Working Group Meeting #4

PROPOSED RULE 1159.1 – CONTROL OF NOx EMISSIONS FROM NITRIC ACID TANKS (PR 1159.1)

South Coast AQMD

August 17, 2022

10:00 AM

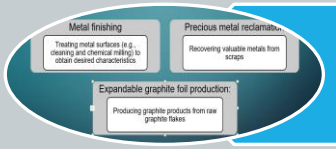
Zoom webinar link:
https://scaqmd.zoom.us/j/99367895005
Join via teleconference:
Dial-in Number: +1 669 900 6833
Zoom Webinar ID: 99367895005

Agenda

- Summary of Working Group #3
- Response to Comments
- NOx Emissions from Facility Universe
- Low-Use Exemptions
- Rule Concepts
- Next Steps

Summary of Working Group #3

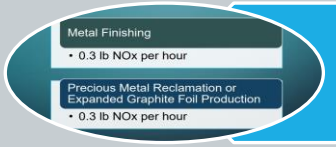
During the third Working Group meeting, staff presented:



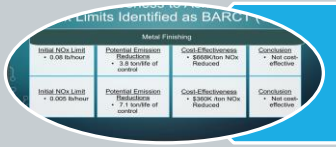
Emission Limits of Existing Units

Source Tests for Existing Units

Control Technology



Initial BARCT Limit



Cost-Effectiveness

RESPONSE TO COMMENTS

NOX EMISSIONS – NOT ALL NITRIC ACID FORMS NOX

Comment #1

Staff Response:

- Staff acknowledges some metal finishing facilities discard solution from nitric acid unit, in part or in whole, before reacting to form NOx emissions
- PR 1159.1 will regulate NOx emissions formed from nitric acid with metals or its decomposition at high temperatures in nitric acid units at facilities that perform metal finishing, precious metal reclamation, or expanded graphite foil production operations
- Staff will include rule language for determining nitric acid usage

Comment #2

NOX EMISSIONS FROM NITRIC ACID SENT TO WASTEWATER SYSTEMS

Staff Response:

- Solution removed from nitric acid units hauled off-site for disposal or treated in wastewater systems
  - Rule 1176 – VOC Emissions from Wastewater Systems regulates VOC emissions from wastewater systems
- Wastewater systems would not be subject to PR 1159.1

Comment #3

SOLUTIONS RECYCLED FROM ONE NITRIC ACID TANK TO ANOTHER

Staff Response:

- Staff acknowledges some facilities remove solution from one tank to use in another tank – both tanks listed on permits
- Nitric acid solution recycled should not count as nitric acid replenishment because it was already counted when added to the first tank

NOX EMISSIONS FROM FACILITY UNIVERSE

Overview – Determining NOx Emissions from PR 1159.1 Universe

RECLAIM (5 facilities)

- Required to report NOx emissions
- Emissions based on audited data in 2017

NON-RECLAIM (249 facilities)

- 5% of non-RECLAIM facilities reported emissions in 2021 Annual Emission Reporting (AER)
- Majority not required to report emissions
- Staff developed methodology to determine NOx emissions from non-RECLAIM facilities without NOx emission data

NOX EMISSIONS FROM RECLAIM FACILITIES

RECLAIM – Reported Facility NOx Emissions

- Audited 2017 RECLAIM NOx emissions used
- Reported emissions included those with NOx controls

	Facility Category	Number of Nitric Acid Units	Annual NOx Emissions for Units (lbs/yr)
Facility A	Metal finishing (Surface treatment)	2	131
Facility B	Metal finishing (Surface treatment)	1	86
Facility C	Metal finishing (Chemical milling)	2	432(2)
Facility D	Precious metal reclamation	39(1)	1320(2)
Facility E	Expanded graphite foil production	2	1197(2)

[1]Facility installed ten additional precious metal reclamation units since 2017

[2] NOx controls installed

NOX EMISSIONS FROM NON-RECLAIM FACILITIES

NOx Emissions from Non-RECLAIM Facilities

- 249 non-RECLAIM facilities
  - 12 facilities reported emissions in 2021 AER
- Survey sent to PR 1159.1 facilities in January to collect data
- Staff developed methodology to estimate NOx emissions from remaining facilities

Facility Category	Number of Facilities	Number of Facilities with AER Reported Emissions
Metal finishing – chemical milling	6	0
Metal finishing – surface treatment	240	12
Precious metal reclamation	3	0
Graphite expansion	0	Not applicable
Total	**249**	**12**

Methodology – Estimating NOx Emissions for Non-RECLAIM Facilities Without AER Data

Working Group Meeting 2

STEP 1

Estimate number of nitric acid units at each facility

Today's Working Group

STEP 2

Estimate usage for each nitric acid unit

STEP 3

Develop NOx emission profiles

Step 1. Estimate Number of Nitric Acid Units at Non-RECLAIM Facilities

Estimating number of nitric acid units at each facility

- Working Group Meeting #2 – Staff identified number of units at non-RECLAIM facilities
  - Data obtained from surveys, permits, facilities contacts
- 3 metal reclamation facilities – permit data used to determine number of units
- Metal finishing (surface treatment and chemical milling) - data averaged to create category average profiles

FACILITY CATEGORY AVERAGE PROFILES		
Metal Finishing Category	Number of Facilities with Data	Average Nitric Acid Units per Facility
Surface treatment	83 of 240	6 surface treatment
Chemical milling	4 out of 6	2 chemical milling
		5 surface treatment

Step 2. Estimate Nitric Acid Usage at Non-RECLAIM Facilities

Estimating usage for each nitric acid unit

- Staff determined nitric acid usage as the best metric for estimating emissions
  - Commonly tracked and more accurate than emission factors
- Staff obtained usage information from:
  - Facility surveys
  - Inspection reports
  - Discussions with facilities
- Calculated average usage for each unit category type and applied to units without usage data

Unit Category	Number of units with usage data	Average usage per unit (gal/day)
Surface Treatment	109	0.36
Chemical Milling	6	2.1
Precious Metal Reclamation	1	0.1

Step 3. Develop NOx Emissions Profiles

Estimating NOx emissions for each nitric acid unit

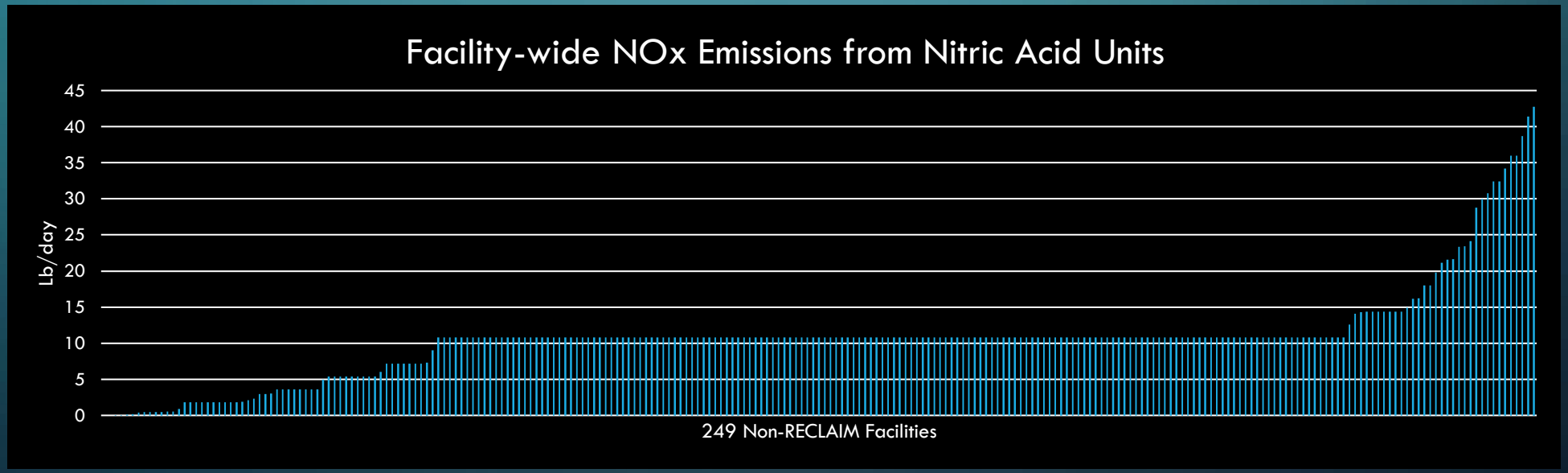
- Staff developed emission profiles based on nitric acid usage for unit categories
- NOx emissions estimated per gallon of nitric acid based on the approximation of 1 gallon produces ~5 lbs of NOx
  - 68% nitric acid by weight
  - 1 mole of NOx will form from 1 mole of nitric acid
  - NOx is half NO and half NO2
  - Does not depend on process or type of metal

CATEGORY AVERAGE PROFILES	
Nitric acid unit category	Daily NOx emission per unit (lbs/day)
Surface treatment	1.8
Chemical milling	10.5
Precious metal reclamation	0.5

Summary of NOx Emissions at Non-RECLAIM Facilities

Estimating NOx emissions for each nitric acid unit

- NOx emissions determined for 249 facilities
  - 12 facilities reported emissions in 2021
  - Staff calculated facility emissions (uncontrolled) for 237 Non-RECLAIM facilities based on usage per unit and number of units



Baseline NOx Emissions Summary

- Baseline emissions represent total emissions from nitric acid units
- Non-RECLAIM facilities make up majority of NOx emissions
  - More non-RECLAIM facilities than RECLAIM facilities
  - Survey usage data may include recycled nitric acid and discarded portions of unreacted solution
  - Conversion from nitric acid usage to NOx emissions based on conservative engineering assumptions
  - Actual emissions likely lower than estimated
- Uncertainties with non-RECLAIM emissions estimates
  - Category profiles used to determine emissions for 92% of non-RECLAIM nitric acid units
  - Proposed rule to include a one-time reporting element to better understand nitric acid usage across facilities

Facility	NOx Emissions (ton/day)	Number of facilities
RECLAIM	0.004[a]	5
Non-RECLAIM	0.008 (Reported through AER)	12
	1.3 (Estimated)	237

(a) 2017 RECLAIM reported emissions

LOW-USE EXEMPTIONS

Exemptions for Low-Use

- Facilities with low usage of nitric acid might not be cost-effective to install control (i.e., scrubber system)
- Staff proposing exemption for facilities emitting 11 lbs/day or less per unit
  - Based on current cost-effectiveness threshold of $50,000/ton of NOx reduced (2016 AQMP)
  - Based on control device costs and assumptions presented in Working Group Meeting #3
    - $1 million capital cost, $100,000 annual costs, 99% control efficiency
  - Equivalent to 2.1 gallons of nitric acid (concentration 68% by weight) per day
    - Staff is considering a threshold on a monthly basis given facilities operations
  - Exemption for some requirements only (i.e., emission limit)

Exemptions for Low-Use *(continued)*

- Staff proposes threshold of 11 lbs/day per unit with facility-wide emissions limitation of 33 lbs/day to limit emissions from facilities with multiple units
  - Multiple units could potentially be routed to one scrubber
  - Staff considering both thresholds averaged over a calendar month

Examples

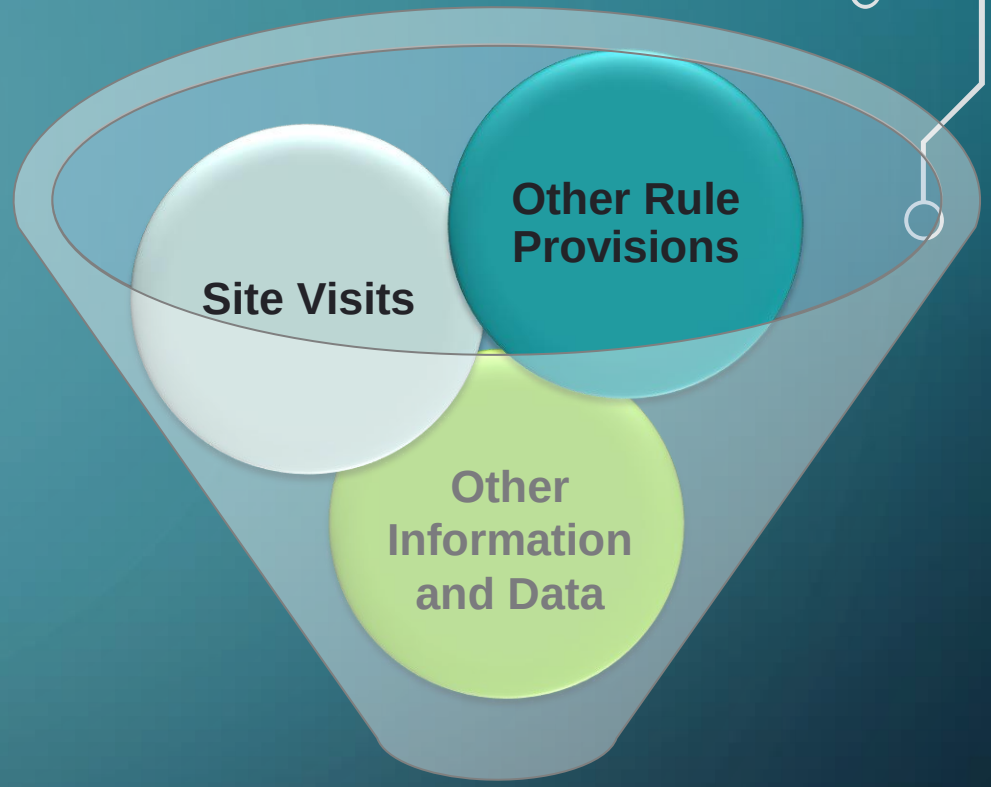
- Facility A has 10 units using 68% by weight nitric acid solution
- Usage allowed is 2.1 gal/day (11 lbs NOx/day) per unit
- Facility-wide usage limited to 6.3 gal/day (6.3 gal/day instead of 21 gal/day)

- Facility B has 2 units using 68% by weight nitric acid solution
- Usage allowed is 2.1 gal/day (11 lbs NOx/day) per unit
- Facility-wide usage limitation would not apply to Facility B

RULE CONCEPTS

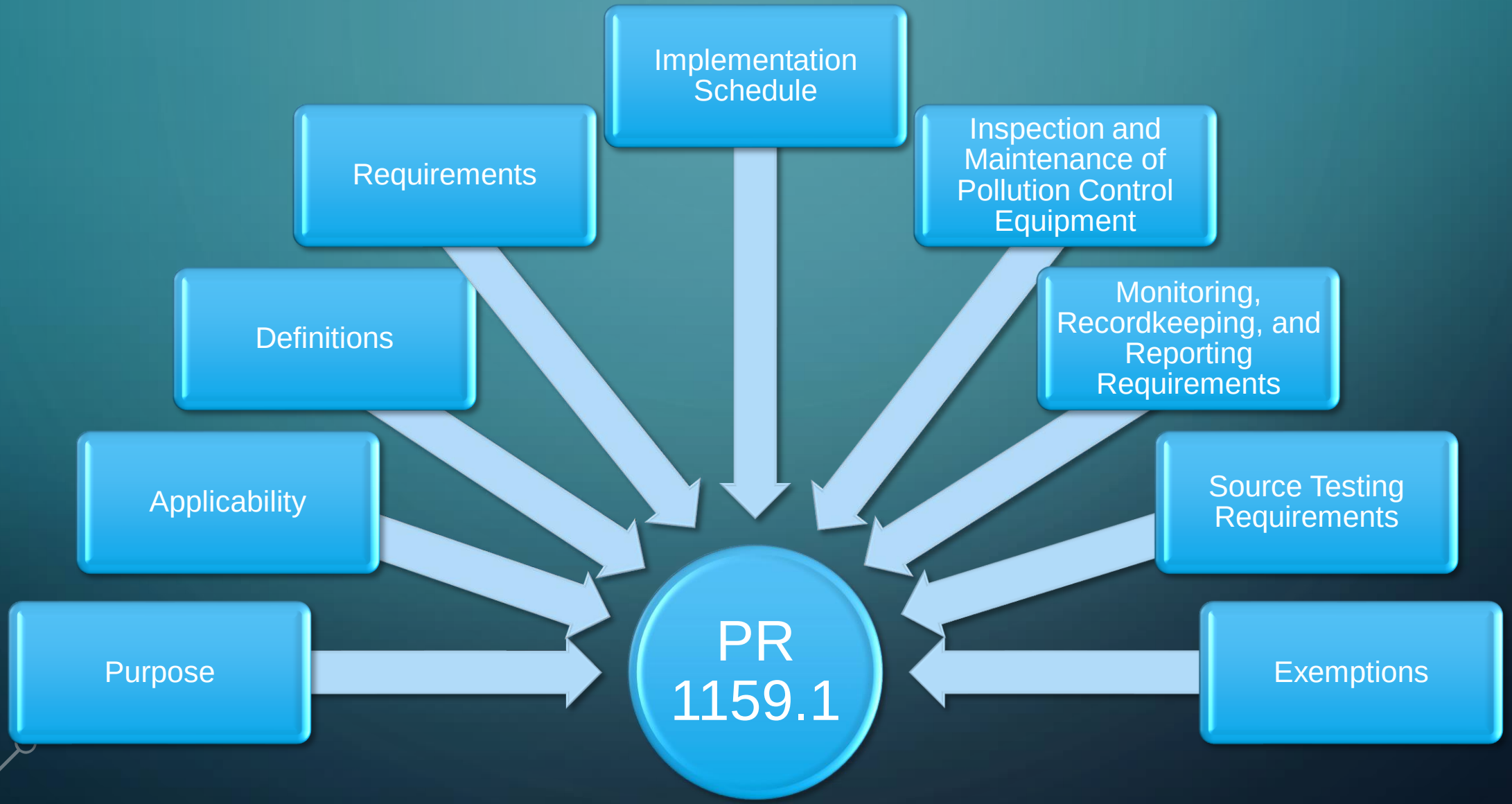
OVERVIEW

- Rule concepts are initial thoughts for proposed provisions and considerations:
  - Provisions in other rules
  - Site visits
  - Working group meetings
  - Other information and data
- Stakeholder input on rule concepts helps shape proposed rule language (expected to be released late August)



Rule Concepts

PR 1159.1 Structure



PR 1159.1 Concept – Purpose (a)

Specifies purpose of the rule

- Reduce nitrogen oxide emissions from metal finishing, precious metal reclamation, and expanded graphite foil operations from the use of nitric acid

PR 1159.1 Concept – Applicability (b)

Describes who is subject to the rule

- Facilities that perform metal finishing, precious metal reclamation, or expanded graphite foil production operations using nitric acid

PR 1159.1 Concept – Definitions (c)

Defines specific terms to add clarity to rule language

- Including definitions for terms such as:
  - Nitric Acid Unit
  - Air Pollution Control Device
  - Metal Finishing
  - Precious Metal Reclamation
  - Replenishment

Overview – Requirements (d)

Specifies requirements for nitric acid units and controls

- NOx add-on control equipment requirements
  - Meet 0.3 lb/hr emission limit
  - Visible emissions must be collected by add-on control equipment
  - Must not be removed or rendered inoperative
  - Labeling: allowable operational ranges specified on permit
- Nitric Acid Unit requirements
  - Labeling: permit information and maximum nitric acid concentration (WT%)

Overview – Implementation Schedule (e)

Specifies timeline requirements for installing controls on nitric acid units requiring controls

- Deadline to submit permit to construct application
- Deadline to complete construction

Overview – Inspection and Maintenance of Pollution Control Equipment (f)

Specifies requirements to ensure proper operation of air pollution control devices to reduce NOx emissions

- Inspect per manufacturer's recommendations or at least once a quarter
- Maintain per manufacturer's specifications and recommendations

Overview – Monitoring, Recordkeeping, and Reporting Requirements (g)

Specifies documentation required to demonstrate compliance

- Parametric monitoring of add-on control equipment
- Source test records and reporting
- Nitric acid replenishment records
- Submission of one-time usage report
- 5-year record retention

Overview – Source Testing Requirements (h)

Specifies requirements related to source testing air pollution control devices

- Source test protocol procedure and timeline
- Specify applicable test methods to be used
- Source test timeline
- Periodic source test every 5 years

Overview – Exemptions (i)

Specifies provisions nitric acid units or facilities are exempt from

- Exempt units
  - Low-use nitric acid units
- Exemption requirements
  - Usage threshold
- Exempt provisions

NEXT STEPS

Next Steps

Release proposed rule language for PR 1159.1

Working Group Meeting #5 – Rule language (Late August)

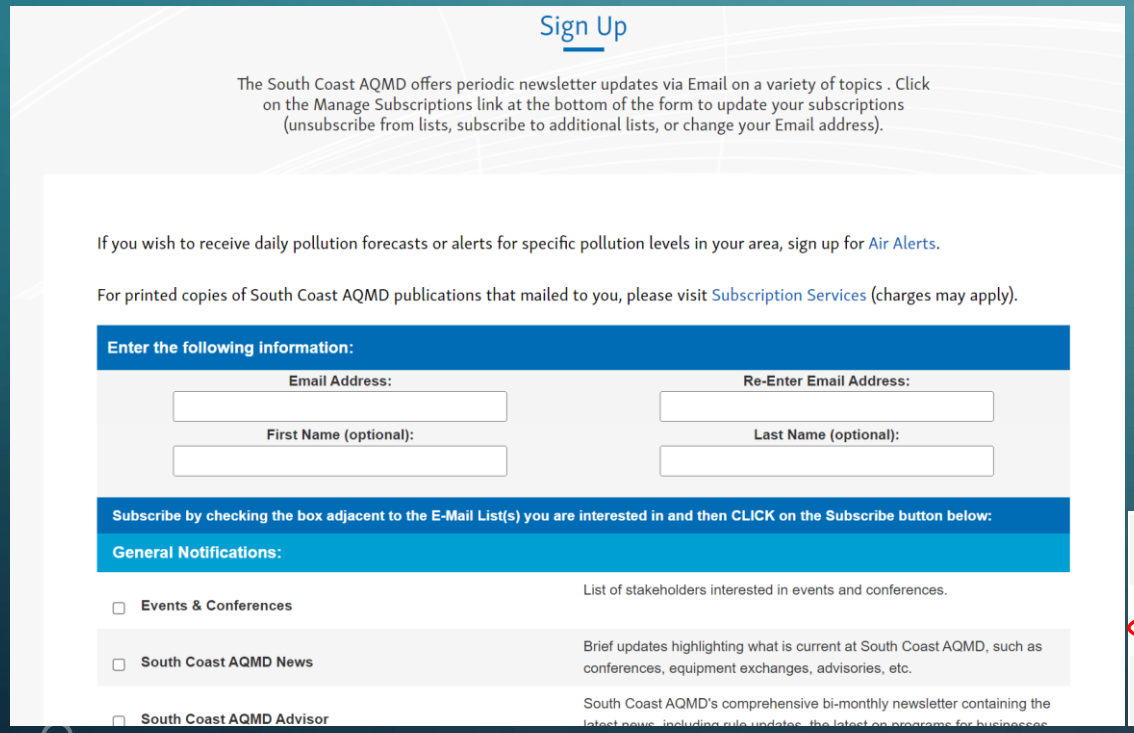
Release Preliminary Draft Rule Language and Staff Report (Mid-September)

Public Workshop (Late September)

Public Hearing (Expected in December)

Staying Updated with PR 1159.1

- Sign up and receive email updates via *http://www.aqmd.gov/sign-up*



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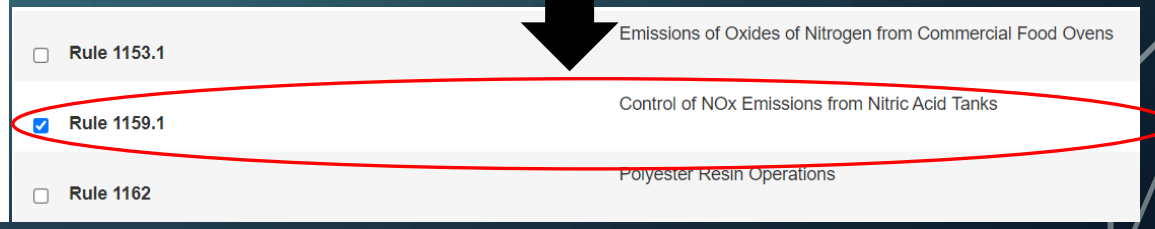

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