

**Adopt Proposed Amendments to Rule 4306 (Boilers,
Steam Generators, and Process Heaters – Phase 3)
and Rule 4320 (Advanced Emission Reduction
Options For Boilers, Steam Generators, And Process
Heaters Greater Than 5.0 MMBtu/hr)**

San Joaquin Valley Air Pollution Control District
Governing Board Meeting
December 17, 2020

Overview

- Rules 4306 and 4320 apply to any gaseous fuel- or liquid fuel- fired boiler, steam generator, or process heater with a total rated heat input greater than 5 MMBtu per hour
- Boilers are external combustion equipment used to produce hot water or steam
- Steam generators are external combustion equipment that convert water to steam; most commonly used in thermally enhanced crude oil production
- Process heaters are combustion equipment that transfer heat from combustion gases to liquid or gas process streams



Image credit: US EPA, 2013

Where do Boilers, Steam Generators, and Process Heaters Operate?

- These units are used at a wide range of facility types in Valley including:
 - Oil and gas production facilities
 - Petroleum refineries
 - Food and agricultural product processing operations
 - Schools, Universities
 - Ethanol Production
 - Hospitals
 - Livestock husbandry operations (dairies, cattle feedlots, etc.)
 - Manufacture and industrial facilities

District Rules 4306 and 4320

- Rule 4306 establishes specific NO_x limits for many categories of large boilers, oil field steam generators, and process heaters
 - NO_x limits must be met in order to legally operate in District
 - Facilities generally control emissions from sources through combustion modification or exhaust gas treatment
- Rule 4320 establishes additional technology-forcing NO_x limits for units in this source category, with several compliance options:
 - Meet specified emission limits, or
 - Pay emissions fee annually to the District
- Through these rules, NO_x emissions from these sources already reduced by 96%

Attainment Plan Commitments

- Substantial emission reductions needed to meet federal air quality standards
- Commitment in *2018 PM2.5 Plan* to evaluate further emissions reduction opportunities from boilers, steam generators, and process heaters, including lowering NOx limits where feasible
- District staff have conducted comprehensive review of air district rules, lowest emission limits being achieved nationwide, and costs and feasibility of most effective emission control technologies available

New Proposed NOx Emissions Requirements

- District proposing to further reduce NOx emissions from various categories through new proposed Rule 4306 and 4320 limits
- Majority of units must meet proposed Rule 4306 limits by Dec. 31, 2023
 - Units with lower-NOx technologies allowed until 2029 to allow for useful life
- Technology-forcing limits included in Rule 4320
 - Due to costly controls required to meet these limits, District staff maintained Advanced Emission Reduction Opportunities compliance option of rule
 - Operators have option of paying an annual emissions fee based on the actual emissions of the unit during the previous calendar year while the facility continually evaluates the feasibility of potential controls
- Emission Compliance Plan and Authority to Construct due May 1, 2022
- Proposed amendments also include updates to definitions, category groupings, and test methods

Proposed NOx Limits for Category A & B Units

Category A: 5-20 MMBtu/hr	Total # of Units	Rule 4306 Current Limit¹	Rule 4306 Proposed Limit	Rule 4320 Current Limit¹	Rule 4320 Proposed Limit
Fire Tube Boilers	178	15/9 ppmv	7 ppmv	9/6 ppmv	5 ppmv
Units at Schools and Colleges	9	15/9 ppmv	9 ppmv	9/6 ppmv	9 ppmv
Digester Gas Fired Units	2	15/9 ppmv	9 ppmv	9/6 ppmv	9 ppmv
Thermal Fluid Heaters	3	15/9 ppmv	9 ppmv	9/6 ppmv	9 ppmv
Any Other Units	110	15/9 ppmv	9 ppmv	9/6 ppmv	5 ppmv
Category B: ≥ 20 MMBtu/hr	Total # of Units	Rule 4306 Current Limit¹	Rule 4306 Proposed Limit	Rule 4320 Current Limit¹	Rule 4320 Proposed Limit
Fire Tube Boilers >20 to ≤75	88	9/6 ppmv	7 ppmv	7/5 ppmv	2.5 ppmv
Any Other Units >20 to ≤75	56	9/6 ppmv	7 ppmv	7/5 ppmv	2.5 ppmv
Units >75	86	9/6 ppmv	5 ppmv	7/5 ppmv	2.5 ppmv

¹ Standard/enhanced schedule limits

Proposed NOx Limits for Oilfield Steam Generators

Category C: Oilfield Steam Generators	Total # of Units	Rule 4306 Current Limit	Rule 4306 Proposed Limit	Rule 4320 Current Limit	Rule 4320 Proposed Limit
>5 to ≤20 MMBtu/hr	8	15 ppmv	9 ppmv	9/6 ppmv ¹	6 ppmv
>20 to ≤75 MMBtu/hr	276	15 ppmv	9 ppmv	7/5 ppmv ¹	5 ppmv
>75 MMBtu/hr	134	15 ppmv	7 ppmv	7/5 ppmv ¹	5 ppmv
Units fired on <50% PUC Gas	142	15 ppmv	15 ppmv	9 ppmv	5 ppmv

¹ Standard/enhanced schedule limits

Proposed NOx Limits for Units at Refineries

Category D: Refinery Units	Total # of Units	Rule 4306 Current Limit	Rule 4306 Proposed Limit	Rule 4320 Current Limit	Rule 4320 Proposed Limit
Boilers >5 and ≤40 MMBtu/hr	2	30 ppmv	30/5 ppmv ²	9/6 ppmv ¹	5 ppmv
Boilers >40 to ≤110 MMBtu/hr	4	30 ppmv	9/5 ppmv ²	6/5 ppmv ¹	5 ppmv
Boilers >110 MMBtu/hr	1	5 ppmv	5 ppmv	5 ppmv	2.5 ppmv
Process Heaters >5 to ≤40 MMBtu/hr	15	30 ppmv	30/9 ppmv ²	9/6 ppmv ¹	5 ppmv
Process Heaters >40 to ≤110 MMBtu/hr	6	30 ppmv	15/9 ppmv ²	6/5 ppmv ¹	5 ppmv
Process heaters >110 MMBtu/hr	1	5 ppmv	5 ppmv	5 ppmv	2.5 ppmv

¹ Standard/enhanced schedule limits

² Upon replacement of unit

Cost-Effectiveness & Socioeconomic Impacts

- Cost-effectiveness of Rule 4306 ranges depending on current permitted limit of unit, size of unit, and emission reductions achieved
 - Average cost effectiveness \$13,000 to \$106,000 per ton of NO_x reduced
- Rule 4320 includes compliance options for ensuring requirements are feasible and cost-effective
- Socioeconomic Impact Analysis conducted by third-party consultant, Eastern Research Group (Staff Report, Appendix D)
 - Units affected in multiple industries (oil and gas, manufacturing, food processing)
 - COVID-19 adjusted baselines and multiple recovery scenarios used in modeling
 - Impact projected to be less than significant using Board and CARB-approved methodology

NOx Emissions Reductions Achieved

- Estimated NOx Emission Reductions from Rule 4306 in 2024
 - 16.4% reduction
 - 0.19 tons per day
- Estimated NOx Emission Reductions from Rule 4306 in 2030
 - 2.6% reduction
 - 0.03 tons per day
- Potential NOx Emission Reductions from Rule 4320
 - Additional 46% (0.45 tons per day) reduction in emissions from this source category
 - Not quantified for State Implementation Plan emission reduction credit at this time

Public Process to Amend Rules 4306 & 4320

- *2018 Plan for the 1997, 2006, and 2012 PM2.5 Standards*
 - Adopted: November 15, 2018
- Public scoping meeting held December 2019
- Public workshops held July, September, and October 2020
- Regular updates provided at Citizens Advisory Committee (CAC), Environmental Justice Advisory Group (EJAG), and District Governing Board meetings
 - Consensus support received by CAC
- Through AB 617, District has invited community steering committee feedback
- Draft rules published for public review on October 2, 2020
- Proposed rules posted for public review on November 17, 2020
- Ongoing opportunities for public input throughout rule development process

Significant Comments

Comment: Rule 4320 limits may require expensive controls that may not be commercially available

Response:

- District carefully considered the technological and economic feasibility of further controls
- District staff worked closely with stakeholders to tailor compliance schedules to achieve maximum NO_x reductions as expeditiously as possible, while providing time needed to identify most feasible options
- Emissions fee option available if needed while working to identify control technology options

Significant Comments

Comment: Sufficient time should be provided to allow for planning and permitting for retrofits necessary to comply with the proposed limits.

Response:

- Compliance deadlines crafted to provide for significant emission reductions by 2024 per commitments in federally-approved *2018 PM2.5 Plan*
- Based on feedback received, the District has provided additional time and flexibility that take into account technological feasibility, and remaining useful life for units retrofitted with lower-emitting technologies
- District will work closely with affected stakeholders to provide necessary outreach and assist with the permitting process

Recommendations

1. Adopt proposed amendments to Rule 4306 (Boilers, Process Heaters, and Steam Generators – Phase 3) and Rule 4320 (Advanced Emission Reduction Options for Boilers, Process Heaters, and Steam Generators Greater than 5 MMBtu/hr)
2. Authorize Chair to sign attached Resolution