burners in combined cycle systems: 43 ng/J (low heat release), 86 ng/J (high heat release) • Residual Oil: 130 ng/J (low heat release), 170 ng/J (high heat release) • Coal: 210 ng/J (mass-feed stoker), 260 ng/J (spreader stoker and fluidized bed combustion), 300 ng/J (pulverized coal), 260 ng/J (Lignite), 340 ng/J (Lignite mined in North 		

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
										Dakota, South Dakota or Montana and combusted in a slag tap furnace), 210 ng/J (coal-derived synthetic fuels) <ul style="list-style-type: none"> • Duct burner in a combined cycle system: 86 ng/J (natural gas and distillate oil), 170 ng/J (residual oil) • Simultaneous combustion of mixtures of only coal, oil, or natural gas $E_c = \frac{(EL_{p,H_c}) + (EL_{s,H_c}) + (EL_{f,H_c})}{(H_{c,p} + H_{c,s} + H_{c,f})}$ <ul style="list-style-type: none"> • Affected facility that simultaneously combusts coal or oil, natural gas (or any combination of the three), and wood, or any other fuel: Emission limit pursuant to paragraph (a) or (b) • Affected facility that simultaneously 		

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
										combusts natural gas and/or distillate oil with a potential SO2 emissions rate of ≤ 26 ng/J with wood, municipal-type solid waste, or other solid fuel, except coal: 130 ng/J <ul style="list-style-type: none"> Affected facility that commenced construction after July 9, 1997: 86 ng/J (combusts coal, oil, or natural gas, or any combination of the three) 		
Monitoring	None	A continuous in-stack NOx monitor for turbines with a capacity of 2.9 MW or greater. Source testing every 1-3 years.	A continuous in-stack NOx monitor for units with a rated heat input capacity ≥ 40 MMBtu/hr and an annual heat input $> 200 \times 10^9$ Btu per year. Source testing every 3-5 years. Diagnostic	Source testing in accordance with the schedule in the permit. Test methods: District Source Test Method 100.1, ASTM Method D6522-00, United States Environmental Protection Agency	<ul style="list-style-type: none"> A continuous in-stack NOx monitor for existing systems Source testing once every 5 calendar years for units < 10 MMBtu/hr Source testing once every 3 	Source testing requirements for units subject to the concentration limit and implementation schedule requirements in paragraph (d)(1), (d)(2), (d)(3), or (d)(4): <ul style="list-style-type: none"> No later than 60 calendar months from 	<ul style="list-style-type: none"> Continuous monitoring device for each as specified in Rule 2012, Appendix A and Rule 2011, Appendix A for each major NOx or SOx source Source testing every 6 months for 	<ul style="list-style-type: none"> Performance test using either: EPA Method 20; ASTM D6522-00; EPA Method 7E and either EPA Method 3 or 3A; sampling traverse points following Method 20 or Method 1, and sampled 	<ul style="list-style-type: none"> Initial performance test Test methods: EPA Methods 7E and 3A, EPA Method 20, EPA Method 19 A continuous monitoring system to monitor and record the fuel consumption 	<ul style="list-style-type: none"> Performance tests Test Methods: Method 19, Method 3A or 3B, Method 5, 5B, or 17, Method 5, Method 17, Method 1, Method 9, Method 7E, Method 7.7A, 7E, Method 320 Quarterly accuracy 	<ul style="list-style-type: none"> Initial performance test Test Methods for PM: Method 1, Method 3A or 3B, Method 5, 5B, or 17, Method 9 CEMS for measuring SO2 and either O2 or CO2 at the outlet of the 	Permit specific

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
			emissions checks.	Conditional Test Method CTM-030, District Source Test Method 7.1, District Source Test Method 10.1, or Any alternative test method determined approved before the test in writing by the Executive Officers of the District, the California Air Resources Board and the United States Environmental Protection Agency. For any operator who chooses to comply using pound per million Btu, NOx emissions in pounds per million Btu of heat input shall be calculated	calendar years for units ≥ 10 MMBtu/hr and < 40 MMBtu/hr <ul style="list-style-type: none"> • Source testing once every calendar year for units ≥ 40 MMBtu/hr 	the previous source test for units < 10 MMBtu/hr <ul style="list-style-type: none"> • 60 calendar months from the previous source test for Units rated ≥ 10 MMBtu/hr with an annual heat input of less than or equal to 23 billion Btu per year • 36 calendar months from the previous source test for Units rated ≥ 10 MMBtu/hr with an annual heat input of greater than 23 billion Btu per year in any year Test methods: South Coast AQMD Source Test Method 100.1, South Coast AQMD Source Test Method 7.1, EPA Test Method 19, or any	major NOx sources at a Super Compliant NOx facility which is reclassified as a large NOx source <ul style="list-style-type: none"> • Source testing every 12 months (units with emission rates) and every 6 months (units with concentration limits) for major SOx sources at a Super Compliant SOx facility which is reclassified as a SOx process unit • Source testing shall comply with District Source Test Methods 1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 4.1, 6.1, 7.1, 307-91, and 100.1; ASTM 	for equal time intervals <ul style="list-style-type: none"> • A continuous monitoring system to monitor and record the fuel consumption and the ratio of water or steam to fuel (averaged over one hour) or CEMS consisting of NOx and O2 monitors for stationary gas turbines that commenced construction, reconstruction, or modification after October 3, 1977, but before July 8, 2004, and which uses water or steam injection to control NOx emissions (averaged 	and the ratio of water or steam to fuel or CEMS for stationary gas turbines using water or steam injection (hourly average) <ul style="list-style-type: none"> • Annual performance tests or continuous monitoring for turbines without water or steam injection. • Monitor the total sulfur content of the fuel being fired. 	determinations and daily calibration drift tests for CEMS <ul style="list-style-type: none"> • SO2 CEMS except as provided in paragraphs (b) and (f) • Continuous opacity monitoring systems (COMS) 	SO2 control device (or unit if there is no control device); 1 hour average <ul style="list-style-type: none"> • Quarterly accuracy determinations and daily calibration drift tests • COMS 	

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
				using procedures in 40 CFR Part 60, Appendix A, Method 19, Sections 2 and 3.		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. CEMS and RATA testing required for units ≥ 40 MMBtu/hr Quarterly source tests with any ammonia limits in permits using South Coast AQMD Source Test Method 207.1	Methods D3588-91, D4891-89, D1945-81, D4294-90, and D2622-92; and EPA Method 19 • Source testing once every 3 years for large NOx sources • Source testing once every 5 years for NOx process units	over one hour) • Monitor the total sulfur content of the fuel being fired				
Reporting	Notification of scheduled startups	Source testing. CEMS data every six months	CEMS data every six months (Rule 218).	<ul style="list-style-type: none"> Emission test reports Signed emission certifications 	Every 6 months for units with existing continuous emissions	<ul style="list-style-type: none"> Source test protocols and reports CEMS data every six months (Rule 218). 	<ul style="list-style-type: none"> Daily electronic reporting for major sources Monthly emissions 	Semi- annual reports of excess emissions and monitor downtime	Semi- annual reports of excess emissions and monitor downtime. Annual	Performance test results, notification of the initial startup, design heat input capacity, fuels	Performance test results, performance evaluation of the CEMS and/or COMS,	Permit Specific

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
		(Rule 218).		<ul style="list-style-type: none"> Source test protocols and reports CEMS data every six months (Rule 218). 	monitoring system (CEMS) or equivalent prior to date of rule adoption (Rules 218.2 and 218.3).		report for major sources <ul style="list-style-type: none"> Quarterly reporting for large sources and process units Quarterly Certification of Emissions Report and Annual Permit Emissions Program report for all units Breakdowns which result in an applicable rule or permit violation 		performance test results.	to be combusted, a copy of any federally enforceable requirement that limits the annual capacity factor, annual capacity factor, emerging technology used for SO ₂ emissions; reports of excess emissions	excess emission reports, notification of the date of requirement of construction, reconstruction, and startup, design heat input capacity, fuels to be combusted, annual capacity factor, emerging technology used for SO ₂ emissions	
Recordkeeping	Operating log and list of scheduled startups shall be maintained onsite for 5 years. Documentation from the manufacturer of the minimum operating	Operating log, emission control system records of operation and maintenance for 2 years.	CEMS maintenance and emission records for 2 years. Records of all source tests. Diagnostic emission check records for 2 years (5 years for Title V facilities).	<ul style="list-style-type: none"> Monthly recordkeeping of unit use documenting average emissions to demonstrate NO_x emissions of less than one pound per day. Daily recordkeeping of unit 	Source test records for 5 years	<ul style="list-style-type: none"> Source test reports and, if applicable, monthly records demonstrating compliance with the 1 pound NO_x per day demonstration requirements for 5 years Maintain sufficient 	<ul style="list-style-type: none"> Maintenance & emission records, source test reports, RATA reports, audit reports and fuel meter calibration records for Annual Permit Emissions Program 	Performance testing; emission rates; monitoring data; CEMS audits and checks; occurrence and duration of any startup, shutdown, or malfunction	Performance testing; emission rates; monitoring data; CEMS audits and checks; occurrence and duration of any startup, shutdown, or malfunction	Performance testing; emission rates; daily records of the amounts of each fuel combusted; calculations of the annual capacity factor for coal, distillate oil, residual oil, natural gas, wood, and municipal-type	Performance testing; emission rates; monitoring data; CEMS audits and checks; fuel supplier certification; daily fuel combustion. Records are required to be	Permit Specific

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
temperature of NOx post-combustion control equipment.				operation for small and low-use units. <ul style="list-style-type: none"> • Copy of the manufacturer's, distributor's, installer's, or maintenance company's written maintenance schedule and instructions and retain a record of the maintenance activity for 3 years • Source tests shall be maintained for 10 years • Maintain on site a copy of all documents identifying the unit's rated heat input capacity • Copy of the District certification or District approved source test reports 		operating records to demonstrate that a Unit complies with the requirements for extension of the source test deadline <ul style="list-style-type: none"> • Maintain records on-site identifying the Rated Heat Input for any Unit • 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 • Maintain records on-site in compliance 	<ul style="list-style-type: none"> • Records shall be maintained for 3 years (5 years if Title V) except data gathered or computed for intervals < 15 minutes shall be maintained for a minimum of 48 hours 			solid waste; nitrogen content; opacity; hours of operation. Records are required to be maintained for 2 years.	maintained for 2 years.	

Rule Element	PAR 429	Rule 1134	Rule 1146	Rule 1147	Rule 1147.1	PR 1147.2	RECLAIM	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart GG	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart KKKK	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Db	CFR, Title 40, Chapter 1, Subchapter C, Part 60, Subpart Dc	U.S. EPA General Permit
						with any applicable South Coast AQMD Rule for CEMS certification, operation, monitoring, reporting, and notification or any applicable permit condition.						