Proposed Amended Rule 429 (PAR 429) Startup and Shutdown Provisions for Oxides of Nitrogen

Working Group Meeting #1

January 6, 2022

Join Zoom Meeting:
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Meeting ID: 935 8829 6076

Teleconference Dial-In: 1-669-900-6833

Agenda

1. Proposed Amended Rule 429 (PAR 429)
2. Rule Concepts
3. Next Steps

Proposed Amended Rule 429 (PAR 429)

Background on Rule 429

- Rule 429 was adopted May 5, 1989 and amended December 21, 1990
- Rule 429 provides an exemption from NOx emission limits and establishes provisions during scheduled startups and shutdowns for:

Rule 429			
Rule 1134 Stationary Gas Turbines	**Rule 1146** Boilers ≥ 5 MMBtu/hr	**Rule 1159** Nitric Acid Production Units	**Rule 1109** Boilers and Process Heaters in Petroleum Refineries

- Staff is addressing startup and shutdown provisions for other sources in separate rules:

Rule 429.1 – Startup and Shutdown Provisions at Petroleum Refineries and Related Operations

Proposed Rule 429.2 – Startup and Shutdown Exemption Provisions for Oxides of Nitrogen from Electricity Generating Facilities

Current Requirements in Rule 429

- Rule 429 restricts the duration and frequency that units are exempt from NOx emission limits during scheduled startups and shutdowns
- Rule 429 contains other requirements:
  - Mitigate NOx emissions in excess of rule limits to the extent demonstratable
  - Startup and shutdown cannot last longer than is necessary to reach stable temperatures
  - Notification and recordkeeping

Equipment Type	Maximum Scheduled Startup/Shutdown Duration	Maximum Scheduled Startup/Shutdown Frequency
Boilers or Process Heaters > 40 MMBtu/hr	8 hours	10 per year
Boilers or Process Heaters ≤ 40 MMBtu/hr	6 hours	10 per month
Combined Cycle and Cogeneration Turbines	2 hours	10 per year
Simple Cycle Turbines	15 minutes	10 per year
Nitric Acid Production Units	1 hour	10 per year

Need for Startup and Shutdown Provisions

- During startup and shutdown events, units cannot achieve NOx concentration limits when:
  - Unit is not at steady-state conditions
  - Temperature is not optimal for pollution control equipment such as SCR
- RECLAIM does not establish limitations on the length of startup and shutdown events
  - RECLAIM facilities are required to hold RTCs for all emissions*, including emissions during startup and shutdown events
- Although some units have permit requirements for startup and shutdown, U.S. EPA commented that startup and shutdown provisions must be addressed in a rule

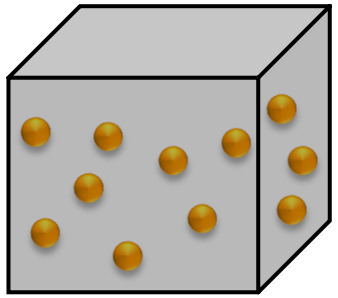
*Required RTC holdings do not include emissions from breakdowns as specified in Rule 2004

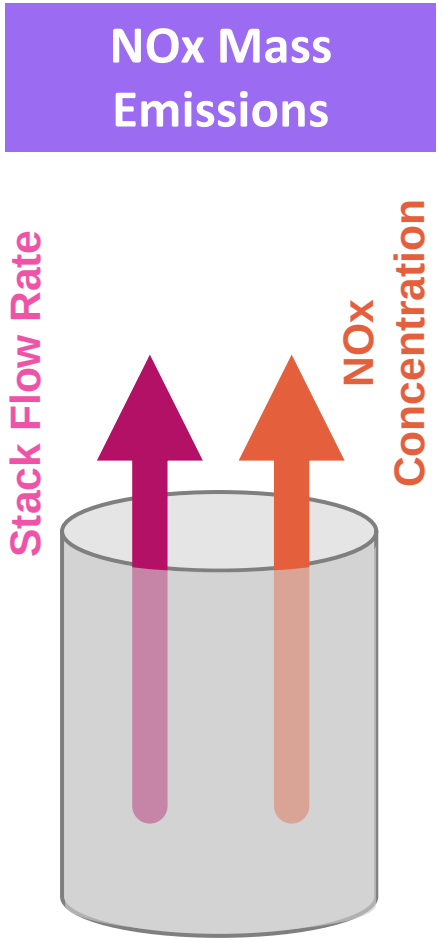
U.S. EPA 2015 Startup, Shutdown, and Malfunction (SSM) Policy

- In 2018, during the rule development process for Rules 1134 and 1135, U.S. EPA provided guidance regarding startup and shutdown provisions
  - Currently, Rules 1134 and 1135 reference permit conditions for startup and shutdown
  - U.S. EPA was concerned that SSM provisions in permits are not state implementation plan (SIP) enforceable and therefore should be included in rules
- U.S. EPA's 2015 SSM Policy states that an emission limitation must be applicable to the source continuously to be permissible in a SIP
- The policy states that emission limitations:
  - Do not need to be numerical in format
  - May include alternative numerical limitations, other technological control requirements, or work practice requirements during startup and shutdown events

Understanding NOx Mass Emissions and NOx Concentration Emissions

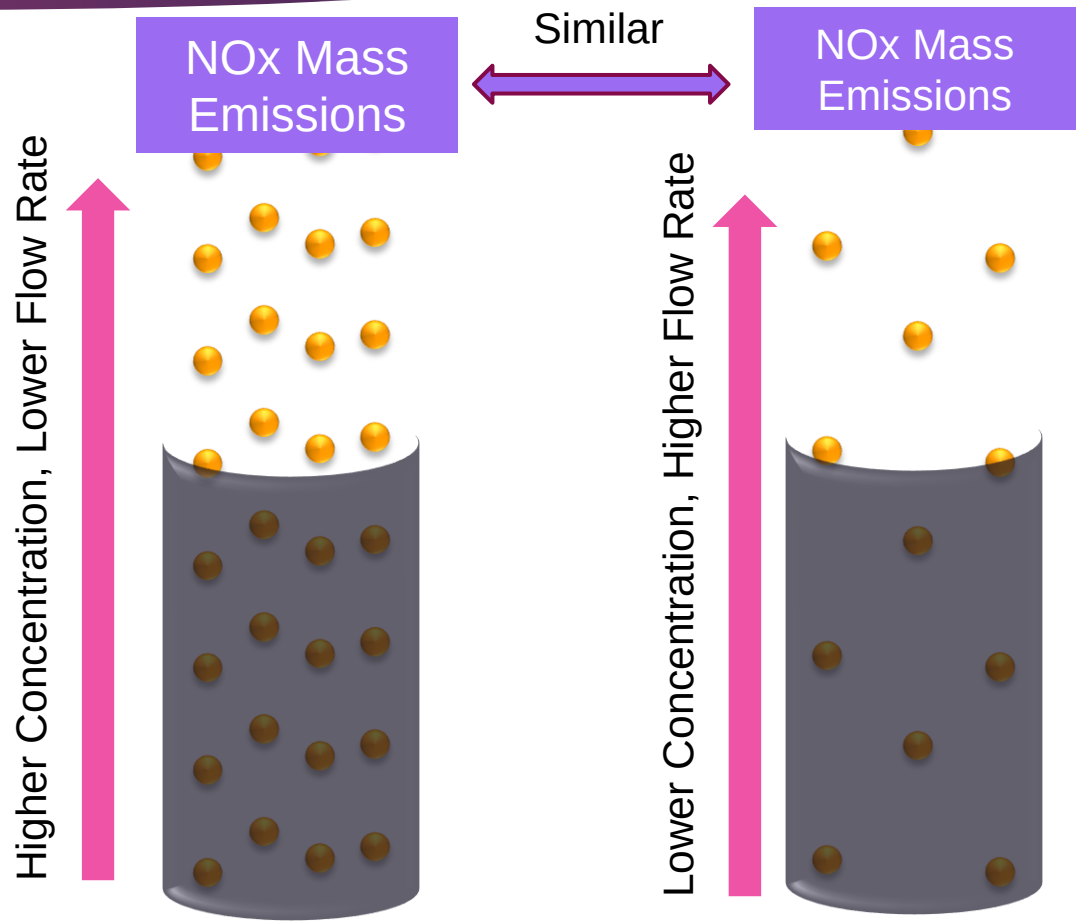
- Mass emissions are the weight of a pollutant over a specified time period
  - Tons of NOx per Year
  - Tons of NOx per Day
- Concentration is the volume of a pollutant per volume of gases in the exhaust
  - Parts per million volume or ppmv
- Continuous Emissions Monitoring Systems measure **NOx Mass Emissions** using two main components:
  - **Stack flow rate through the stack**
  - **NOx concentration in the stack**





Understanding NOx Mass Emissions and NOx Concentration Emissions

- An increase in NOx concentration does not necessarily yield the same increase in NOx mass emissions if the stack flow rate is lower
- As a unit reaches stable conditions and the stack flow rate increases, the NOx concentration will approach the rule limit
- For units with SCR where the catalyst needs additional time to reach optimal temperatures there is a continual increase in control efficiency



Rule Concepts

Overview of Amendments to Rule 429

Update Applicability

- Applies to units with continuous emissions monitoring systems (CEMS)
- Remove units subject to Rule 1109 (rescinded) and Rule 1159 (no known units)
- Include units subject to Rules 1147 and 1147.2

Update Requirements

- Most requirements will apply during all startups and shutdowns (not just scheduled)
- Remove obsolete recordkeeping requirements
- Align requirements with Rule 429.1 for consistency

Add Additional Requirements for Units with NOx Post-Combustion Controls

- Install and maintain temperature measuring device
- Operate NOx post-combustion control equipment

Purpose and Applicability – Subdivisions (a) & (b)

- Adding a purpose subdivision
  - Provides an exemption from NOx and CO concentration limits during startup and shutdown for a limited time period for specific units regulated under certain source-specific rules
  - Establishes requirements during startup and shutdown to limit NOx and CO emissions
- Applies to units with continuous emissions monitoring systems subject to the following rules:
  - Rule 1134 - Emissions of Oxides of Nitrogen from Stationary Gas Turbines
  - Rule 1146 – Emissions of Oxides of Nitrogen from Industrial Institutional and Commercial Boilers, Steam Generators, and Process Heaters
  - Rule 1147 – NOx Reductions from Miscellaneous Sources
  - Rule 1147.2 – NOx Reductions from Metal Melting and Heating Furnaces

Key Definitions – Subdivision (c)

Startup	Period of time during which a unit is heated to its normal temperature range from a cold or ambient temperature
Shutdown	Period of time during which a unit is allowed to cool from its normal temperature range to a cold or ambient temperature
Scheduled Startup	Planned startup that is known to occur and specified by January 1 of each year

- Staff is seeking input from stakeholders on startup and shutdown definitions

What is a “Scheduled Startup”?

- Planned event known to the facility prior to January 1 for the upcoming calendar year which include:
  - Turnaround (catalyst changeout)
  - Planned maintenance
- Scheduled startup does not include:
  - Response to demand
  - Unscheduled maintenance
  - Equipment failure
  - Breakdowns or malfunctions

Startup and Shutdown Exemption and Limits – Paragraphs (d)(1) to (d)(3)

- Paragraph (d)(1) specifies that an owner or operator is not subject to NOx or CO concentration limits and rolling average provisions during startup and shutdown
- Startup and shutdown duration limits will be presented under Table 1
- Startup and shutdown periods will not be allowed to last longer than is necessary for the unit to reach stable conditions or the minimum operating temperature of the NOx post-combustion control equipment (if applicable)
- Paragraph (d)(3) limits each unit to a maximum of 10 scheduled startups per calendar year

TABLE 1: STARTUP AND SHUTDOWN DURATION LIMITS

Unit Type	Not to Exceed per Startup or Shutdown
Boilers and Process Heaters > 40 MMBtu/hour rated heat input	8 hours
Boilers and Process Heaters ≤ 40 MMBtu/hour rated heat input	6 hours
Simple Cycle Gas Turbines	15 minutes
Cogeneration, Combined Cycle, Compressor and Recuperative Gas Turbines	2 hours
Furnaces	48 hours
Kilns	Staff is seeking input from stakeholders

Best Management Practices and Requirements for Units with NOx Post-Combustion Control Equipment – Paragraphs (d)(4) to (d)(6)

Take all reasonable and prudent steps to minimize emissions (d)(4)

- Includes equipment repairs and adjusting temperatures of post-combustion controls

Install Temperature Measuring Device (d)(5)

- An annually calibrated temperature measuring device required at the inlet of the NOx post-combustion control
- Temperature measuring device includes a temperature gauge or thermocouple

Operate NOx Post-Combustion Control Equipment (d)(6)

- Operate control equipment if the temperature of the exhaust gas to the inlet of the NOx post-combustion control equipment is ≥ the minimum operating temperature

Notification and Recordkeeping – Subdivisions (e) and (f)

- Notification will be required least 24 hours prior to a scheduled startup by calling 1-800-CUT-SMOG
  - Must contain the date and time that the scheduled startup will begin
- The following records will be required to be maintained on-site for 5 years
  - Operating log for startup, shutdown, and refractory dryout events which contains the date, time, duration, and reason for each event
  - A list of scheduled startups
- An owner or operator of a unit equipped with NOx post-combustion control equipment will be required to maintain on-site documentation from the manufacturer of the minimum recommended operating temperature of the NOx post-combustion control equipment

Exemptions – Subdivision (g)

- Units burning fuel solely in a pilot light will be exempt from the startup and shutdown duration limits specified in paragraph (d)(2) and operating log requirement specified in paragraph (f)(1)
- Units will be exempted from startup and shutdown duration limits in paragraph (d)(2) during refractory dryout

Next Steps

Next Steps

Public Workshop	Late January/Early February 2022
Preliminary Rule Language and Preliminary Draft Staff Report Available	February 18, 2022
Stationary Source Committee	March 18, 2022
Set Hearing	April 1, 2022
Public Hearing	May 6, 2022

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For more information, visit:
PAR 429 Proposed Rules Page

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