

# Proposed Rule 1150.3

Emissions of Oxides of Nitrogen from Combustion  
Equipment at Landfills

Date: August 12, 2020

Join Zoom Meeting:

<https://scaqmd.zoom.us/j/99060455359?pwd=VjdETy9jUzA3VmkvOHF0USs3bIZCUT09>

Meeting ID: 990 6045 5359

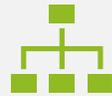
Password: 315995

Teleconference Dial-In: +1 669 900 6833

# Agenda



Summary of last working group meeting



Proposed Rule Structure



Proposed Rule Language



Next Steps

# Update Since Last Working Group Meeting

Since the last working group meeting on February 12, 2020, staff has:

- Made changes to PR 1150.3 rule team
- Worked on completing rule language
- Met with stakeholders
- Discussed control technology with suppliers

# COVID-19 Meeting Format

- South Coast AQMD acknowledges the challenges to stakeholders due to COVID-19
- To ensure safe social distancing, working group meetings will be held via Zoom, or a call-in option is also available
- Staff will want to ensure the public has the ability to fully participate in the working group meetings
  - With the new meeting format, participants can still comment throughout the meeting
- In addition to working group meetings, staff is available for individual meetings

# Summary of Last Working Group Meeting



Based on engine survey results— Engines are not included in applicability of PR 1150.3

Initial BARCT NOx Emission Limit (ppmv @ 3% O <sub>2</sub> )	Boiler Size (MMBtu/hr)	Cost-Effectiveness (\$/ton NOx reduced)	Average Cost-Effectiveness (\$/ton NOx reduced)
5 (SCR and landfill gas treatment system)	115	\$637,611	\$446,988
	335	\$351,676	
	335	\$351,676	
9 (using UANB)	115	\$9,024	\$8,711
	335	\$8,555	
	335	\$8,555	

Cost-effectiveness analysis showed that 9 ppmv is cost effective for boilers and 12.5 ppmv is cost effective for turbines at replacement



Proposed BARCT emission limits of 9 ppmv for boilers and 12.5 ppmv for turbines

\*All concentration limits are corrected to 3% oxygen on a dry basis for boilers and 15% oxygen on a dry basis for turbines

# Proposed Rule Structure

- Similar structure as Proposed Rule 1179.1
- Emission limits for applicable pollutants will be contained in one table categorized by equipment type/size
- Subdivisions will be organized by requirement
  - Purpose (a)
  - Applicability (b)
  - Definitions (c)
  - Emission Limits (d)
  - Source Testing (e)
  - CEMS (f)
  - Diagnostic Emissions Checks for Boilers (g)
  - Recordkeeping (h)
  - Other Requirements for Boilers (i)
  - Exemptions (j)

# Proposed Rule 1150.3

Proposed Rule Language

# Purpose (a) and Applicability (b)

- Purpose
  - The purpose of this rule is to reduce emissions of oxides of nitrogen ( $\text{NO}_x$ ) and carbon monoxide (CO) from boilers and turbines located at Municipal Solid Waste (MSW) landfills and landfill gas to energy facilities.
- Applicability
  - Boilers  $> 2$  MMBtu/hr fueled by landfill gas or landfill gas blend
  - Turbines  $< 0.3$  MW fueled by landfill gas or landfill gas blend
  - Turbines  $\geq 0.3$  MW fueled by landfill gas, landfill gas blend, or natural gas
    - Rule 1134 does not apply to turbines located at landfills

## Definitions (c)

Definitions used in other source-specific rules are incorporated in PR 1150.3

New or modified definitions specific to PR 1150.3 include:

- LANDFILL GAS BLEND means a fuel blend of landfill gas combined with natural gas or another gaseous fuel
- LANDFILL GAS TO ENERGY FACILITY means a facility that receives and processes landfill gas to generate electricity for sale. Landfill gas to energy facility does not include MSW landfills
- REPLACEMENT means installing new equipment with the same or similar function in place of currently installed equipment. Replacement does not include turbine overhauls.
- TURBINE means any internal combustion equipment that burns liquid and/or gaseous fuel to create hot gas that expands to move a rotor assembly, with vanes or blades, to do work
- UNIT means a boiler or turbine subject to this rule

## Emission Limits (d)

- PR 1150.3 establishes NO<sub>x</sub> and CO emission limits for:
  - Boilers fueled with landfill gas and landfill gas blends
    - Boilers fueled with natural gas are subject to Rules 1146 and 1146.1 and are required to meet the NO<sub>x</sub> and CO emission limits in those rules
  - Turbines fueled with landfill gas, landfill gas blends and natural gas
    - Since turbines at landfills are exempt from Rule 1134, PR 1150.3 includes limits for natural gas turbines  $\geq 0.3$  MW
- Emission limits do not apply during periods of startup or shutdown

# Boiler Emission Limits for Landfill Gas or Landfill Gas Blend with 75% Landfill Gas or More (d)(1)

Landfill Gas or Landfill Gas Blend with 75% Landfill Gas or More	Equipment Category	Compliance Schedule	NOx (ppmv) <sup>1</sup>	CO (ppmv) <sup>1</sup>
	Boilers	On or before [Date of Adoption]	24	400
On or before 1/1/2030		9		

- Existing boilers required to meet 24 ppmv
  - Limit is consistent with existing permits
  - Existing boilers expected to shut down due to decline in landfill gas
  - Not cost effective to retrofit
- Any boilers replaced after January 2030 must meet a NOx limit of 9 ppmv
- CO limits consistent with Rule 1146

<sup>1</sup>All parts per million volume (ppmv) emission limits are referenced at 3% volume stack gas oxygen on a dry basis.

# Turbine Emission Limits for Landfill Gas or Landfill Gas Blend with 75% Landfill Gas or More (d)(1)

Landfill Gas or Landfill Gas Blend with 75% Landfill Gas or More	Equipment Category	Compliance Schedule	NOx (ppmv) <sup>2</sup>	CO (ppmv) <sup>2</sup>
	Turbines ≥ 0.3 MW with post-combustion control	On or before [Date of Adoption]	25	130
	Turbines ≥ 0.3 MW without post-combustion control	On or before [Date of Adoption]	12.5 <sup>3</sup>	
	Turbines ≥ 0.3 MW	Upon turbine replacement		
Turbines < 0.3 MW	On or before [Date of Adoption]	9		

- Two categories for NOx limits for existing turbines ≥ 0.3 MW:
  - Turbines *with* post-combustion controls (SCR): NOx limit of 25 ppmv
  - Turbines *without* post-combustion controls: NOx limit of 12.5 ppmv
- New turbines ≥ 0.3 MW must meet a NOx limit of 12.5 ppmv
- Turbines < 0.3 MW consistent with current permits
- CO limits consistent with existing permit limit

<sup>2</sup>All parts per million volume (ppmv) emission limits are referenced at 15% volume stack gas oxygen on a dry basis.

<sup>3</sup>Concentration limit applicable to turbines operating at a load of 60% rated output or greater.

# Turbine Emission Limits for Natural Gas or Landfill Gas Blend with Less than 75% Landfill Gas (d)(1)

Natural Gas or Landfill Gas Blend with Less than 75% Landfill Gas	Equipment Category	Compliance Schedule	NOx (ppmv) <sup>2</sup>	CO (ppmv) <sup>2</sup>
	Combined Cycle Turbine ≥ 0.3 MW	On or before [Date of Adoption]	2	130
Simple Cycle Turbine ≥ 0.3 MW	On or before [Date of Adoption]	2.5		

- Natural gas fired turbines would be subject to lower NOx limits than landfill gas fired turbines
  - Limits are consistent with Rule 1134
  - No existing natural gas turbines at landfills
- CO limit consistent with permit limit

<sup>2</sup>All parts per million volume (ppmv) emission limits are referenced at 15% volume stack gas oxygen on a dry basis.

# Turbine NO<sub>x</sub> Emission Limits for Low Load (d)(2)

- Applicable to turbines only
  - Turbines  $\geq 0.3$  MW without post-combustion control
  - New turbines  $\geq 0.3$  MW
- 25 ppmv concentration limit at loads less than 60% rated output for no more than 250 hours per calendar year
- Beyond 250 hours, the 12.5 ppmv concentration limit applies

# Emission Limits (d)(3)- Averaging Times for CEMS

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

# Emission Limits (d)(4)-Startup and Shutdown

Unit Type	Requirement	Change From Source-Specific Rule
Boilers (d)(4)(A)	Not longer than 6 hours	Consistent with Rule 1146.1
Turbines w/out post-combustion control (d)(4)(B)	Not longer than 30 minutes	Consistent with existing landfill gas turbine limits.
Turbines w/post-combustion control (d)(4)(B)	Not longer than 1 hour	

# Prohibition of Liquid Fuel (d)(5)

- Turbines
  - Cannot burn any liquid fuel, such as diesel
  - Does not apply to emergency use turbines

# Source Testing (e)

Equipment Category	Frequency	Pollutant
Boilers >2 MMBtu/hr and <10 MMBtu/hr <sup>1</sup>	Every 5 years from the date the previous source test was required	NOx and CO
Boilers ≥ 10 MMBtu/hr <sup>1</sup>	Every 3 years from the date the previous source test was required	
Turbines emitting < 25 tons of NOx per year		
Turbines emitting ≥ 25 tons NOx per year	Once every calendar year	

- Source testing schedule in paragraph (e)(1) is based on other source-specific rules
  - Boiler schedule based on Rules 1146/1146.1
  - Turbine schedule based on Rule 1134
- Turbines < 0.3 MW would be subject to source testing once every 3 years

<sup>1</sup>All emissions determinations for boilers shall be conducted at least 250 operating hours, or at least thirty days subsequent to the tuning or servicing of any boiler, unless it is an unscheduled repair.

# Overview of Source Testing Procedures for Boilers and Turbines

Other source testing requirements are based on source-specific rules



## Overview of PR 1150.3 Source Testing Procedures (Applicable to Boilers and Turbines)

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)
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# Provisions for Revised Protocol Submittals

- Subparagraph (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 South Coast AQMD (e.g., outdated protocols)

# Source Test Methods (e)(5)

Pollutant	Test Methods
NO <sub>x</sub>	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 <sub>2</sub> and O <sub>2</sub>	South Coast AQMD Test Method 3.1 or 100.1

# CEMS (f)

Equipment Type	Threshold	Pollutant
Boilers	Rated heat input capacity $\geq 40$ MMBtu/hr and Annual heat input $> 200 \times 10^9$ Btu per calendar year	NOx
Turbines	Rated output $\geq 2.9$ MW	NOx

- Table 4 contains the thresholds for all equipment where CEMS is required
- Consistent with requirements under Rules 1146 and 1134

# Diagnostic Emission Checks for Boilers (g)

- Diagnostic emission check requirements under PR 1150.3 are consistent with those from Rules 1146 and 1146.1
- Testing shall be conducted pursuant to the Combustion Gas Periodic Monitoring Protocol
  - Protocol requires 15 minute sampling

# Recordkeeping (h)

- PR 1150.3 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 5 year requirement would be effective upon rule adoption for these units
- PR 1150.3 also requires recordkeeping for basic equipment parameters for boilers and turbines (e.g., operating time, fuels used, emission control system parameters), as well as:
  - Maintenance and tuning records
  - Daily operating logs for boilers and turbines

## Other Requirements for Boilers (i)

- Prohibits derating boilers to less than or equal to 2 MMBtu/hr
  - Consistent with Rules 1146 and 1146.1
  - Based on manufacturer's identification or rating plate or permit condition.

# Exemptions (j)

- PR 1150.3 contains exemptions for the following:
  - Paragraph (j)(1): Special use turbines
    - Turbines operated exclusively for firefighting and/or food control
    - Emergency backup power turbines
      - Operation limit of 200 hours per calendar year
      - Includes requirements if hour-per-year limit is exceeded
  - Paragraph (j)(2): Natural gas boilers subject to Rule 1146 series

# Next Steps



Preliminary Draft Rule Language



Preliminary Draft Staff Report



Continue to meet with stakeholders

# Rulemaking Schedule

October 2020- Public Workshop



November 20, 2020-Stationary Source Committee



December 4, 2020-Set Hearing



January 8, 2020-Public Hearing

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