

Proposed Rule 1179.1

NOx Emission Reductions from Combustion Equipment at Publicly Owned Treatment Works Facilities

Public Workshop

Date: July 22, 2020

Join Zoom Meeting: <https://scaqmd.zoom.us/j/95735021417?pwd=ckthTzZWb3BWWYis0QlFtVk02TFE0dz09>

Meeting ID: 957 3502 1417 Password: 203164

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

Background

- Proposed Rule 1179.1 is designed to address emissions from combustion equipment at Publicly Owned Treatment Works (POTW) facilities
- POTW facilities are
 - Wastewater treatment or reclamation plants owned or operated by a public entity
 - Includes all operations within the boundaries of the wastewater or sludge treatment plant
- 31 POTW facilities
- Addressing combustion equipment in a rule that is specific to POTWs can better tailor requirements to issues that are unique to these facilities

BARCT Assessment

○ BARCT assessments conducted for digester gas boilers and turbines

Assessment of South Coast AQMD Regulatory Requirements

Assessment of Emission Limits for Existing Units

Other Regulatory Requirements

Assessment of Pollution Control Technologies

Initial BARCT Emission Limits and Other Considerations

Cost-Effectiveness Analysis

BARCT Emission Limits

Proposed Rule 1179.1

Purpose (a) and Applicability (b)

○ Purpose

- Reduce emissions of Oxides of Nitrogen (NO_x) and Carbon Monoxide (CO) from boilers and turbines, and emissions of NO_x, CO, and Volatile Organic Compounds (VOCs) from engines located at publicly owned treatment works (POTW) facilities.

○ Applicability

- Boilers, steam generators and process heaters over 400,000 Btu/hr fueled by digester gas or a digester gas blend
- Turbines less than 0.3 MW fueled by digester gas or a digester gas blend and turbines greater than or equal to 0.3 MW fueled by natural gas, digester gas, or a digester gas blend
- Engines over 50 brake horsepower fueled by digester gas or a digester gas blend

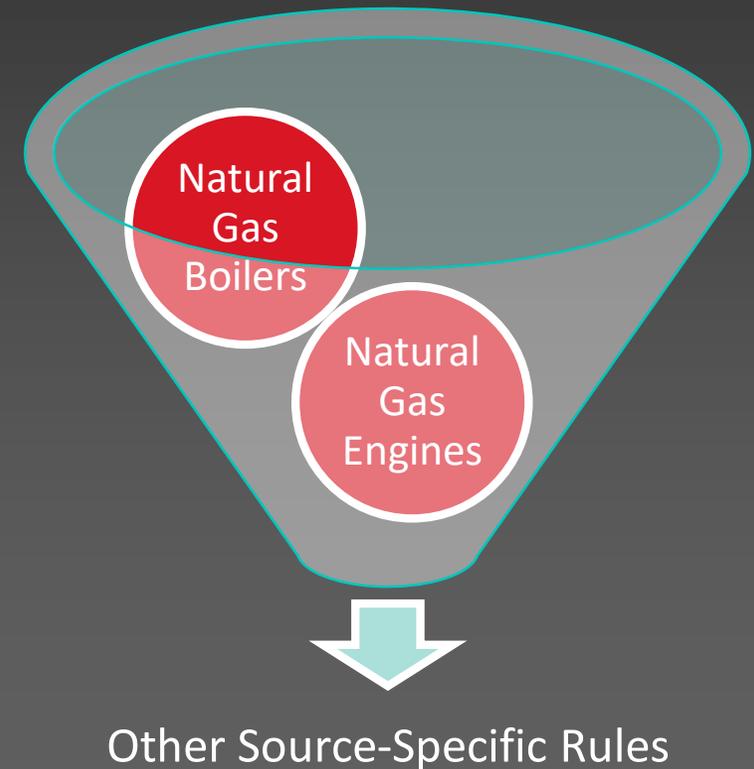
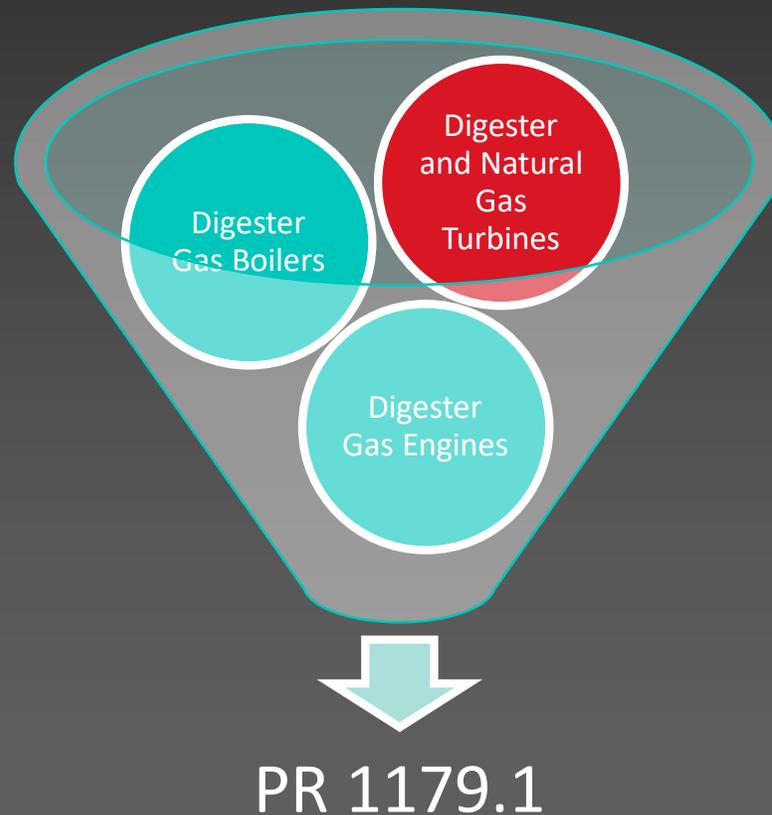
Definitions (c)

- Definitions that are also used in other source-specific rules are incorporated in PR 1179.1 to define equipment, fuels, and other rule terms
- New or modified definitions specific to PR 1179.1 include
 - DIGESTER GAS: Describes the primary type of fuel used by combustion equipment subject to the proposed rule
 - ENGINE: Describes an equipment type that will be subject to the proposed rule
 - TURBINE: Describes an equipment type that will be subject to the proposed rule
 - UNIT: Describes the equipment subject to the proposed rule requirements and includes boilers, turbines, and engines

Emission Limits (d)

Highlights

- Focus is on equipment fueled with digester gas and digester gas blends
 - Limits for natural gas are addressed in other source-specific rules
 - All turbines at POTWs excluded from Rule 1134, PR 1179.1 includes limits for natural gas and digester gas



Emission Limits (d) - continued

Highlights

- Contains emission limits, averaging times, and startup/shutdown provisions for UNITS subject to PR 1179.1 for NO_x, CO, and VOC (if applicable)
- Equipment categories affected:
 - Boilers > 2 MM Btu/hr burning digester gas
 - Boilers ≤ 2 MM Btu/hr burning digester gas
 - Turbines ≥ 0.3 MW blending less than 40% natural gas
 - Turbines ≥ 0.3 MW blending more than 40% natural gas (simple cycle)
 - Turbines ≥ 0.3 MW blending more than 40% natural gas (combined cycle)
 - Turbines < 0.3 MW (microturbines) burning digester gas or a digester gas blend
 - Engines > 50 bhp
- Emission limits do not apply during periods of startup or shutdown

Emission Limits (d) – Boilers fired on digester gas

- PR 1179.1 maintains existing emission limits for:
 - Boilers greater than 2 MM Btu/hr currently complying with NO_x/CO limits in Rules 1146 and 1146.1
 - Boilers less than or equal to 2 MM Btu/hr with a NO_x permit limit of 30 ppm
- CO limits consistent with Rule 1146.2

Paragraph (d)(1)

TABLE 1 CONCENTRATION LIMITS BOILERS, STEAM GENERATORS, AND PROCESS HEATERS FIRED ON DIGESTER GAS OR DIGESTER GAS BLEND				
EQUIPMENT CATEGORY	NO _x (ppm) ¹	CO (ppm) ¹	VOC (ppm)	COMPLIANCE DATE
Rated heat input capacity > 2 MMBtu/hr	15	400	N/A	On or before [<i>Date of Adoption</i>]
Rated heat input capacity ≤ 2 MMBtu/hr	30			On or before [<i>Date of Adoption</i>]

*All boiler concentration limits corrected to 3% oxygen on a dry basis

Emission Limits (d) - Turbines

- Digester gas turbines would be required to meet 18.8 ppm
 - Affects 3 units
- Natural gas units would meet lower limits
 - No existing units
- CO limits consistent with existing permit limits
- Microturbine limits consistent with current permits

Paragraph (d)(1)

TURBINES FIRED ON DIGESTER GAS, DIGESTER GAS BLEND, OR NATURAL GAS				
EQUIPMENT CATEGORY	NO _x (ppm) ²	CO (ppm) ²	VOC (ppm)	COMPLIANCE DATE
Rating ≥ 0.3 MW firing 40% natural gas or less	18.8	130	N/A	On or before [Date of Adoption]
Simple cycle with rating ≥ 0.3 MW firing more than 40% natural gas	5			On or before [Date of Adoption]
Combined cycle with rating ≥ 0.3 MW firing more than 40% natural gas	2			On or before [Date of Adoption]
Rating < than 0.3 MW firing digester gas or digester gas with natural gas	9			On or before [Date of Adoption]

*All turbine concentration limits corrected to 15% oxygen on a dry basis

Emission Limits (d) - Engines

- Engines currently complying under Rule 1110.2 would have no change under PR 1179.1

Paragraph (d)(1)

ENGINES FIRED ON DIGESTER GAS OR DIGESTER GAS BLEND				
EQUIPMENT CATEGORY	NO _x (ppm) ²	CO (ppm) ²	VOC (ppm) ³	COMPLIANCE DATE
Engines > 50 bhp	11	250	30	On or before [<i>Date of Adoption</i>]

² All parts per million (ppm) emission limits are referenced at 15% volume stack gas oxygen on a dry basis.

³ Parts per million (ppm) by volume, measured as carbon, corrected to 15% oxygen on a dry basis.

Emission Limits (d) – Weighted Averaging Limit

- Applies to boilers that fire digester gas and natural gas simultaneously and use weighted average limit under Rules 1146/1146.1
- If blending 10% or less natural gas, boiler is subject to PR 1179.1 NOx limit
- If blending more than 10% natural gas, boiler is subject to:
 - Natural gas limits in Rules 1146/1146.1; or
 - Weighted average limit using Equation 1, requiring non-resettable totalizing fuel flow meter

Paragraph (d)(2)

$$\text{Weighted Average Limit} = \frac{(CL_A \times Q_A) + (CL_B \times Q_B)}{Q_A + Q_B} \quad (\text{Equation 1})$$

Where:

CL_A = compliance limit for digester gas

Q_A = heat input from digester gas

CL_B = compliance limit for natural gas pursuant to Rule 1146 and Rule 1146.1

Q_B = heat input from natural gas

Emission Limits (d) – Averaging Times for CEMS

Paragraph (d)(3)

Unit Type	Requirement	Change from Source-Specific Rule
Boilers (d)(3)(A)	1 hour fixed interval	Changed from 15 minutes under Rules 1146/1146.1
Turbines (d)(3)(B)	1 hour rolling average	Consistent with Rule 1134
Engines (d)(3)(C)	1 hour fixed interval	Consistent with Rule 1110.2
	48 hour fixed interval when 10% under rule limits for NOx/CO (permit condition)	

Emission Limits (d) – Startup and Shutdown

Paragraph (d)(4)

Unit Type	Requirement	Change From Source-Specific Rule
Boilers w/out SCR (d)(4)(A)	Not longer than 6 hours	Consistent with Rule 1146.1
Boilers w/SCR (d)(4)(A)	Startup: When catalyst reaches normal operating temperature	Startup: consistent with SCR permit requirements
	Shutdown: not longer than 6 hours	Shutdown consistent with Rule 1146.1
Turbines w/out SCR (d)(4)(B)	Not longer than 30 minutes	Consistent with existing digester gas turbine permits (seeking input from operators)
Turbines w/SCR (d)(4)(B)	Not longer than 1 hour	
Engines (d)(4)(C)(i)	Not longer than 30 minutes (up to 2 hours w/ permit condition)	Consistent with Rule 1110.2
(d)(4)(C)(ii)	Not longer than 4 hours for major repairs (e.g., overhaul, installing catalyst)	
(d)(4)(C)(iii) (d)(4)(C)(iv)	Not longer than 150 hours (or permitted limit) for engine commissioning	

Emission Limits (d) – Prohibition of Liquid Fuel

- Paragraph (d)(5)
 - Provision specifically applies to turbines at POTWs
 - Cannot burn any liquid fuel, such as diesel
 - Does not apply to emergency use turbines

Source Testing (e)

- Source testing schedules based on other source-specific rules
 - Boiler schedule based on Rules 1146/1146.1
 - Turbine schedule based on Rule 1134
 - Engine schedule based on Rule 1110.2
- Turbines < 0.3 MW would be subject to source testing once every 3 years

Paragraph (e)(1)

Equipment Category	Frequency	Pollutant	Required Operating Time Prior to Conducting Source Test ¹
Boilers ≥ 10 MMBtu/hr	Every 3 years from the date the previous source test was required	NO _x , CO	At least 250 operating hours or at least 30 days
Boilers < 10 MMBtu/hr and > 2 MMBtu/hr	Every 5 years from the date the previous source test was required		
Turbines emitting ≥ 25 tons NO _x per year	Once every calendar year		None
Turbines emitting < 25 tons of NO _x per year	Every 3 years from the date the previous source test was required		
Engines	Every 2 years from the date the previous source test was required, no later than the last day of the calendar month that the test is due, or every 8,760 operating hours, whichever occurs first. ²	NO _x , CO, and VOC reported as carbon	At least 40 operating hours or at least 1 week

Source Testing (e) - continued

Other source testing requirements are based on source-specific rules, such as Rules 1146 and 1110.2

PR 1179.1 contains source testing requirements which apply to all equipment types

Protocol submittal and scheduling (e)(2)	Source test protocol requirements (e)(3)	Source test date notification (e)(4)	Approved contractor and test methods (e)(5)	Operating conditions during testing (e)(6)	Submittal of completed source test (e)(7)	Periodic monitoring in lieu of testing (e)(8)
---	---	---	--	---	--	--

Source Testing (e) – continued

- Paragraph (e)(2)(B) – Revised protocol submittal requirement
- A new submittal is required for the following:
 - Any equipment modification resulting in a change to the permit
 - Any change to the emission limits
 - At the request of the Executive Officer

Source Testing (e) Source Test Methods

- Contained in Table 3 for all pollutants covered under PR 1179.1

Paragraph (e)(5)

Pollutant	Test Methods
NO _x	South Coast AQMD Test Methods 100.1 or 7.1
CO	South Coast AQMD Test Methods 100.1 or 10.1, or EPA Test Method 10
CO ₂ and O ₂	South Coast AQMD Test Method 3.1 or 100.1
VOC	South Coast AQMD Test Methods 25.1 or 25.3, excluding ethane and methane
Particulate Matter (PM)	South Coast AQMD Test Method 5.1, 5.2, or 5.3

CEMS (f)

- Table 4 contains the thresholds for all equipment where CEMS is required
- Consistent with requirements under source-specific rules

Subdivision (f)

Equipment Type	Threshold	Pollutant(s)
Boilers	Rated heat input capacity > 40 MMBtu/hr and an annual heat input > 200 x 10 ⁹ Btu per year	NOx
Turbines	Output capacity rating ≥2.9 MW	NOx
Engines	Output capacity rating ≥ 1000 bhp and operating more than 2 million bhp-hr per calendar year	NOx, CO
	Combined output capacity rating ≥1500 bhp and a combined fuel usage of >16 x 10 ⁹ Btu per year (higher heating value) of engines at the same location ¹	

CEMS (f) – continued

- Paragraph (f)(1) contains monitoring parameters for turbines, consistent with Rule 1134 (e.g., flow rate, operating time)
- Paragraph (f)(2) contains existing requirements for engines that are consistent with Rule 1110.2
 - Includes recent provisions from the November 2019 amendments to Rule 1110.2 that allow biogas engines 1,000 bhp and greater and less than 1,200 bhp to conduct weekly diagnostic emission checks in lieu of CEMS

Inspection and Monitoring (I&M) Plans (g)

- I&M Plan requirements under PR 1179.1 are consistent with those from Rule 1110.2
 - Attachment 1 of PR 1179.1 contains the same requirements as Attachment 1 of Rule 1110.2
 - Facilities with natural gas engines subject to Rule 1110.2 and digester gas engines subject to PR 1179.1 would be required to maintain I&M plans for each rule
 - Applications for I&M Plan would be required to be submitted within 3 months from rule adoption - Subparagraph (g)(1)(C)

Diagnostic Emission Checks for Boilers and Engines (h)

- Diagnostic emission check requirements under PR 1179.1 are consistent with those from Rules 1146, 1146.1, and 1110.2
- Testing shall be conducted pursuant to the Combustion Gas Periodic Monitoring Protocol
 - Protocol requires 15 minute sampling

Recordkeeping (i)

- PR 1179.1 harmonizes recordkeeping requirements from other rules into one rule
 - Requires retaining records for 5 years for all equipment types
 - Some units under other rules have a 2 year requirement
 - The accumulation of records would begin upon rule adoption for these units
- PR 1179.1 also requires recordkeeping for basic equipment parameters for boilers, turbines, and engines (e.g., operating time, fuels used, emission control system parameters), as well as:
 - Maintenance and tuning records
 - Daily operating logs for boilers and turbines and monthly operating logs for engines

Other Requirements for Boilers (j)

- PR 1179.1 contains requirements consistent with Rules 1146, 1146.1, and 1146.2
 - Paragraph (j)(1): Cannot derate to 2 MM Btu/hr or lower
 - Paragraph (j)(2): Requirements for maintenance and documentation, consistent with Rule 1146.2

Other Requirements for Engines (k)

- PR 1179.1 contains engine requirements consistent with Rule 1110.2 for the following:
 - Paragraph (k)(1): Breakdowns
 - Paragraph (k)(2): Totalizing meters
 - Paragraph (k)(3): Maintenance of combustion controls (e.g., air-fuel ratio controllers)
 - Paragraph (k)(4): Reporting of breakdowns and emissions exceedances

Exemptions (I)

- PR 1179.1 contains exemptions for the following:
 - Paragraph (I)(1): Low-use boilers under Rule 1146
 - Boilers in operation before September 5, 2008 operating below 90K therms
 - Paragraph (I)(2): Special use turbines
 - e.g., flood control and emergency backup power turbines
 - Includes requirements if exemption criteria is exceeded
 - Paragraph (I)(3): Natural gas boilers and engines
 - Boilers firing 100% natural gas subject to Rule 1146 series
 - Engines firing 100% natural gas subject to Rule 1110.2

Exemptions (I) - continued

- PR 1179.1 contains exemptions for the following:
 - Paragraph (I)(4): Low-use engines
 - Must operate less than 200 hours per year
 - Usage verified with non-resettable hour meter and operating log
 - Paragraph (I)(5): Permit-exempt turbines < 0.3 MW in operation prior to May 3, 2013
 - Replacement units would be subject to PR 1179.1
 - Paragraph (I)(6): Existing small boilers without permitted NO_x concentration limits
 - Replacement units would be subject to PR 1179.1

Proposed Rule 1179.1

Impact Assessment

Emission Reductions

- PR 1179.1 will affect three turbines above 0.3 MW
 - Turbines will reduce emissions from 25 ppm to 18.8 ppm (corrected to 15% O₂, dry)
- No reductions from boilers or engines

PAR 1179.1 NO _x Emissions and Reductions from Turbines (tons per day)	
Baseline Emissions	0.18
Remaining Emissions	0.13
Emission Reductions	0.05

Proposed Rule 1179.1

Cost-Effectiveness

Cost-Effectiveness

- Threshold is \$50,000/ton NO_x reduced
- Calculated using Discounted Cash Flow Method
- Costs were obtained from the facility that would be subject to the proposed limit and one technology supplier
- Factors considered in the calculation of costs
 - The increase in annual operating costs for increased water usage

Cost-Effectiveness Summary

- 3 turbines would be subject to the proposed emission limit of 18.8 ppm at 15% O₂
 - Costs includes annual operating costs of \$143,200 per turbine for increased water injection
- Emission reductions are 138 tons over 25 years for 3 turbines
- Cost-effectiveness to meet 18.8 ppm at 15% O₂ is \$48,600 per ton of NO_x reduced

Cost-Effectiveness Summary

- Staff also evaluated cost effectiveness for the following boilers and turbines to meet more stringent emission limits*
 - 20 ppm for boilers < 1 MMBtu/hr
 - 12 ppm for boilers ≥ 1 MMBtu/hr
 - 5 ppm for turbines ≥ 0.3 MW
- The emission limits proposed had cost-effectiveness values of more than \$50,000 per ton of NOx reduced
 - 20 ppm for boilers < 1 MMBtu/hr would result in minimal emission reductions
 - Stranded assets considered for boilers ≥ 1 MMBtu/hr increased costs to meet 12 ppm
 - Stranded assets for turbines increased costs to meet 5 ppm

*All emission limits in parts per million (ppm) are at 3% O2 for boilers and 15% O2 for turbines

Proposed Rule 1179.1

California Environmental Quality Act (CEQA)

California Environmental Quality Act (CEQA)

- PR 1179.1 is a project subject to CEQA
- Decision to prepare 30-day Draft Environmental Assessment (EA)
 - ▶ Equivalent to a Negative Declaration
 - ▶ No significant impacts are expected with PR 1179.1
 - ▶ No CEQA scoping meeting is required to be held
 - ▶ Will contain project description (Chapter 1) and environmental checklist (Chapter 2) to evaluate the revised project's impacts on 18 topic areas
 - ▶ Analysis of alternatives and mitigation measures are not required
 - ▶ Will be released for 30-day public review period in August 2020
- Final EA
 - ▶ Will include responses to Draft EA comment letters and any necessary modifications to Draft EA
 - ▶ Governing Board must certify Final EA

Proposed Rule 1179.1

Scope of Socioeconomic Impact Assessment

Scope of Socioeconomic Impact Assessment

- California Health and Safety Code Section 40440.8
 - Requires socioeconomic impact assessment for proposed rule or rule amendment which “will significantly affect air quality or emissions limitations”
- Socioeconomic impact assessment shall consider:
 - Type of affected industry
 - Impact on employment and regional economy
 - Range of probable costs, including costs to industry or business

Rulemaking Schedule



Contacts

Melissa Gamoning

Air Quality Specialist
mgamoning@aqmd.gov
909-396-3115

Isabelle Shine

Air Quality Specialist
ishine@aqmd.gov
909-396-3065

Kevin Orellana

Program Supervisor
korellana@aqmd.gov
909-396-3492

Mike Morris

Planning and Rules Manager
mmorris@aqmd.gov
909-396-3282

To receive e-mail notifications for Rule 1179.1 - NOx Emission Reductions from Combustion Equipment at Publicly Owned Treatment Works Facilities, sign up at: www.aqmd.gov/sign-up