



Proposed Rule 1109.1 – NO_x Emission Reduction for Refinery Equipment and Related Operations

Working Group Meeting #19
March 4, 2021

Join Zoom Meeting
<https://scaqmd.zoom.us/j/96547367211>
Meeting ID: 965 4736 7211
Password: 602155
Teleconference Dial-In: +1 669 900 6833

Agenda

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- Progress of Rule Development
- February Stationary Source Meeting – Key Topics
- Boilers and Heaters ≥ 40 MMBtu/hour Follow-up
- FCCU Performing Near BARCT Limit
- Vapor Incinerator Follow-up
- Implementation Compliance Plan & BARCT Equivalent Plan
- Next Steps

Progress of Rule Development

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Summary of Working Group # 18 (02/11/21)

- Provided update to other related rulemaking projects: PAR 1304, PAR 429, and Rule 1109
- Staff responded to the 2 ppm BARCT for heaters and boilers >40 MMBtu/hr
- Provided responses to comment letters submitted
- Discussed Revised PR 1109.1 Rule language

Comment Letters

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- Since last Working Group Meeting, received two comment letters
 - Western States Petroleum Association (WSPA) on February 16, 2021
 - Comments focused on the proposed NOx limit for large boilers and heaters
 - WSPA on February 26, 2021
 - Comments focused on the proposed NOx limit for FCCUs
 - Staff reassessing the proposed NOx BARCT limit for large boilers and heaters
 - Discussing near limit provisions for FCCU at today's Working Group Meeting
 - Both comments are posted on the South Coast AQMD's website on the Proposed Rule webpage for PR 1109.1



Stakeholder Meetings

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- Staff has been conducting individual stakeholder meetings to better understand issues and to discuss the implementation plan
- Staff is planning on continuing meetings with individual stakeholders in addition to Working Group Meetings
- Since the last Working Group Meeting staff had:
 - One meeting with environmental and community organizations
 - Multiple meetings with affected facilities
 - One meeting with the Western States Petroleum Association

February Stationary Source Committee Meeting

- Staff provided an update on PR 1109.1 and a summary of key remaining issues at the February Stationary Source Committee Meeting
- Based on Committee member comments
 - Staff is collecting revised cost data
 - Staff is re-evaluating the NOx BARCT limit for large boilers and heaters
 - Socioeconomic Impact Analysis will be made available at least 60 days before the Public Hearing
 - Committed to third party review of the Socioeconomic Impact Analysis



NOx Limit for Large Boilers and Heaters (≥ 40 MM Btu/hr)



Implementation Schedule and Approach



Implementation Cost



Alternative Implementation Approach

New Source Review for Co-Pollutants

Length of Averaging Time

Applicability of CEMS

Estimated Emission Reductions

Rule Development Timeframe

RECLAIM Transition Issues

Key Topics

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Request for Revised Cost Data



Proposed NO_x Limit for Large Boilers and Heaters (≥ 40 MMBtu/hr)



FCCU and Vapor Incinerator BARCT Assessment



Implementation Schedule and Approach



Alternative Implementation Approach

Request for Revised Cost Data



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- Collecting revised cost data from affected facilities
- Any revised or new cost data should be submitted by March 12, 2021
- Cost data should be specific to the project to meet the targeted NO_x limits (e.g., 2 ppm and 5 ppm for large heaters and boilers) and include:
 - Unit type and size
 - Technology such as burner and/or SCR
 - Details that support and justify the costs estimates
- Staff will need to cut-off data collection after March 12th
 - Third party review of cost data
 - Incorporate cost data in EPA SCR cost estimator
 - Revise cost-effectiveness analysis
 - Complete BARCT analysis

NO_x Limit for Large Boilers and Heaters (≥ 40 MMBtu/hr)



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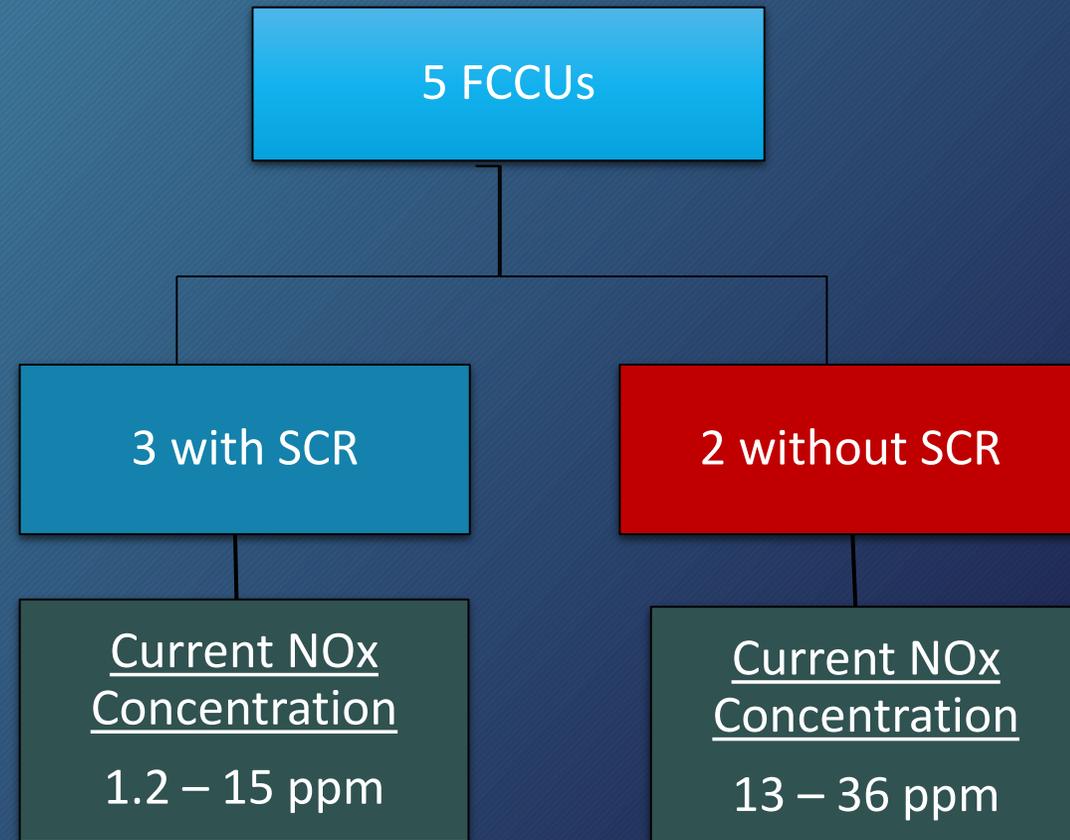
- Staff will be re-evaluating the proposed NO_x BARCT limit for large boilers and heaters
- Evaluation of a 5 ppm NO_x limit cannot be completed until staff receives revised cost data
 - Cost data needed to calculate the cost-effectiveness and incremental cost-effectiveness
- Staff will also be evaluating outlier units that are:
 - Achieving NO_x concentrations that are near 5 ppm referred to as “near limit”
 - Low-use units
- Any units that qualify for near limit or low-use provisions
 - Must accept permit limits to ensure compliance with NO_x concentration limit and/or ensure use of unit remains low
 - In general these units will be exempt from proposed NO_x concentration limit

FCCU BARCT Assessment Follow-Up



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- Stakeholders requested staff evaluate FCCU's with existing SCR's operating near the proposed 2 ppm NOx limit
- BARCT assessment presented in Working Group Meeting #10 on February 18, 2020
 - Staff recommended 2 ppm limit
 - Cost-Effectiveness \$37,000
 - One unit already achieving 2 ppm
- Staff will assess the cost-effectiveness of retrofitting units achieving close to 2 ppm once updated costs are received from facilities

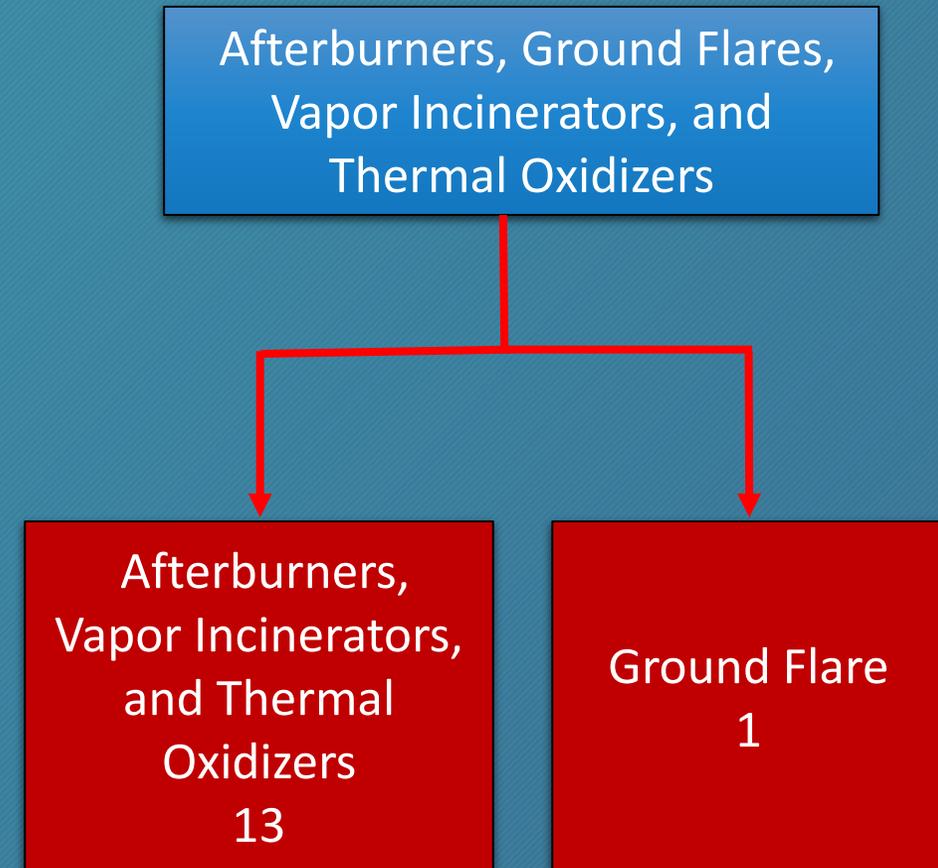


Vapor Incinerator BARCT Assessment



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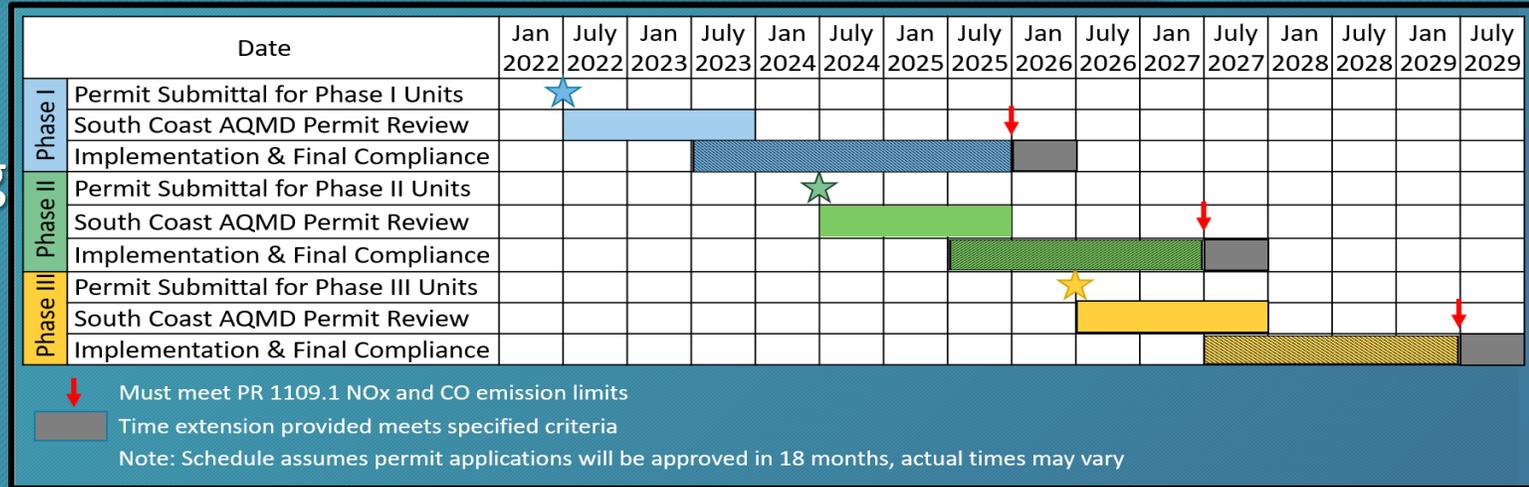
- Several stakeholders expressed concern with the proposed 20 ppm NO_x limit for vapor incinerators
- BARCT assessment presented in Working Group Meeting #12 on July 17, 2020
 - Staff recommended 20 ppm limit, with low-use exemption
 - Cost-Effectiveness \$3,500
 - Cost and technical feasibility based on similar units from Rule 1147 universe
- Staff is working with technology vendors to assess unique challenges with PR 1109.1 vapor incinerators
- Will evaluate the need for a near limit provision



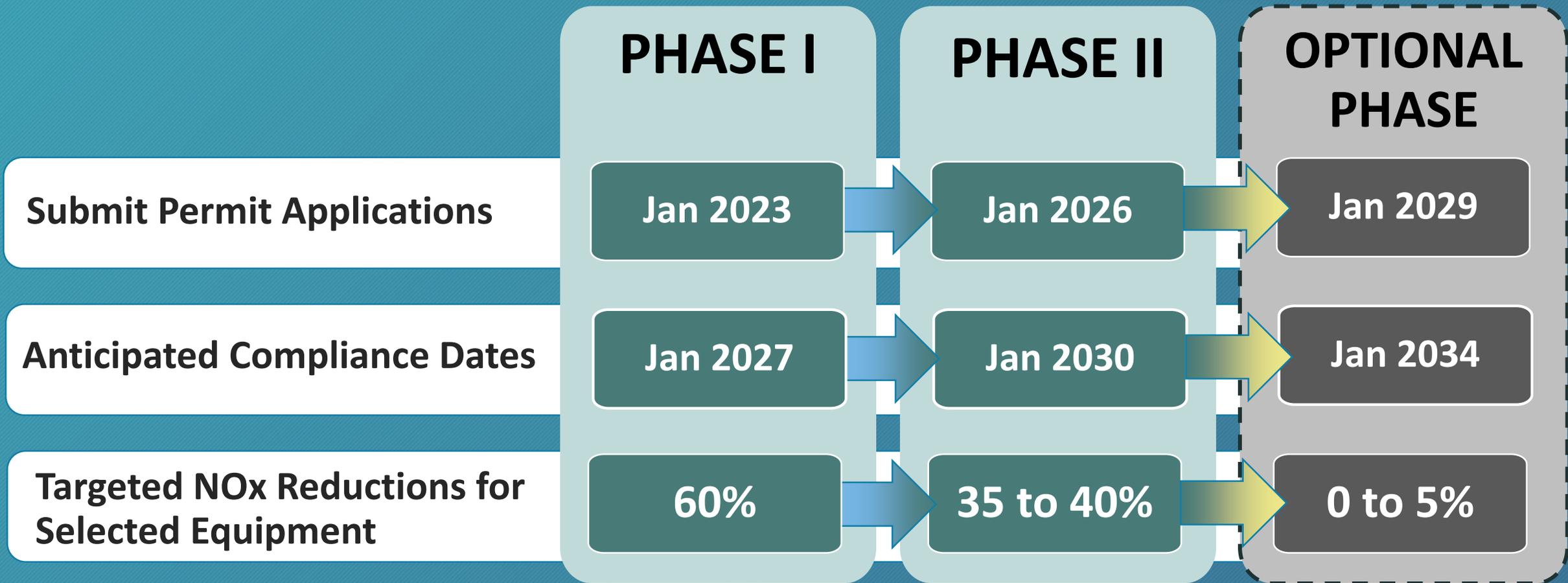
Implementation Schedule and Approach



- Staff proposed a revised implementation schedule during Working Group Meeting #16 on December 10, 2020
- Stakeholders expressed concerns regarding the lack of flexibility in a three-phase implementation schedule
- Staff is proposing to revise the implementation plan to two main phases, with an optional third phase for the most challenging projects or units with an extended turnaround schedule
- Approach will seek 95 percent of the reductions by 2030, with the remaining 5 percent by 2034



Implementation Compliance Plan with Two-Phases and an Optional Phase



Considerations for Turnaround Schedules

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- Facilities expressed concern that permit issuance delay could push projects beyond facility's scheduled turnaround
- Considering a provision that will provide additional time if the permit approval falls outside of the turnaround window (next slide)
- Staff is seeking input on proposal

Consideration for Turnaround Schedule

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- PR 1109.1 will allow additional time if a permit is issued after the beginning of a turnaround window if the operator:
 - Notifies the Executive Officer in writing, of the beginning of turnaround schedule at the time the complete permit application was submitted
 - Submits a complete permit application at least 24 months prior to the beginning of the turnaround
 - Provides any information requested by the permitting engineer within the timeframe specified by the permitting engineer
 - Completes the appropriate CEQA document prior to the Executive Officer issuing the Permit to Construct
- If the permit is not issued within 24 months from the date the application is deemed complete, the operator shall meet the NOx concentration limit no longer than 48 months from the issuance of the Permit to Construct

BARCT Equivalent Compliance Plan

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BARCT Equivalent Compliance Plan

- To help address the high implementation costs, PR 1109.1 will include an alternative compliance path for facilities with 6 or more units
- Facilities with 6 or more units can either
 - Meet the NO_x emission limits Table 1 of PR 1109.1; or
 - Meet the NO_x emission limits in a BARCT Equivalent Compliance Plan
- Objective of the BARCT Equivalent Compliance Plan is to achieve BARCT NO_x concentration levels in aggregate
- BARCT Equivalent Compliance Plan is facility-specific and tailored to the equipment at each facility

General Concept for BARCT Equivalent Compliance Plan

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- BARCT Equivalent Compliance Plan allows operators to select the NO_x concentration limit for each unit (**Alternative BARCT NO_x Limit**) provided the:
 - NO_x limit does not exceed the **Maximum Alternative NO_x Limit** and
 - NO_x emissions for all units in the BARCT Equivalent Compliance Plan (**Equivalent Mass Emissions**) ≤ NO_x emissions if all units met the proposed BARCT limits in Table 1 (**Facility BARCT Emission Target**)
 - **Maximum Alternative NO_x Limit** will be designed to represent a similar control efficiency that achieves the proposed BARCT NO_x limit for the class and category
- **Alternative BARCT NO_x Limit** is the unit specific NO_x limit that can be feasibly met in order for all units in the plan to collectively achieve the **Facility BARCT Emission Target**
 - **Maximum Alternative NO_x Limit** is the maximum NO_x limit that will be allowed for any unit, will be specific to the class and category
 - **Equivalent Mass Emissions** is the total remaining emissions calculated based on the **Alternative BARCT NO_x Limit** and the 2017 activity (or a more representative year as approved by the Executive Officer)
 - **Facility BARCT Emission Target** is the remaining emissions that are based on the Proposed NO_x BARCT limits in Table 1 of PR 1109.1 and the 2017 activity (or more representative year as approved by the Executive Officer)

BARCT Equivalent Compliance Plan

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**Step 1**

Operator selects the Alternative BARCT NO_x Limit for each unit

**Step 2**

- Calculate NO_x emissions for each unit using:
 - Alternative BARCT NO_x Limit in Step 1
 - 2017 activity

**Step 3**

Calculate the Equivalent Mass Emissions by summing emissions for each unit from Step 2

**Step 4**

- Confirm Mass Emissions \leq Facility BARCT Emission Target
- Return to Step 1, if Mass Emissions $>$ Facility BARCT Emission Target

Example of Calculating the Facility BARCT Emission Target*

- BARCT Control Efficiency is ratio of the PR 1109.1 Proposed Table 1 Proposed NOx Limit and the 2017 NOx Concentration
- Facility BARCT Emission Target is the product of the
 - BARCT Control Efficiency and
 - 2017 Baseline Emissions
- BARCT Emission Target is 22.4 tons/year (remaining emissions)

Category	Size (MMBtu/hr)	2017 Baseline Emissions (tpy)	2017 NOx Conc (ppmv)	PR 1109.1 Table 1 Proposed NOx Limit (ppmv)	BARCT Control Efficiency	Facility BARCT Emission Target (tpy)
Heater	100	7.0	20.0	5.0	75%	1.8
Heater	200	42.5	60.0	5.0	92%	3.4
Heater	150	17.5	40.0	5.0	88%	2.1
Boiler	300	10.0	60.0	5.0	92%	0.8
Heater	130	25.0	50.0	5.0	90%	2.5
Heater	100	10.0	25.0	5.0	80%	2.0
Heater	150	15.0	30.0	5.0	83%	2.6
Heater	220	30.0	30.0	5.0	83%	5.1
Heater	80	18.0	80.0	5.0	94%	1.1
Heater	30	4.5	40.0	9.0	78%	1.0
Heater	225	1.0	1.5	5.0	0%	0.0
						22.4

* Example assumes Table 1 NOx limit for boilers and heaters ≥ 40 MMBtu/hr is 5 ppmv

Example of Calculating *Equivalent Mass Emissions*

- Alternative BARCT Control Efficiency is ratio of the Alternative NOx BARCT Limit and the 2017 NOx Concentration
- *Equivalent Mass Emissions* is the product of the
 - Alternative BARCT Control Efficiency and
 - 2017 Baseline Emissions
- *Equivalent Mass Emissions* is 22.2 tons/year (remaining emissions)

Category	Size (MMBtu/hr)	2017 NOx Conc (ppmv)	Alternative NOx BARCT Limit (ppmv)	Alternative BARCT Control Efficiency	Equivalent Mass Emissions
Heater	100	20.0	8.0	60%	1.4
Heater	200	60.0	4.0	93%	3.5
Heater	150	40.0	3.0	93%	2.2
Boiler	300	60.0	5.0	92%	0.8
Heater	130	50.0	4.0	92%	2.6
Heater	100	25.0	7.0	72%	1.8
Heater	150	30.0	2.0	93%	2.9
Heater	220	30.0	6.0	80%	4.9
Heater	80	80.0	5.5	93%	1.1
Heater	30	40.0	7.0	83%	1.1
Heater	225	1.5	1.5	0%	0.0
					22.2

Comparison

- NOx concentrations may be higher or lower than PR 1109.1 Table 1 Proposed NOx limit
- Equivalent Mass Emissions* must be \leq Facility BARCT Emission Target

Category	Size (MMBtu/hr)	PR 1109.1 Table 1 Proposed NOx Limit (ppmv)	BARCT Control Efficiency	Facility BARCT Emission Target (tpy)	Alternative NOx BARCT Limit (ppmv)	Alternative BARCT Control Efficiency	Equivalent Mass Emissions
Heater	100	5.0	75%	1.8	8.0	60%	1.4
Heater	200	5.0	92%	3.4	4.0	93%	3.5
Heater	150	5.0	88%	2.1	3.0	93%	2.2
Boiler	300	5.0	92%	0.8	5.0	92%	0.8
Heater	130	5.0	90%	2.5	4.0	92%	2.6
Heater	100	5.0	80%	2.0	7.0	72%	1.8
Heater	150	5.0	83%	2.6	2.0	93%	2.9
Heater	220	5.0	83%	5.1	6.0	80%	4.9
Heater	80	5.0	94%	1.1	5.5	93%	1.1
Heater	30	9.0	78%	1.0	7.0	83%	1.1
Heater	225	5.0	0%	0.0	1.5	0%	0.0
				22.4			22.2

Additional Details of BARCT Equivalent Compliance Plan

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- BARCT Equivalent Compliance Plan will specify the Alternative NOx BARCT Limit for each unit
- Operator will be required to achieve the Alternative NOx BARCT Limit in lieu of the NOx concentration limits in PR 1109.1 Table 1
- Facility BARCT Emission Target is only used to ensure the selection of Alternative NOx BARCT Limits will achieve the same or greater emission reductions
- Approach retains the command-and-control structure, but acknowledges certain units may have greater challenges to achieve the proposed NOx BARCT limits

Category	Size (MMBtu/hr)	Alternative NOx BARCT Limit (ppmv)
Heater	100	8.0
Heater	200	4.0
Heater	150	3.0
Boiler	300	5.0
Heater	130	4.0
Heater	100	7.0
Heater	150	2.0
Heater	220	6.0
Heater	80	5.5
Heater	30	7.0
Heater	225	1.5

Additional Considerations

- Staff is working with U.S. EPA regarding the proposed approach
 - If the alternative approach is subject to U.S. EPA's Economic Incentive guidance, approach may require a 10 percent environmental benefit
- Operators that elect to use this alternative approach would be required to submit a BARCT Equivalent Compliance Plan
 - Operators must submit plan six months after date of adoption
 - Staff is considering a provision that would restrict any changes to the plan after approval
- Staff is awaiting revised cost data which will be incorporated in the analysis for the proposed BARCT NOx limit

Next Steps

Continue Discussions on Facility-Specific information with Facilities



Continue Meetings with Stakeholders



Update Stationary Source Committee –
March 19th



Release Preliminary Draft Staff Report and
Rule Language – March 19th



Public Workshop March 25th



Public Hearing June 4th

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