Proposed Rule 1179.1
NOx Emission Reductions from Combustion Equipment at Publicly Owned Treatment Works Facilities

Working Group Meeting #5
June 4, 2020

JOIN ZOOM MEETING
HTTPS://SCAQMD.ZOOM.US/J/4285162364
MEETING ID: 428 516 2364
TELECONFERENCE DIAL-IN: 1-669-900-6833

Agenda

- Summary of last working group meeting
- BARCT assessment for boilers ≤ 2 mmbtu/hr
- BARCT emission limits for boilers and turbines
- Startup and Shutdown
- Co-fired boilers
- Proposed Rule Structure
- Next Steps

Photo courtesy of www.ocsd.com/Home/ShowImage?id=1700&t=636274946915770000

Update Since Last Working Group Meeting

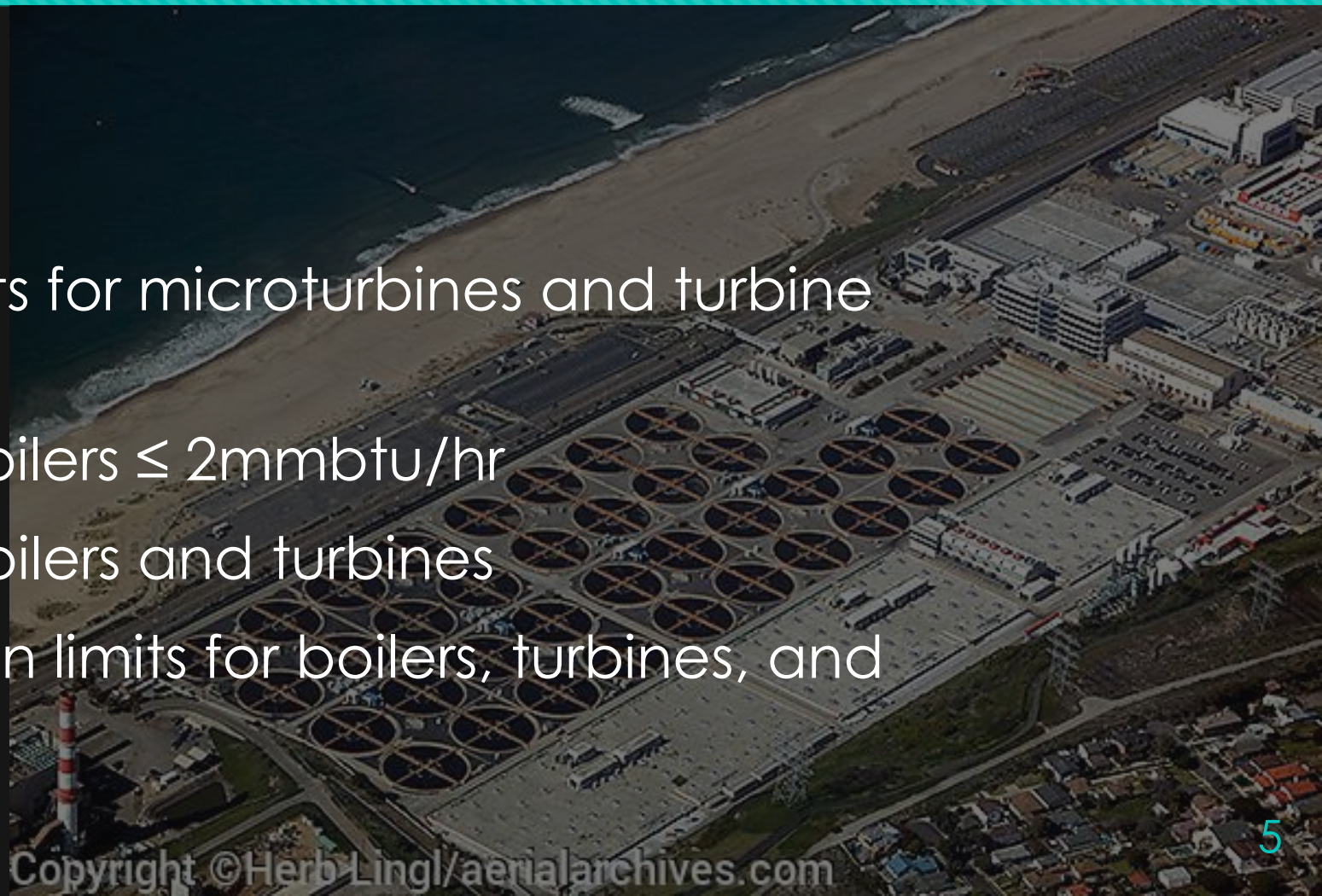
- Since the last working group meeting on February 12, 2020:
  - Staff has met with stakeholders to discuss the proposed initial BARCT limits and other provisions for rule
  - Staff is continuing to discuss control technology with suppliers
  - Staff is working on completing rule language

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 wants 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

- Engine survey results
- Proposed initial NOx limits for microturbines and turbine replacement
- BARCT assessment for boilers ≤ 2mmbtu/hr
- Cost-effectiveness for boilers and turbines
- Proposed BARCT emission limits for boilers, turbines, and microturbines



BARCT Assessment

Status of BARCT Assessment for Equipment Types

Equipment Category	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
Microturbines	✓	✓	✓	✓	✓	Not Conducted*	**9 ppm**
Boilers ≤2 mmbtu/hr	✓	This meeting	This meeting	This meeting	This meeting	This meeting	This meeting
Boilers >2mmbtu/hr	✓	✓	✓	✓	✓	✓	**9 ppm**
Turbines	✓	✓	✓	✓	✓	✓	**2.5 ppm**

*Existing sources meet proposed BARCT Emission Limit

Digester Gas Boilers ≤ 2 mmBtu/hr

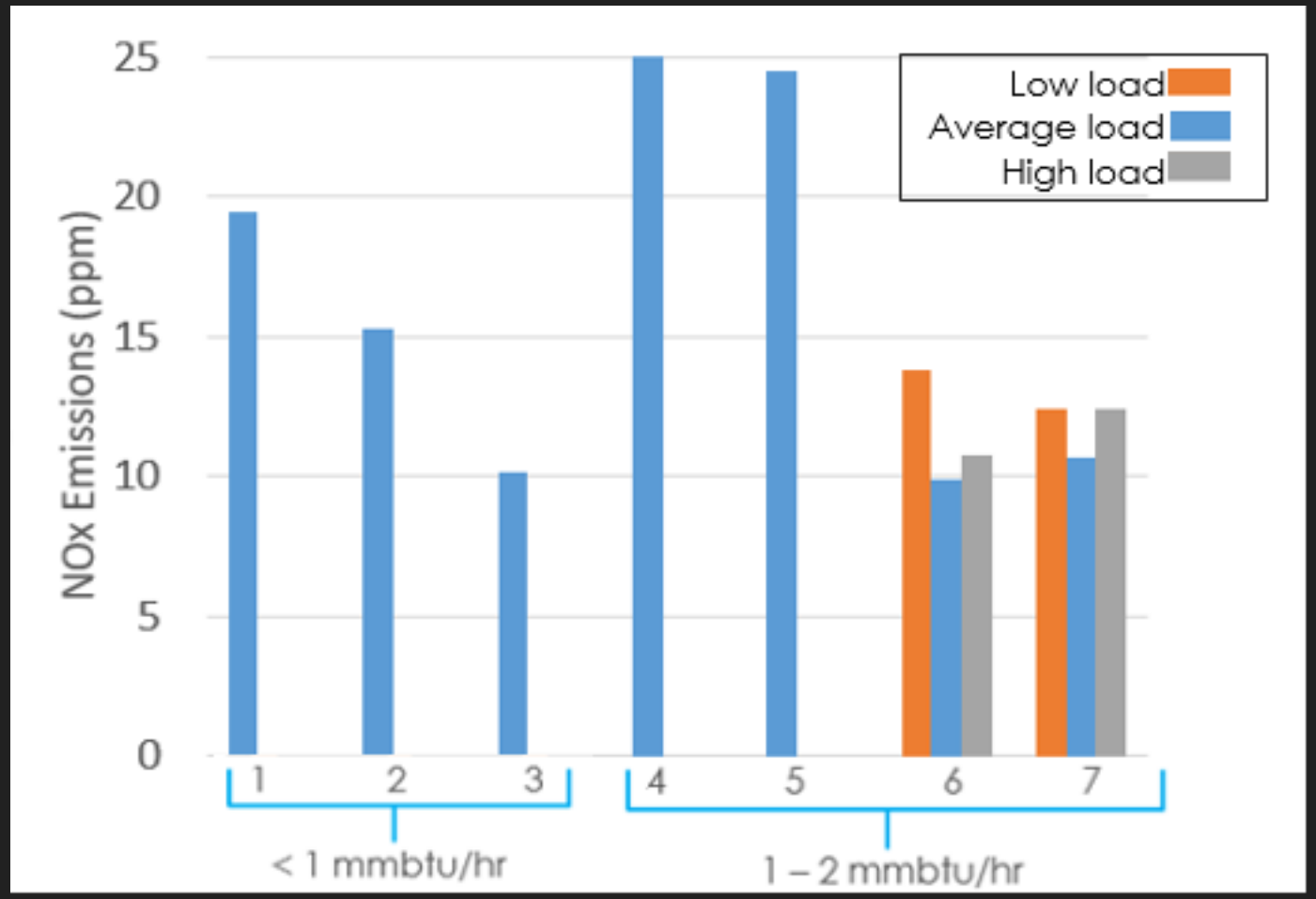
Assessment of South Coast AQMD Regulatory Requirements

- Recap from last working group meeting:
  - 12 boilers rated ≤ 2 mmBtu/hr
    - 9 dual fuel boilers
    - 3 digester gas (only) boilers
  - Currently no rule at South Coast AQMD for boilers ≤ 2 mmbtu/hr that fire digester gas
    - 8 permitted at 30 ppm
    - 2 permitted with emission rate (6 lbs/day), no concentration limit
    - 2 with no emission limit

Boiler parts per million (ppm) emission limits are referenced at 3% O2.

Digester Gas Boilers ≤ 2 mmBtu/hr

- Of the 12 boilers, source test results identified for 7 boilers
  - 3 boilers are <1 mmbtu/hr
  - 4 boilers are 1-2 mmbtu/hr
    - 2 boilers tested at low, average, high loads
    - 5 boilers tested at average load
- Boilers < 1 mmbtu/hr source tested at levels < 20 ppm
- Boilers 1 – 2 mmbtu/hr source tested between 10 – 25 ppm



Boiler parts per million (ppm) emission limits are referenced at 3% O2.

Digester Gas Boilers ≤ 2 mmBtu/hr

Other Regulatory Requirements

- Staff reviewed regulatory requirements for boilers ≤ 2 mmbtu/hr at SJVAPCD, SMAQMD, and BAAQMD
- Limits at other air districts for digester gas range from 20 – 30 ppm for boilers between 0.4 to 2 mmbtu/hr
- There are no permitted boilers ≤ 2 mmbtu/hr in these districts that fire digester gas

SJVAPCD limits (non-PUC fuel)	Boiler type	Limit (ppmv)
	> 0.4 and < 2 mmbtu/hr	30

SMAQMD limits (gaseous fuels)	Boiler type	Limit (ppmv)
	0.4 – 1 mmbtu/hr	20
	> 1 and < 5 mmbtu/hr	30

BAAQMD limits (digester gas)	Boiler type	Limit (ppmv)
	> 1 mmbtu/hr	30

Boiler parts per million (ppm) emission limits are referenced at 3% O2.

Digester Gas Boilers ≤ 2 mmBtu/hr

Assessment of Pollution Control Technologies

- Based on discussions with 2 suppliers, low NOx burner technologies that can meet 12 ppm are available for boilers ≥1 mmbtu/hr
  - 2 suppliers will guarantee a 12 ppm NOx emission level for new burner retrofits ≥1 mmbtu/hr
    - Source tests indicate that existing burners meet between 10-25 ppm
- Three source tests for existing boilers <1 mmbtu/hr achieved a NOx concentration of <20 ppm under average load
  - Staff is currently discussing burner retrofits for <1mmbtu/hr with suppliers about 20 ppm burners

Boiler parts per million (ppm) emission limits are referenced at 3% O2.

Digester Gas Boilers ≤ 2 mmBtu/hr

Initial BARCT Emission Limits and Other Considerations

- Staff is proposing an emission limit of 12 ppm for burners 1 mmbtu/hr – 2 mmbtu/hr
- Staff is proposing an emission limit of 20 ppm for burners <1 mmbtu/hr

Courtesy of powerflame.com

Boiler parts per million (ppm) emission limits are referenced at 3% O2.

Digester Gas Boilers ≤ 2 mmBtu/hr Proposed NOx Emission Limits

Cost-Effectiveness Analysis

- Cost-effectiveness:
  - The average cost-effectiveness to replace burners between 1 – 2 mmbtu/hr with a 12 ppm burner is >$50,000 per ton of NOx reduced
    - 4 of the 5 burners were installed in 2013 or later (stranded assets were included in cost calculation)
  - The average cost effectiveness to replace burners between <1 mmbtu/hr to meet 20 ppm >$50,000 per ton of NOx reduced

Proposed NOx limits:

12 ppm for burners between 1 – 2 mmbtu/hr at time of replacement

20 ppm for burners < 1 mmbtu/hr at time of replacement

Boiler parts per million (ppm) emission limits are referenced at 3% O2.

Initial NOx Limit for Digester Gas Boilers ≤ 2 mmbtu/hr

- Proposed limit for boilers ≤ 2 mmbtu/hr that fire digester gas or a blend of digester gas

	South Coast Rule Limit	Existing Units (source tests)	Other Regulatory Requirements	Technology Assessment	Initial NOx Limit	Proposed BARCT NOx Limit
1 – 2 mmbtu/hr	**None**	**10-19.5 ppm**	**30 ppm**	**12 ppm**	**12 ppm**	**12 ppm** At replacement
< 1 mmbtu/hr	**None**	**10-25 ppm**	**20 – 30 ppm**	**20 ppm**	**20 ppm**	**20 ppm** At replacement

Boiler parts per million (ppm) emission limits are referenced at 3% O2.

BARCT Emission Limits for Digester Gas Boilers > 2 mmbtu/hr and Digester Gas Turbines

Updated BARCT Emission Limits for Digester Gas Boilers > 2 mmbtu/hr

- Staff proposed a 9 ppm BARCT emission limit for boilers >2 mmbtu/hr - effective at burner replacement
- Staff met with stakeholders to discuss the proposed BARCT emission limit
  - Staff also followed up with suppliers to discuss proposed BARCT emission limit
- Although emissions data supports a 9 ppm emission limit, 2 suppliers will guarantee 12 ppm for burners ≥1 mmbtu/hr
- 1 supplier is expected to have 9 ppm burners in the 2024 to 2025 timeframe

Proposed NOx limits:

12 ppm upon burner replacement

9 ppm for burners installed after January 1, 2025

Boiler parts per million (ppm) emission limits are referenced at 3% O2.

Updated BARCT Emission Limits for Digester Gas Turbines

- Staff proposed a 2.5 ppm BARCT emission limit for turbines ≥ 0.3 MW that would be effective upon turbine replacement
- Some stakeholders have commented on:
  - Concerns with gas cleanup that can affect the performance of the SCR
- Based on discussions with stakeholders, the following revisions are proposed:
  - Revise the NOx emission limit for turbines with SCR
  - Add an alternative NOx emission limit for turbines with no SCR

Turbine parts per million (ppm) emission limits are referenced at 15% O2.

Updated BARCT Emission Limits for Digester Gas Turbines with SCR

- Stakeholders commented that a NOx limit at 2.5 ppm for digester gas
  - Does not provide a sufficient compliance margin
  - Will likely limit their ability to implement beneficial use projects
- Staff is recommending a NOx emission limit to 5 ppm for new turbines with SCR recognizing
  - Digester gas quality is not consistent compared to natural gas
  - Challenges with SCR because of gas contaminants (siloxanes)
- Revised cost-effectiveness is: $35,360 per ton of NOx reduced

Proposed NOx Emission Limit for digester gas turbines with SCR: 5 ppm at time of turbine replacement

Turbine parts per million (ppm) emission limits are referenced at 15% O2.

Updated BARCT Emission Limits for Digester Gas Turbines without SCR

- Staff is adding an option that will allow replacement of new turbines without SCR
- 11 landfill and digester gas fired turbines currently operating without SCR
  - 10 turbines without SCR at landfills source tested between 3.1 – 7.6 ppm
  - 1 turbine without SCR at a POTW tested:
    - 3.7 – 8.1 ppm (2019)
    - 4.4 – 7.7 ppm (2018)
    - Operator of facility stated that 4-6 ppm is typical
- Staff is proposing an emission limit of 9 ppm for new turbines without SCR

Turbine parts per million (ppm) emission limits are referenced at 15% O2.

Updated BARCT Emission Limits for Digester Gas Turbines without SCR *(Continued)*

- Cost-effectiveness to meet a NOx emission limit of 9 ppm before the unit reaches its useful life is >$50,000 per ton of NOx reduced

Proposed NOx Emission Limit for digester gas turbines without SCR:
9 ppm at time of turbine replacement

Turbine parts per million (ppm) emission limits are referenced at 15% O2.

Current Proposed BARCT Emission Limits

Equipment Category	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
Microturbines	✓	✓	✓	✓	✓	Not Conducted*	9 ppm
Boilers <1 mmbtu/hr	✓	✓	✓	✓	✓	✓	**20 ppm** At replacement
Boilers ≥1mmbtu/hr	✓	✓	✓	✓	✓	✓	**12 ppm** **9 ppm (2025)** At replacement
Turbines	✓	✓	✓	✓	✓	✓	**5 ppm (SCR)** **9 ppm** At replacement

*Existing sources meet proposed BARCT Emission Limit

Startup and Shutdown

U.S. EPA Guidance

- U.S. EPA has commented on recent rules that were adopted or amended that referenced startup and shutdown provisions in permit conditions
- U.S. EPA has commented that startup and shutdown provisions should be included in the rule
  - Leaving these provisions out of the rule is an enforceability issue
- Staff wants to create a startup and shutdown provision for turbines that is based on the operations at the two facilities with turbines

Startup and Shutdown Requirements

- One facility does not have a startup and shutdown condition in its permit for turbines
- Staff proposes to include startup and shutdown limitations for turbines in Rule 1179.1
- Staff wants to discuss with stakeholders to establish an appropriate startup and shutdown limitation

Turbine Type	Startup/Shutdown time limit in permit
3 digester gas fired turbines without SCR	None
3 digester gas turbines with SCR	60 minutes (no more than 18 start-ups per year)

Co-Fired Boilers

Co-fired Boiler Provisions

- Rules 1146 and 1146.1 allow facilities to blend up to 10% natural gas in a co-fired unit, on a monthly basis, and be subject to the digester gas limit
  - Blending up to 25% natural gas is allowed upon approval if only alternative is to shut down unit and increase flaring,
  - For certain units, blending up to 50% natural gas is allowed upon approval, if only alternative is to shut down unit and increase flaring
  - Facilities blending more than an approved percent use the weighted average limit
- Staff is proposing that all co-fired boilers will use a weighted average emission limit if blending more than 10% natural gas, on a monthly basis

Proposed Rule Structure

Proposed Rule Structure

- Emission limits for applicable pollutants will be contained in one table categorized by equipment type/size
- Subdivisions will be organized by requirement (emission limits, averaging times, CEMS, etc.)
  - Purpose
  - Applicability
  - Definitions
  - Emission limits
  - Averaging times
  - Start-up and shut down
  - Source testing
  - CEMS
  - I&M plans
  - Diagnostic emission checks
  - Recordkeeping
  - Other requirements

Proposed Changes to Existing Provisions

- Proposed Rule 1179.1 encompasses turbines, boilers, microturbines, and engines
  - Rule will need to include provisions from 5 source specific rules and language for microturbines
- Staff is proposing to modify some existing provisions from other source specific rules when incorporating into Rule 1179.1 to streamline the rule
  - Proposing to only include provisions that apply to equipment currently at POTWs

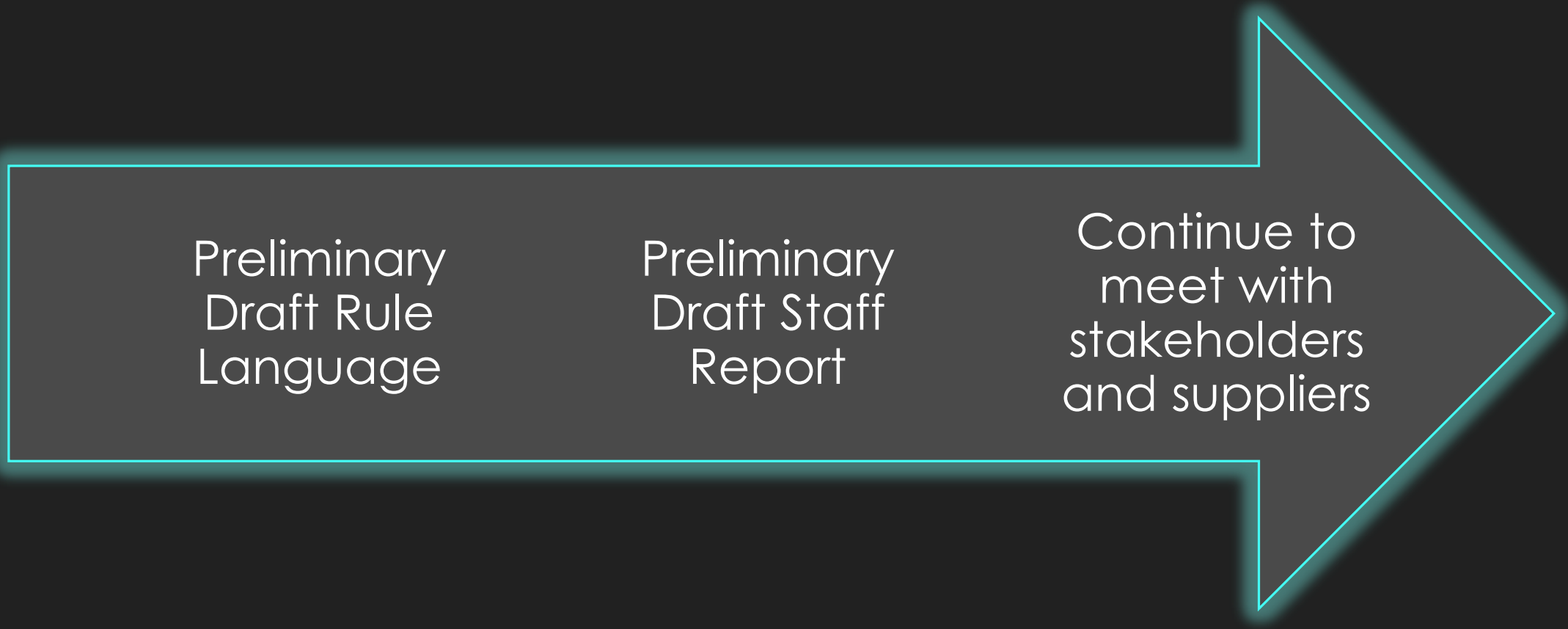
Engines in PR 1179.1

- Survey results showed that most agencies are in favor of including engines in the applicability of PR 1179.1
- Including engines in PR 1179.1 presents some challenges:
  - Requirements unique to engines
  - Increased complexity to organizing subdivisions by requirement
  - Requires a facility to submit a separate and new I&M plan application for 1179.1. If a facility has both 1110.2 and 1179.1 engines, then the facility would be required to have two I&M plans.
- Staff has found that PR 1179.1 could be streamlined without engine requirements similar to PR 1150.3

Summary of Proposed Limits

Equipment	Limit at Rule Adoption	Limit upon Equipment Replacement after Rule Adoption
Boilers <1 mmbtu/hr	Permit limit	20 ppm
Boilers 1 – 2 mmbtu/hr	Permit limit	12 ppm
Boilers >2 mmbtu/hr	15 ppm	12 ppm/9 ppm after 2025
Co-fired Boilers	Weighted avg >10% NG	Same
Engines	11 ppm	Same
Microturbines	9 ppm	Same
Turbines (no SCR)	18.8 ppm	9 ppm
Turbines (with SCR)	18.8 ppm	5 ppm

Next Steps


Preliminary Draft Rule Language
Preliminary Draft Staff Report
Continue to meet with stakeholders and suppliers

Rulemaking Schedule

Early July	July	September 4, 2020	October 2, 2020
Next Working Group Meeting	Public Workshop	Set Hearing	Public Hearing

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