



PROPOSED RULE 1109.1
***EMISSIONS OF OXIDES OF NITROGEN
FROM PETROLEUM REFINERIES
AND RELATED OPERATIONS***

PROPOSED RULE 429.1
***STARTUP AND SHUTDOWN PROVISIONS
AT PETROLEUM REFINERIES AND
RELATED OPERATIONS***

PROPOSED AMENDED RULE 1304
EXEMPTIONS

PROPOSED AMENDED RULE 2005
NEW SOURCE REVIEW FOR RECLAIM

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Study Session

September 10, 2021

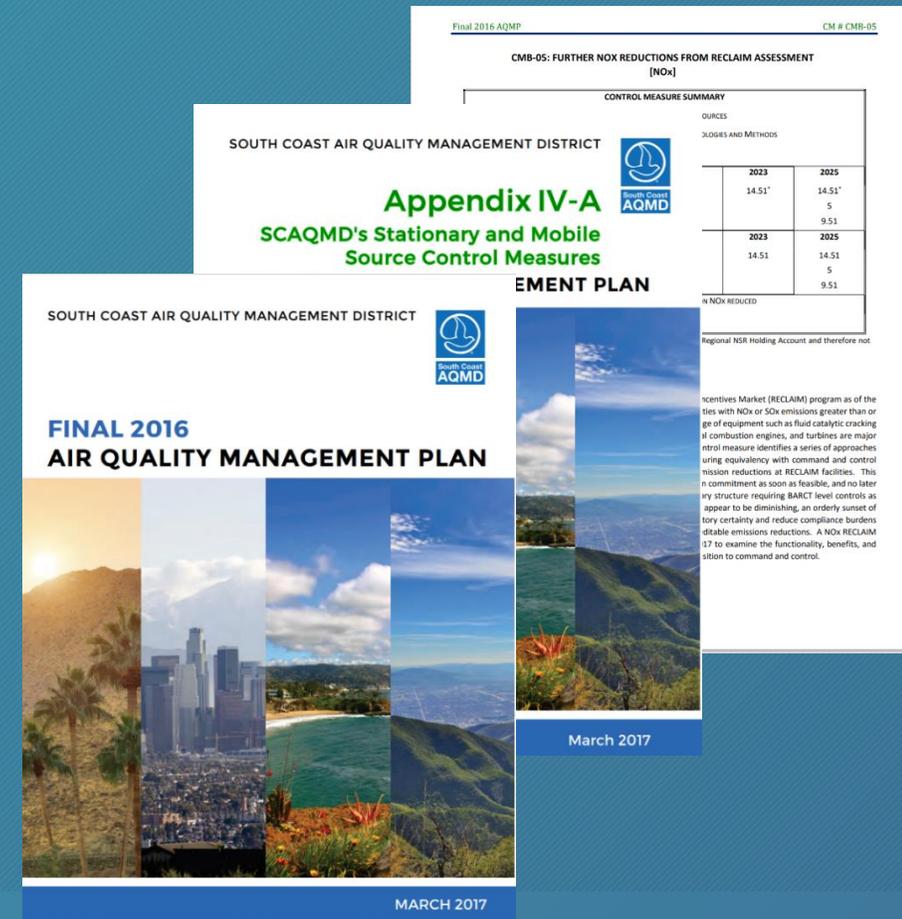
- Background and Overview
- Proposed Rule 1109.1
- Proposed Rule 429.1
- Proposed Amended Rules 1304 and 2005
- Next Steps

Background and Overview of Rule Development

Background

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- 2016 Air Quality Management Plan
 - Adoption Resolution called for further NOx reductions from an assessment of the RECLAIM program, including:
 - 5 tons per day NOx reduction
 - Transitioning RECLAIM to a command-and-control regulatory structure
- 2017 – AB 617
 - Applicable to facilities in the state greenhouse gas cap-and-trade program
 - Requires the highest priority for implementation will be for those sources that “have not modified emissions-related permit conditions the greatest period of time”



Overview of Rulemakings Related to PR 1109.1

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Proposed Rule 1109.1

- Establishes NOx and CO emission limits for combustion equipment at petroleum refineries and facilities with operations related to petroleum refineries

Other Rulemakings to Support PR 1109.1

Proposed Rule 429.1

Provides exemptions from PR 1109.1 NOx concentration limits when units are starting up and shutting down, and certain maintenance activities

Proposed Amended Rules 1304 and 2005

Provides a narrow exemption NSR exemptions for installation of BARCT controls related to the RECLAIM transition

Proposed Rescinded Rule 1109

Existing rule for large refinery boilers and heaters that will be rescinded

Background of PR 1109.1

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- Applies to 16 facilities
- Establishes NOx limits for nearly 300 pieces of combustion equipment
- Rule development began Feb 2018



9 Petroleum Refineries

- Chevron
- Marathon (Carson)
- Marathon (Wilmington)
- Marathon – Calciner
- Marathon – Sulfur Recovery Plant
- Phillips 66 (Carson)
- Phillips 66 (Wilmington)
- Torrance Refining Company
- Ultramar (Valero)



3 Small Refineries

Asphalt Refineries

- Lunday-Thagard DBA World Oil Refining
- Valero Wilmington Asphalt Plant

Biodiesel Refinery

- Alt Air Paramount



4 Related Operations

Hydrogen Plants

- Air Liquide Large Industries
- Air Products and Chemicals (Carson & Wilmington)

Sulfuric Acid Plant

- Eco Services Operations

PR 1109.1 Rulemaking Process

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25 Working Group Meetings – Starting February 2018



14 Site Visits and 50+ Individual Stakeholder Meetings



One Community Meeting with AB 617 Carson, Wilmington, and West Long Beach Community



**Four Drafts of PR1109.1
Oct 23, 2020
Dec 24, 2020
July 21, 2021
Aug 20, 2021**



One Public Workshop and One Study Session



About Proposed Rule 1109.1

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- Proposed Rule 1109.1 is a command-and-control industry-specific rule that establishes BARCT NOx emission limits for all combustion equipment at refinery and refinery-related facilities
- Regulates nearly 300 pieces of combustion equipment
- Proposed NOx emission limits were developed through a rigorous BARCT analysis that is consistent with California Health and Safety Code Section 40920.6 (c)(2)
- All BARCT options provided in PR 1109.1 are designed to achieve equivalent emission reductions
- Emission reductions obligations cannot be purchased through credits – and must be achieved by the affected facilities
 - Facilities cannot use RECLAIM Trading Credits (RTCs) to meet PR 1109.1 emission reduction obligations

Rule Structure and Provisions

| | |
|-----|--|
| (a) | Purpose |
| (b) | Applicability |
| (c) | Definitions |
| (d) | Emission Limits |
| (e) | B-Plan and B-Cap Requirements |
| (f) | Interim Limits |
| (g) | Compliance Schedule |
| (h) | Time Extensions |
| (i) | I-Plan, B-Plan, & B-Cap Submittal & Approval |
| (j) | CEMS Requirements |
| (k) | Source Test Requirements |
| (l) | Diagnostic Emission Checks |
| (m) | Monitoring, Recordkeeping, and Reporting |
| (n) | Exemptions |

| Rule Attachments | |
|------------------|---|
| (Attachment A) | Supplemental Calculations |
| (Attachment B) | Calculation Methodology for the I-Plan, B-Plan, And B-Cap |
| (Attachment C) | Facilities Emissions – Baseline and Targets |
| (Attachment D) | Units Qualify for Conditional Limits in B-Plan and B-Cap |

Purpose, Applicability, and Definitions

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- Purpose and applicability for South Coast AQMD rules describe what the rule intends to accomplish and to who the rule applies
 - Purpose: to reduce emissions of oxides of nitrogen (NO_x), while not increasing carbon monoxide (CO) emissions
 - Applicability: petroleum refineries and facilities with related operations to petroleum refineries
 - Facilities with related operations to petroleum refineries include asphalt plants, biofuels plants, hydrogen production plants, petroleum coke calcining facilities, sulfuric acid plants, and sulfur recovery plants
- Definitions are incorporated to define equipment, fuels, and other rule terms

Core Requirements

- Operators must meet NOx limits in Table 1
- If the conditional requirements can be met, operators can meet Table 2 “conditional NOx limits” in lieu of Table 1 limits
- Conditional NOx limits were developed to acknowledge achieving Table 1 NOx limits for some units have:
 - A high cost-effectiveness due to high capital cost and/or low emission reduction potential
- Incorporating the conditional NOx limits reduced the average cost-effectiveness to near or below \$50,000 per ton of NOx reduced for each class and category

TABLE 1: NOx AND CO EMISSION LIMITS

| Unit | NOx (ppmv) | CO (ppmv) | O2 Correction (%) | Rolling Averaging Time ¹ |
|--|------------------------------|-----------|-------------------|-------------------------------------|
| Boilers <40 MMBtu/hour | Pursuant to paragraph (d)(3) | 400 | 3 | 24-hour |
| Boilers ≥40 MMBtu/hour | 5 | 400 | 3 | 24-hour |
| FCCU | 2 | 500 | 3 | 365-day |
| | 5 | | | 7-day |
| Flares | 20 | 400 | 3 | 2-hour |
| Gas Turbines fueled with Natural Gas | 2 | 130 | 15 | 24-hour |
| Gas Turbines fueled with Gaseous Fuel other than Natural Gas | 3 | 130 | 15 | 24-hour |
| Petroleum Coke Calciner | 5 | | | 365-day |

TABLE 2: CONDITIONAL NOx AND CO EMISSION LIMITS

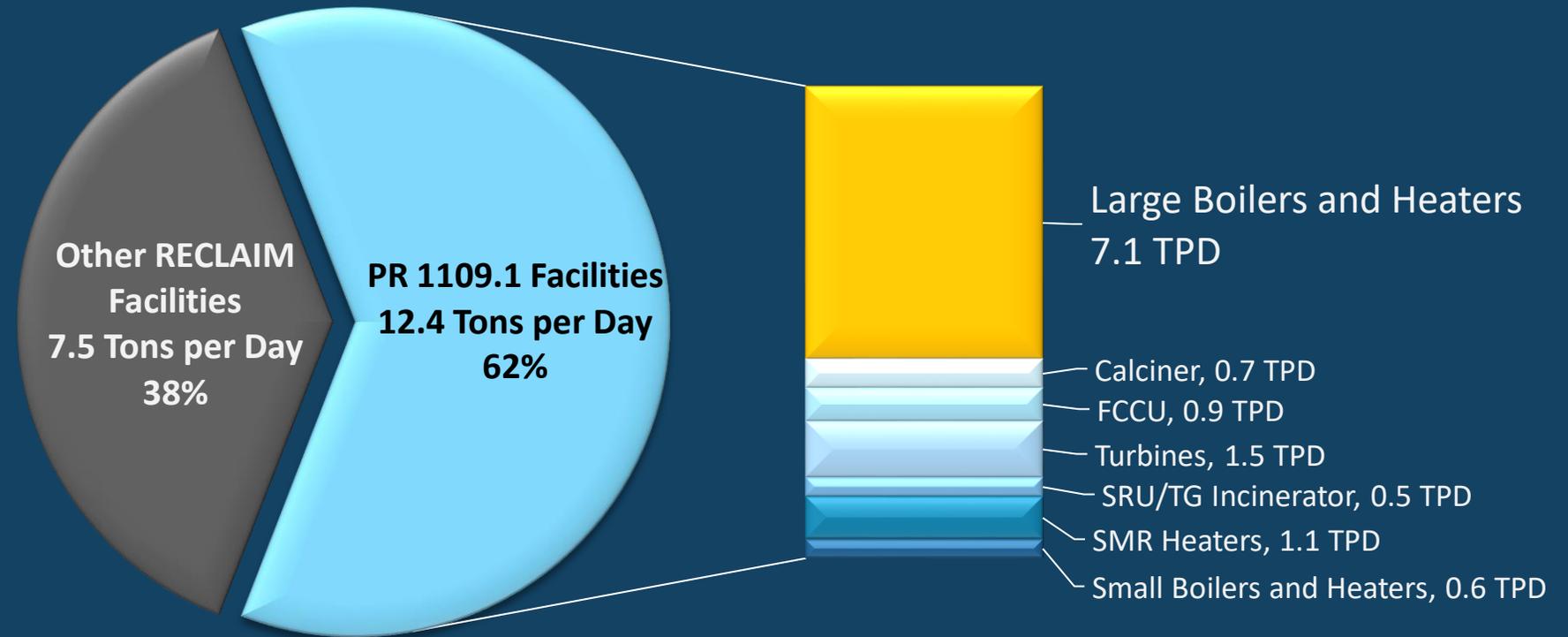
| Unit | NOx (ppmv) | CO (ppmv) | O2 Correction (%) | Rolling Averaging Time ¹ |
|--------------------------------------|------------|-----------|-------------------|-------------------------------------|
| Boilers >110 MMBtu/hour | 7.5 | 400 | 3 | 24-hour |
| FCCUs | 8 | 500 | 3 | 365-day |
| | 16 | | | 7-day |
| Gas Turbines fueled with Natural Gas | 2.5 | 130 | 15 | 24-hour |
| Process Heaters 40 – 10 MMBtu/hour | 18 | 400 | 3 | 24-hour |
| Process Heaters >110 MMBtu/hour | 22 | 400 | 3 | 24-hour |
| SMR Heaters | 7.5 | 400 | 3 | 24-hour |
| Vapor Incinerators | 40 | 400 | 3 | 24-hour |

¹ Averaging times apply to units operating pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

¹ Averaging times apply to units operating a certified CEMS and shall be calculated pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

PR 1109.1 2017 Baseline Emissions (Tons per Day or TPD)

- PR 1109.1 facilities represent 62 percent of the NOx emissions in RECLAIM
- NOx Emissions from large boilers and heaters (≥ 40 MMBtu/hour) represent 58% of the emissions from PR 1109.1 combustion equipment



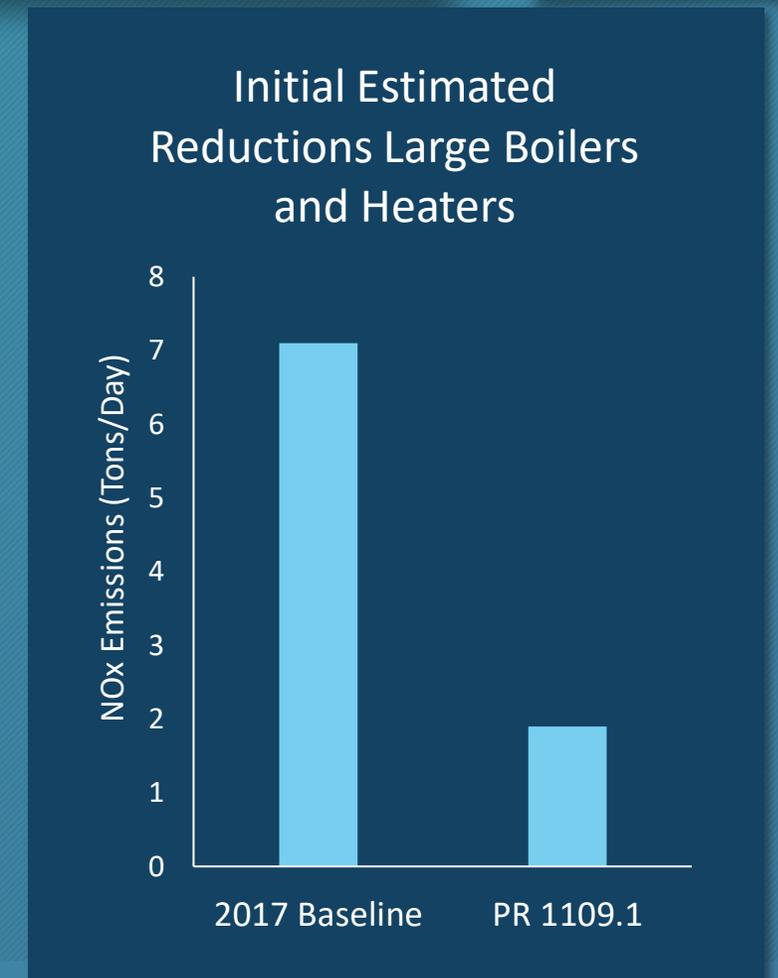
2017 RECLAIM NOx Emissions
19.9 tons per day

Requirements for Large Boilers and Heaters (≥ 40 MMBtu/Hour)

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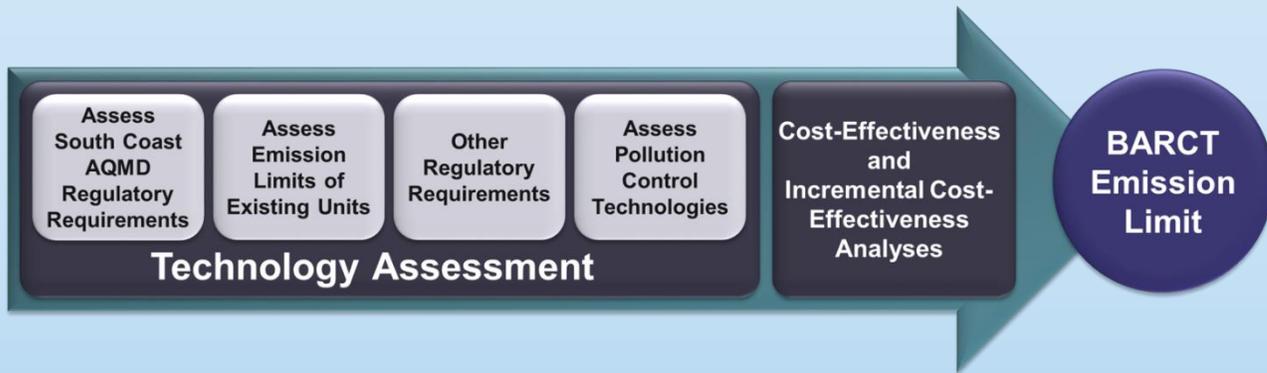
| Unit | Table 1 NOx Limit (ppmv) | Table 2 Conditional NOx Limit (ppmv) |
|--|--------------------------|--------------------------------------|
| Boilers 40 – 110 MMBtu/hour | 5 ppm | None |
| Boilers >110 MMBtu/hour | | 7.5 |
| Process Heaters 40 – 110 MMBtu/hour | | 18 |
| Process Heaters >110 MMBtu/hour | | 22 |

* Emission reductions range based on units identified as possibly meeting Table 2



PR 1109.1 BARCT Assessment

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- Proposed BARCT NOx limit established using a methodical approach that meets state law
- BARCT is defined in the California Health and Safety Code §40406 as
“...an emission limitation that is based on the maximum degree of reduction achievable by each class or category of source, taking into account environmental, energy, and economic impacts.”

- NOx limits are designed to achieve maximum reductions taking into account economic impacts
- Staff uses a cost-effectiveness threshold of \$50,000/ton of NOx reduced
- Incremental cost-effectiveness is the incremental cost over the incremental reductions for the next more stringent NOx limit
 - >>\$50,000 indication that next more stringent NOx limit does not achieve substantially more reductions

Large Boilers and Heaters Proposed NOx Limits

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- Staff considered multiple emission levels for large boilers and heaters
 - Evaluated technical feasibility, cost-effectiveness, and incremental cost-effectiveness
 - Two engineering consultants reviewed proposed NOx BARCT limits

50 ppm
NOx

Does not represent
the Best Available
Retrofit Technology

5 ppm
NOx

Challenging but technically feasible

Cost-effective for boilers but needed
conditional limits for lower cost for
process heaters

- All units will be required to have a
permit limit

2 ppm
NOx

Incremental cost-
effectiveness is
high – considerable
cost for diminishing
emission reduction

Not technically
feasible for all units

NOx Control: 5 ppm versus 2 ppm

- Most large boilers and process heaters will require the installation of SCR to achieve 5 ppmv NOx levels
 - SCRs can achieve up to 95% NOx reductions
- To achieve 2 ppmv, units will require ultra-low NOx burners with SCRs or multiple SCRs in series
 - Not all boilers or process heaters can be retrofit with ultra-low NOx burner due to physical constraints
 - Multiple SCRs have significantly higher costs and require more space for installation
- California Health and Safety Code Section 40920.6 requires a cost-effectiveness and incremental cost-effectiveness evaluation when establishing BARCT levels



BARCT Analysis for Establishing NOx Limit for Large Boilers and Heaters

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- BARCT analysis concluded:
 - 5 ppmv is cost-effective for large boilers and process heaters
 - Process heaters required the Conditional Limits to reduce overall cost below \$50,000 threshold
 - 2 ppmv is not incrementally cost-effective
 - Approximately 95 percent of the reductions can be achieved at 5 ppmv
 - Incremental cost-effectiveness ranged from \$150,000 to \$650,000 per ton of NOx reduced

| Equipment Category | Table 1 NOx Limit | Cost-Effectiveness | Incremental Cost-Effectiveness (\$/ton of NOx Reduced) | |
|---|-------------------|--------------------|--|-----------|
| Boilers (≥40 - ≤110 MMBtu/hour) | 5 ppmv | \$25,000 | 5 to 2 ppmv | \$656,000 |
| Boilers (>110 MMBtu/hour) | 5 ppmv | \$11,000 | 5 to 2 ppmv | \$159,000 |
| Process Heaters (≥40 - ≤110 MMBtu/hour) | 5 ppmv | \$50,000 | 5 to 2 ppmv | \$293,000 |
| Process Heaters (>110 MMBtu/hour) | 5 ppmv | \$50,000 | 5 to 2 ppmv | \$400,000 |

Conditional NOx Limits (Table 2)

Table 2 Conditional NOx Limits

| Unit | NOx (ppmv) | CO (ppmv) | O2 Correction (%) | Rolling Averaging Time ¹ |
|--------------------------------------|------------|-----------|-------------------|-------------------------------------|
| Boilers >110 MMBtu/hour | 7.5 | 400 | 3 | 24-hour |
| FCCU | 8 | 500 | 3 | 365-day |
| | 16 | | | 7-day |
| Gas Turbines fueled with Natural Gas | 2.5 | 130 | 15 | 24-hour |
| Process Heaters 40 – 110 MMBtu/hour | 18 | 400 | 3 | 24-hour |
| Process Heaters >110 MMBtu/hour | 22 | 400 | 3 | 24-hour |
| SMR Heaters | 7.5 | 400 | 3 | 24-hour |
| Vapor Incinerators | 40 | 400 | 3 | 2-hour |

- Conditional limits were included in PR 1109.1 to address the high cost-effectiveness of some equipment categories
- Units that are achieving NOx limits at are below the Conditional Limits have existing SCRs and/or ultra low NOx burners
 - Cost-effectiveness for these units range from \$63,000 to \$8 million per ton of NOx reduced
- Conditional limits will result in early emission reductions as facilities optimize units to meet the limits
 - Operators must submit a permit application by July 1, 2022 and meet Table 2 limit 18 months after Permit to Construct is issued
- PR 1109.1 includes provisions for “pre-qualified” units – early permit submittal is not required for pre-qualified units

Conditions for Using Table 2 NOx Limits

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Units where SCR was or will be installed should be designed to meet Table 1 NOx limits and are not eligible to use Table 2 Conditional Limits

- Excludes units with a Permit to Construct issued on or after December 4, 2015 for the installation post combustion pollution controls

Units with large emission reductions are not eligible to use Table 2 Conditional NOx Limits

- Excludes projects with potential NOx reductions greater than:
 - 10 tons per year for boilers or process heaters between 40 and 110 MMBtu/hour
 - 20 tons per year for boilers and process heaters ≥ 110 MMBtu/hour

Units with a permit limit or currently performing at or below the applicable Table 1 NOx limit are not eligible to use Table 2 Conditional Limits

- Unit currently has permit limit or is currently performing at or below the applicable Table 1 NOx limit

Unit that will be decommissioned are not eligible to use Table 2 Conditional Limits

PR 1109.1 Potential Emission Reductions

- PR 1109.1 will potentially reduce 7.7 – 7.9 tpd of NOx
- Estimated to achieve more than 70% reduction in NOx emissions from boiler and process heater categories
 - Percent reductions vary based on emission reduction potential, some units already achieving low emissions
 - SCR can achieve 95% NOx Reductions for uncontrolled units
 - 41 boilers and process heaters currently have SCRs installed
 - Emission reduction estimates account for potential eligibility to meet Table 2 conditional limits

| Equipment Type | 2017 NOx Baseline Emissions (tpd) | Potential NOx Emission Reductions (tpd) |
|--|-----------------------------------|---|
| Boilers & Process Heaters ≥40 MMBtu/hr | 7.1 | 5.0 – 5.2 ⁽¹⁾ |
| Coke Calciner | 0.71 | 0.68 |
| SMR Heaters | 1.1 | 0.6 |
| Gas Turbine | 1.4 | 0.4 |
| FCCU | 0.83 | 0.4 |
| Boilers & Process Heaters <40 MMBtu/hr | 0.64 | 0.47 ⁽²⁾ |
| SRU/TG Incinerator | 0.43 | 0.1 |
| Vapor Incinerators | 0.05 | 0.02 |
| Sulfuric Acid Plants | 0.1 | 0 |
| Total | 12.4 | 7.7 – 7.9 |

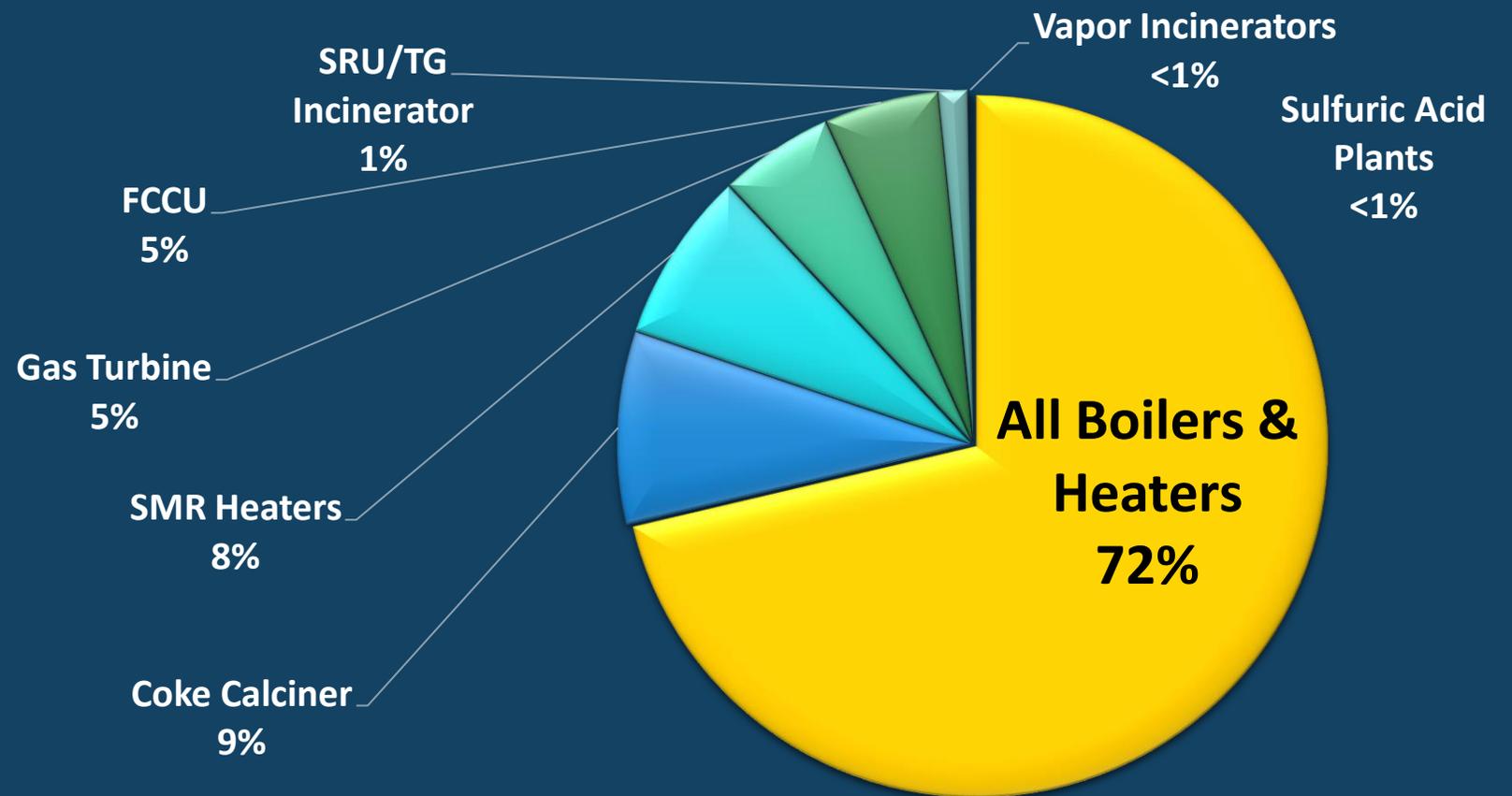
¹ Estimated reductions based on units anticipated to meet conditional limits

² Includes projected NOx emission reductions from end-of-life burner replacement and emerging technologies

PR 1109.1 Potential Emission Reductions (*cont.*)

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- Pie chart shows the emission reduction percentage each equipment category contributes to the total emission reductions projected for PR 1109.1
- Boiler and heater represent the largest source of reductions



Contribution to Total NOx Emission Reduction by Equipment Category

B-Plan and B-CAP Requirements

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- The B-Plan and B-Cap would be implemented through an alternative implementation schedule called an I-Plan
- B-Plan and B-Cap provides options to achieve BARCT in the aggregate
- Both alternative compliance options requires each unit to have an enforceable permit limit
 - Some permit limits will be higher than Table 1 limits, however the higher emission limits will have to be offset by lower limits



- B-Plan is a BARCT equivalent concentration plan
- Allows operators to select a NO_x concentration limits that are equivalent BARCT in aggregate



- B-Cap is a BARCT equivalent mass cap
- Requires operators to accept a NO_x emission limit for each unit
- Allows facilities to take credit for equipment shutdowns and throughput reductions

NOx Emission Targets for B-Cap and B-Plan



TABLE 1: NOx AND CO EMISSION LIMITS

| Unit | NOx (ppmv) | CO (ppmv) | O2 Correction (%) | Rolling Averaging Time ¹ |
|--------------------------------------|------------------------------|-----------|-------------------|-------------------------------------|
| Boilers <40 MMBtu/hour | Pursuant to paragraph (d)(3) | 400 | 3 | 24-hour |
| Boilers ≥40 MMBtu/hour | 5 | 400 | 3 | 24-hour |
| FCCU | 2 | 500 | 3 | 365-day |
| | 5 | | | 7-day |
| Flares | 20 | 400 | 3 | 2-hour |
| Gas Turbines fueled with Natural Gas | 2 | 130 | 15 | 24-hour |

TABLE 2: CONDITIONAL NOx AND CO EMISSION LIMITS

| Unit | NOx (ppmv) | CO (ppmv) | O2 Correction (%) | Rolling Averaging Time ¹ | |
|--------------------------------|--------------------------------------|-----------|-------------------|-------------------------------------|---------|
| Petroleum Coke Calc | Boilers >110 MMBtu/hour | 7.5 | 400 | 3 | 24-hour |
| Process Heaters <40 MMBtu/hour | FCCUs | 8 | 500 | 3 | 365-day |
| | Gas Turbines fueled with Natural Gas | 16 | 500 | 3 | 7-day |
| Process Heaters ≥40 MMBtu/hour | Process Heaters 40 – 10 MMBtu/hour | 2.5 | 130 | 15 | 24-hour |
| | SMR Heaters | 18 | 400 | 3 | 24-hour |
| SMR Heaters with Turbine | Process Heaters >110 MMBtu/hour | 22 | 400 | 3 | 24-hour |
| SRU/TG Incinerator | SMR Heaters | 7.5 | 400 | 3 | 24-hour |
| Sulfuric Acid Furnace | Vapor Incinerators | 40 | 400 | 3 | 24-hour |
| Vapor Incinerator | | | | | |

¹ Averaging times apply to units operating a certified CEMS and shall be calculated pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

B-Plan
 Aggregate NOx concentration limits must meet Emission Target



B-Cap
 Facility-wide emissions must meet Emission Target + 10% Environmental Benefit



Emission Targets for B-Plan and B-Cap based on NOx limits in Table 1 and Table 2

B-Plan and B-Cap are designed to achieve Facility-Specific Emission Targets that are Based on Table 1 and Table 2 NOx Limits

Alternative Implementation Schedule (I-Plan)

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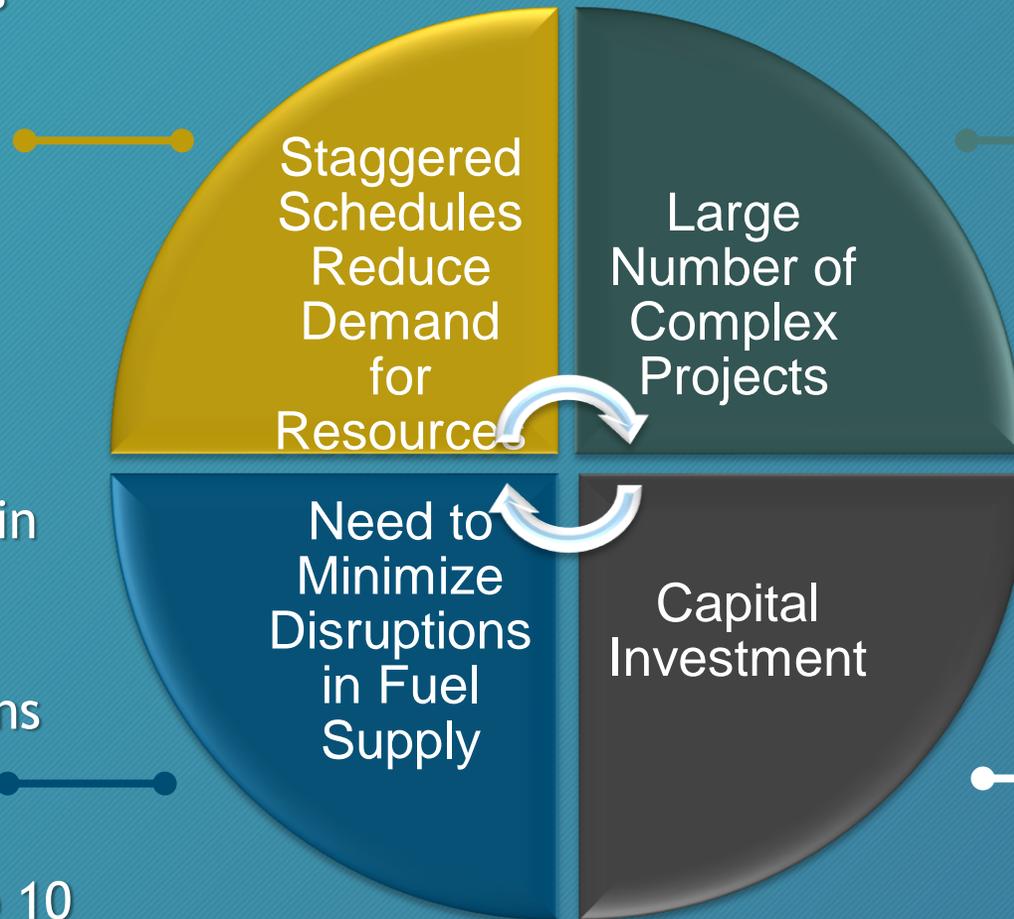


- I-Plan is a phased implementation schedule
- Allows operators to tailor the implementation schedule to meet NOx limits to minimize operational disruptions

- I-Plans are needed due to the complexity and number of projects required to achieve PR 1109.1 limits
- The flexibility in the I-Plans allows the facilities to install the NOx emission reduction projects during schedule maintenance to help minimize downtime and additional cost
 - Allowing flexibility to help defer cost is what enables PR 1109.1 to include low NOx limits
- I-Plans are designed to achieve early emission reductions and allow longer implementation periods for the units that have longer maintenance schedules

- Refineries competing for same pool of skilled labor, equipment manufacturers, source testing companies, etc.

- Integrating projects in refinery turnaround schedules minimizes fuel supply disruptions
- Most turnaround schedules are 3 to 5 years, a few are 9 to 10 years



- ~75 new selective catalytic reduction (SCR) projects
- ~25 SCR upgrades projects
- SCR projects customized and require complex engineering
- Challenging to integrate within existing facility structure
- Capital costs for each project \$10 to \$70 million
- Cost per petroleum refinery ranges from \$179 million to \$1 billion

I-Plan Options

- PR 1109.1 includes five I-Plan Options
- Some I-Plans are limited to the type of BARCT Compliance Plan
- I-Plan Option 3 has an additional condition that the facility must be achieving a NO_x emission rate less than 0.02 pound per million BTU of heat input

| I-Plan Options | Provision | Phase I | Phase II | Phase III |
|--|-----------------------------------|---|---|-----------------|
| I-Plan Option 1 B-Plan Only | Percent Reduction Targets | 70 | 100 | N/A |
| | Permit Application Submittal Date | July 1, 2023 | January 1, 2027 | N/A |
| | Compliance Date | No later than 36 months after a Permit to Construct is issued | | NA |
| I-Plan Option 2 B-Plan Only | Percent Reduction Targets | 60 | 80 | 100 |
| | Permit Application Submittal Date | July 1, 2023 | January 1, 2025 | January 1, 2028 |
| | Compliance Date | No later than 36 months after a Permit to Construct is issued | | |
| I-Plan Option 3 B-Plan or B-Cap and as allowed pursuant to paragraph (g)(3) | Percent Reduction Targets | 50 | 100 | N/A |
| | Permit Application Submittal Date | January 1, 2025 | January 1, 2029 | N/A |
| | Compliance Date | No later than 36 months after a Permit to Construct is issued | | N/A |
| I-Plan Option 4 B-Cap Only | Percent Reduction Targets | 50 to 60 (Still Developing) | 80 | 100 |
| | Permit Application Submittal Date | N/A | January 1, 2025 | January 1, 2028 |
| | Compliance Date | January 1, 2024 | No later than 36 months after a Permit to Construct is issued | |
| I-Plan Option 5 B-Plan Only | Percent Reduction Targets | 50 | 70 | 100 |
| | Permit Application Submittal Date | July 1, 2022 | July 1, 2024 | January 1, 2028 |
| | Compliance Date | No later than 36 months after a Permit to Construct is issued | | |

Cumulative NOx Reductions from Major Petroleum Refineries Based on I-Plans

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- Bars represent the estimated start of the emission reduction projects (18 months from permit submittal deadline)
- Facilities have 36 months from issuance of Permit to Construct to demonstrate compliance

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

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Background

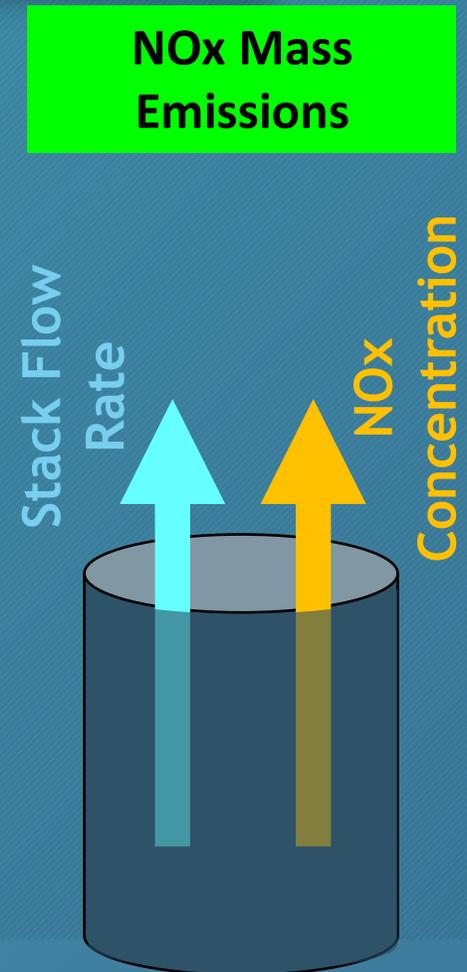
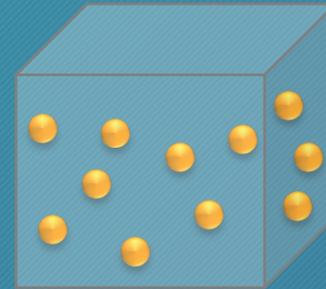
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- Proposed Rule 429.1 (PR 429.1) is a companion rule to PR 1109.1
- An owner or operator will not be subject to PR 1109.1 NO_x or CO emission concentration limits and applicable rolling average provisions during startup, shutdown, and catalyst maintenance
- PR 429.1 establishes duration limits and other requirements to regulate emissions during startup, shutdown, and catalyst maintenance events
- During startup and shutdown a unit is not operating at steady-state conditions and the exhaust temperature is not high enough for pollution control equipment to operate effectively
 - Units cannot meet the concentration limits in PR 1109.1 during startup and shutdown
 - Proposed BARCT concentration limits are based on steady-state conditions
 - Higher NO_x concentrations during startup and shutdown does not necessarily result in higher mass emissions

Understanding NOx Mass Emissions and NOx Concentration Emissions

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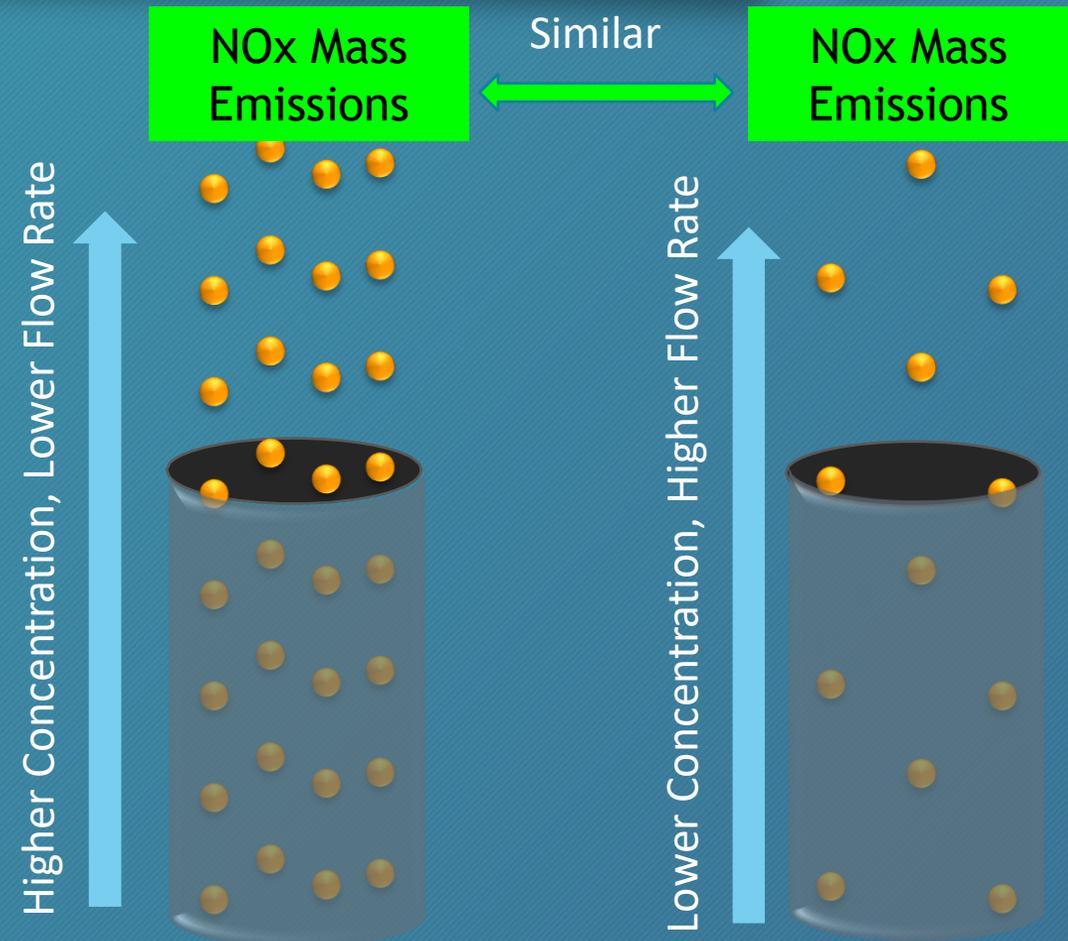
- Mass emissions are the weight of a pollutant over a specified time period
 - Tons of NOx per Year
 - Tons of NOx per Day
- Concentration is the volume of a pollutant per volume of gases in the exhaust
 - Parts per million volume or ppmv
- Continuous Emissions Monitoring Systems measure **NOx Mass Emissions**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



Understanding NOx Mass Emissions and NOx Concentration Emissions

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- 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 PR 1109.1 limit
- For units with SCR where the catalyst needs additional time to reach optimal temperatures there is a continual increase in control efficiency as the stack temperature increases



U.S. EPA Policies on Startup, Shutdown, and Malfunction (SSM)

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- Staff received stakeholder comments that startup and shutdown exemptions are inconsistent with the Clean Air Act
- PR 429.1 is consistent with U.S. EPA Startup, Shutdown, and Malfunction policies for compliance with the Clean Air Act
 - Contains specific technological control requirements and work practice requirements during a defined mode of source operation (i.e. startup and shutdown)
 - Limits the duration and severity of startup and shutdown events
- PR 429.1 is designed to meet U.S. EPA Startup and Shutdown policy
- Equipment breakdowns are addressed in Rule 430 – Breakdown Provisions, which does not provide exemptions for non-compliance that are a result of operator error, neglect, or improper operation or maintenance procedures

PR 429.1 Requirements

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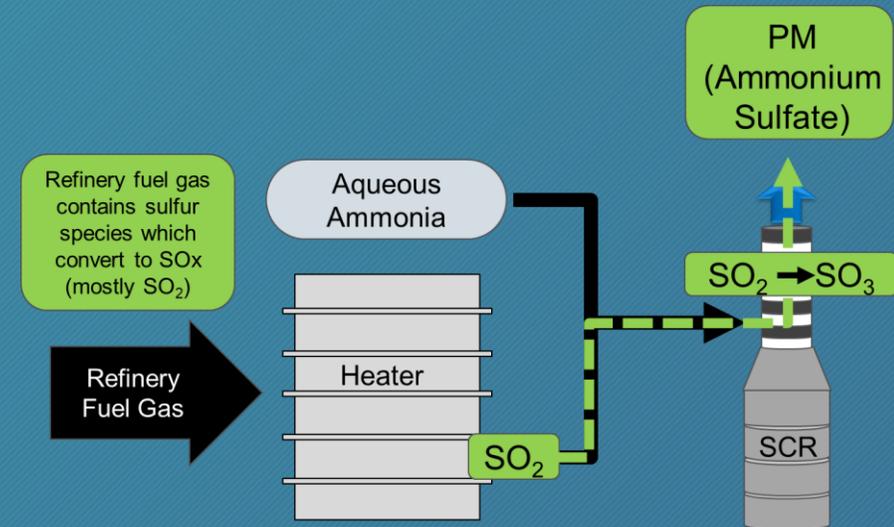
- Startup and shutdown duration limits
 - Startup and shutdown duration limits are further limited in subparagraph (d)(2)(A)
 - Cannot last longer than the time to reach stable conditions and to reach the minimum operating temperature of the NOx post-combustion control equipment, if applicable.
- Limits to the number of scheduled startups
- Catalyst maintenance provision includes an hour limit, operation at minimum rates, and notification and monitoring requirements
- Additional requirements for units with NOx post-combustion control equipment
 - Install temperature measuring device
 - Operate control equipment once the minimum operating temperature is reached
- Notification and recordkeeping

Proposed Amended Rules 1304 – Exemptions and 2005 – New Source Review for RECLAIM

Need for Proposed Amended Rules 1304 and 2005

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- SCR is the air pollution control technology that will achieve the lowest NOx concentration levels
- Many of the low NOx limits under PR 1109.1 cannot be achieved without SCR
- Installation of SCR could potentially trigger Best Available Control Technology (BACT) from co-pollutant emissions associated with SCR
- If BACT was required due to the installation of SCR, then proposed NOx reductions in PR 1109.1 would not be cost-effective and staff may need to increase the proposed NOx limits



Proposed Narrow BACT Exemption

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- Staff is proposing a narrow BACT exemption for emission increases associated with installation of SCR
- Establishes a series of conditions for using this exemption, including provisions to ensure federal New Source Review requirements are met
- Staff worked with CARB and U.S. EPA to develop the proposed BACT exemption
 - Other California air districts have similar provisions to ensure implementation of BARCT is not impeded
- BACT exemption will ensure NOx reductions can be achieved under PR 1109.1

Other Supporting Documents and Next Steps

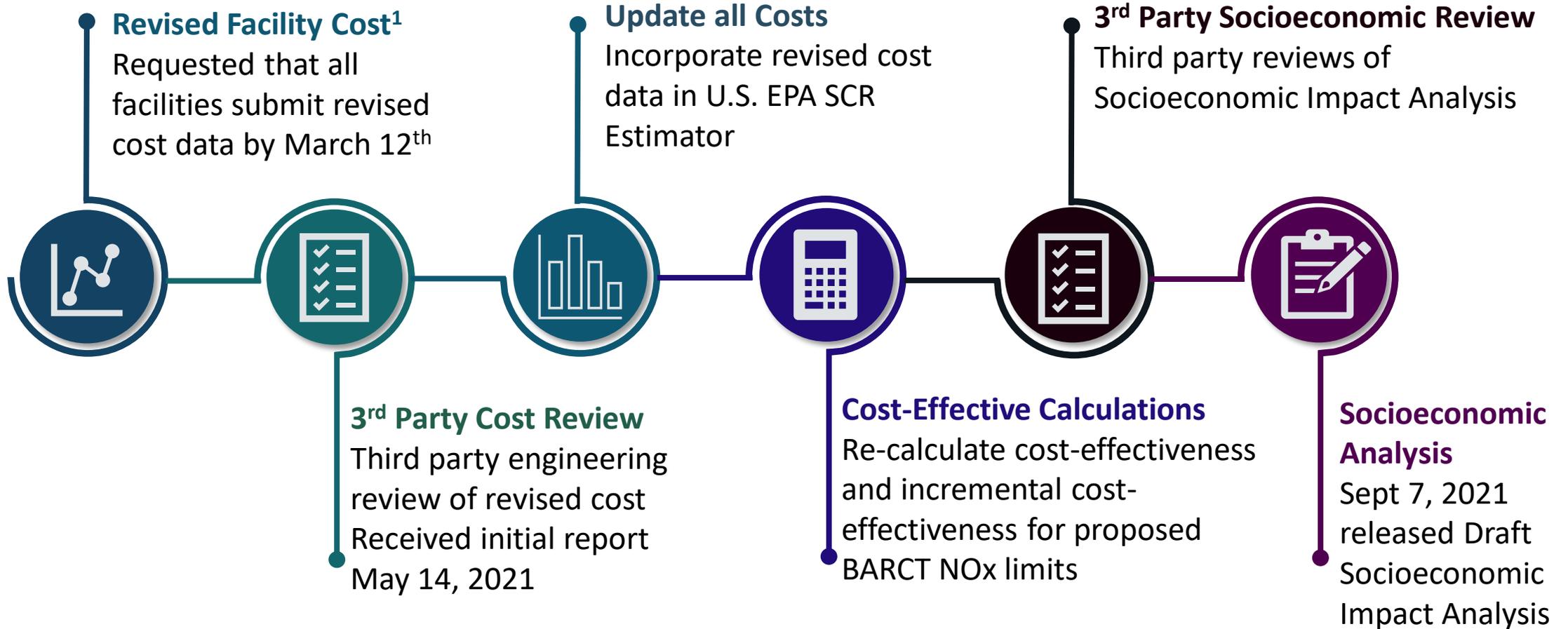
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California Environmental Quality Act (CEQA) Analysis

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- Staff released the Draft Subsequent Environmental Assessment on September 3, 2021
 - Tiers off the December 2015 Program Environmental Assessment for NOx RECLAIM and the March 2017 Program Environmental Impact Report for the 2016 AQMP
 - Potential significant impact areas include air quality and greenhouse gases, hazards and hazardous materials, and hydrology
 - Document can be found here:
<http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2021/pr-1109-1-draft-sea.pdf>
- 45-day public review and comment period ends on October 19, 2021
- Responses to comments will be included in the Final Subsequent Environmental Assessment

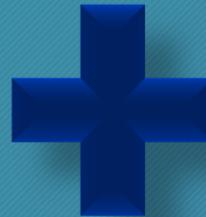
Socioeconomic Analyses



¹ Received new or revised cost for over 100 units (originally received cost for 58 units)

Key Elements of Socioeconomic Analysis

- Affected facilities;
- Range of probable costs, including industry costs;
- Emission reduction potential;
- Availability and cost-effectiveness of alternatives to proposed rule;
- Regional employment and the economic impacts; and
- Need for rule adoption



Additional Elements for Socioeconomic Analysis

- Release Draft Socioeconomic Analysis 60 days before Public Hearing¹
- Consultant to help analyze downstream impacts on fuel-prices² 
- Public health benefits
- Three third-party reviews of:
 - Cost data
 - Socioeconomic impact analysis
 - Public health benefits assessment

¹ South Coast AQMD is required to prepare a socioeconomic impact assessment, released 30 days before a public hearing

² Dr. Erich Muehlegger, Associate Professor, UC Davis, publications on cost pass-through in the U.S. oil refinery sector

Socioeconomic Impact Analysis

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- Socioeconomic Impact Assessment and 3rd Party Reviews released September 7, 2021
 - Total cost estimated to be \$2.34 billion (net present value)
 - Estimated average annual costs of \$132.5 million per year
 - Documents can be viewed here:
<http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1109-1>
- Local price of gasoline is projected to increase by less than one cent per gallon
- Average annual regional job impacts are projected increase by 213 jobs per year
 - In general, job gains are in the construction sector due construction and installation of NOx control equipment
 - Job gains from construction is expected to outweigh any negative impacts on affected industries
- Monetized public health benefits estimated to be \$2.63B (net present value)
 - Public health benefits include approximately 370 premature deaths avoided, 6,200 asthma attacks avoided, and 21,400 work loss days avoided

Next Steps

Working Group Meeting
September 15, 2021



Close of Comment Period:
September 17, 2021



Stationary Source Committee:
September 17, 2021



Set Hearing: October 1, 2021



AB617 WCWLB Community Meeting:
October 14, 2021



Public Hearing: November 5, 2021

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