Working Group Meeting #2

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

South Coast AQMD

May 25, 2022

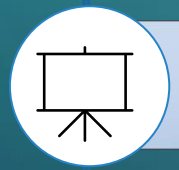
10:00 AM

Zoom webinar link:
https://scaqmd.zoom.us/j/97864739685
Join via teleconference:
Dial-in Number: +1 669 900 6833
Zoom Webinar ID: 978 6473 9685

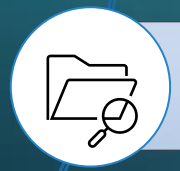
Agenda

Background

Summary of Working Group Meeting #1



Overview of Nitric Acid Operations that will be subject to PR 1159.1



Establishing the PR 1159.1 Universe / BARCT Analysis Process

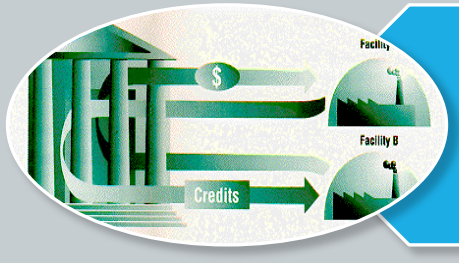
Next Steps

Background on PR 1159.1

- PR 1159.1 will regulate NOx emissions formed from nitric acid operations
  - Applicable to both RECLAIM and non-RECLAIM facilities
  - Unlike most NOx rules, PR 1159.1 does not regulate NOx formed by combustion, but NOx formed from nitric acid use
  - Currently no South Coast AQMD rule for these operations
- PR 1159.1 is a landing rule that will facilitate the transition of the NOx RECLAIM program to a command-and-control structure
  - Five RECLAIM facilities will be subject to PR 1159.1
- Staff held the first Working Group Meeting on August 4, 2021

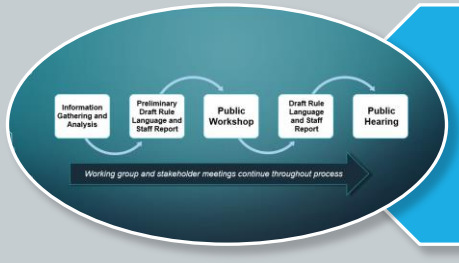
Summary of Working Group Meeting #1

During the first Working Group Meeting, staff presented:



RECLAIM program and the transition to a command-and-control regulatory structure

Nitric acid tanks used for metal finishing and precious metal reclamation



Rule development process

Progress Since Last Working Group Meeting

Distributed facility survey in January 2022 to potential PR 1159.1 facilities

- Sent to 265 facilities
- Received responses from 22 facilities on 111 nitric acid units

Continued developing PR 1159.1 universe by using South Coast AQMD permit databases

Conducted 10 site visits: 8 virtual and 2 in-person

Started researching cost information for add-on controls

OVERVIEW OF NITRIC ACID OPERATIONS THAT WILL BE SUBJECT TO PR 1159.1

Operations Using Nitric Acid that Generate NOx

- Staff previously identified two industries that would be subject to PR 1159.1

Metal finishing

Treating metal surfaces (e.g., cleaning and chemical milling) to obtain desired characteristics

Precious metal reclamation

Recovering valuable metals from scraps

- Staff has identified another industry that will be subject to PR 1159.1

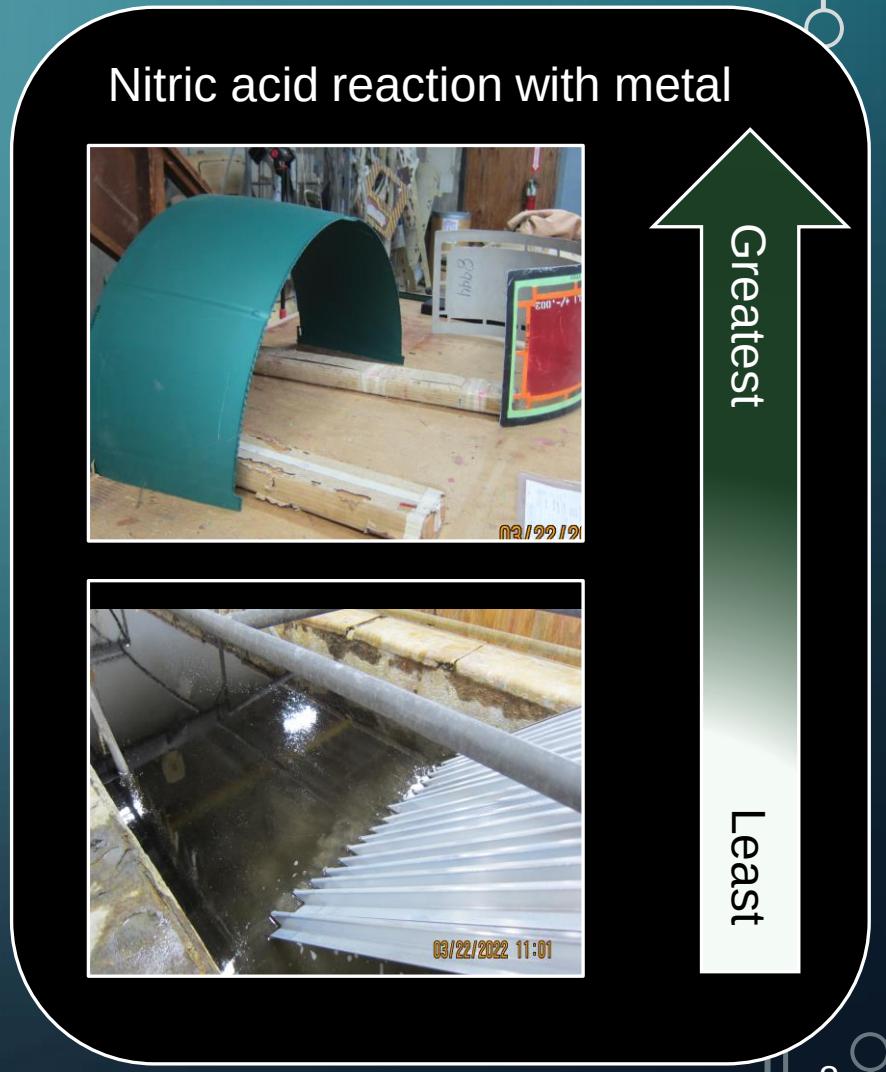
Expandable graphite foil production

Producing graphite products from raw graphite flakes

Metal Finishing

Two categories of metal finishing operations will be subject to PR 1159.1:

- Chemical milling
  - Parts submerged in a tank solution containing nitric acid
  - Removes specified amount of metal (typically > 0.004 inch) from the surface of the part, either entire part or at unmasked areas
  - Takes hours or even days
- Surface treatment
  - Parts submerged in a tank solution containing nitric acid
  - Removes a small surface layer (typically < 0.001 inch) or forms a protective layer on part
  - Takes several seconds or minutes



Precious Metal Reclamation

- Metal scraps are placed in reactors, or other containers, with a solution that contains nitric acid
  - Nitric acid dissolves the metal completely
  - Process takes place in reactors or flasks, depending on size of operation
  - Takes several days to finish

Dissolve (Nitric Acid)

NOx

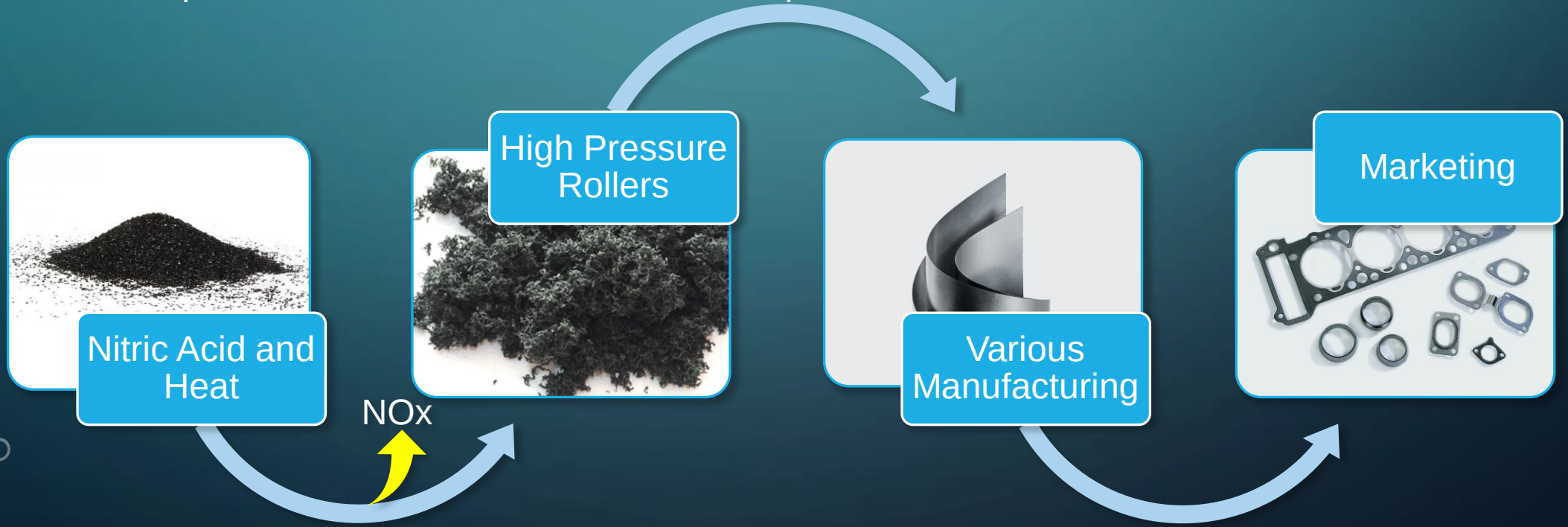
Precipitate

Refining

Purified Metal

Other Operation Identified

- Expanded graphite foil production
  - Raw graphite flakes and nitric acid are mixed and sent to a furnace
  - Graphite flakes expand and NOx emissions are formed
  - Expanded graphite flakes used to make graphite foil
  - Graphite foil used to manufacture various products



ESTABLISHING THE PR 1159.1 UNIVERSE

Determination of PR 1159.1 Facilities

- Staff evaluated facility permit databases to determine the RECLAIM and non-RECLAIM universe of facilities
  - Searched for facilities that used nitric acid
  - Reviewed permits to determine if nitric acid was used in operations that form NOx
  - Identified facilities with NOx control equipment for nitric acid units
  - Identified RECLAIM facilities that reported NOx emissions from nitric acid units
- Categorized facilities based on nitric acid operations occurring at facility
- Metal finishing facilities were separated into chemical milling and surface treatment
  - Differentiated chemical milling process from surface treatment processes as chemical milling is the most reactive process emitting higher NOx

Number of PR 1159.1 Facilities in Universe

5 RECLAIM Facilities	249 Non-RECLAIM Facilities*

• 1 precious metal reclamation
• 3 metal finishing
  ○ 1 chemical milling
  ○ 2 surface treatment
• 1 expanded graphite foil production
	• 3 precious metal reclamation
	• 246 metal finishing
	  ○ 6 chemical milling
	  ○ 240 surface treatment

* Many are small facilities with low-NOx emissions that might not be subject to NOx controls in PR 1159.1

Determination of Number of Nitric Acid Units for PR 1159.1

- Identifying the number of nitric acid units at each facility was challenging, especially for non-RECLAIM facilities
  - Nitric acid was not always listed on the permit, especially on older permits
- Staff evaluated:
  - Facility permits for equipment and process lines that use nitric acid that could form NOx emissions
  - Annual Emission Reporting (AER) data for the previously identified facilities to find equipment that generate NOx emissions
  - Facility survey information
  - Nitric acid operation during site visits
- Staff identified:
  - All nitric acid units that could form NOx at the five RECLAIM facilities
  - Nitric acid units that could form NOx at 90 of the 249 non-RECLAIM facilities

Approach to Estimate Nitric Acid Units at Non-RECLAIM Facilities

- The 3 metal reclamation facilities had data indicating the number of nitric acid units
- 159 metal finishing facilities did not have data on the number of nitric acid units at the facility
  - Nitric acid unit database was used to develop a category average profile for a chemical milling facility and surface treatment facility
- For facilities that did not have nitric acid unit information, the facility category average was used

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

Estimated Number of Nitric Acid Units

RECLAIM

97 NITRIC ACID UNITS

- 49 precious metal reclamation
- 46 metal finishing
  - 2 chemical milling
  - 44 surface treatment
- 2 expanded graphite foil production

Non-RECLAIM

1484 NITRIC ACID UNITS

- 3 precious metal reclamation
- 1481 metal finishing
  - 12 chemical milling
  - 1469 surface treatment

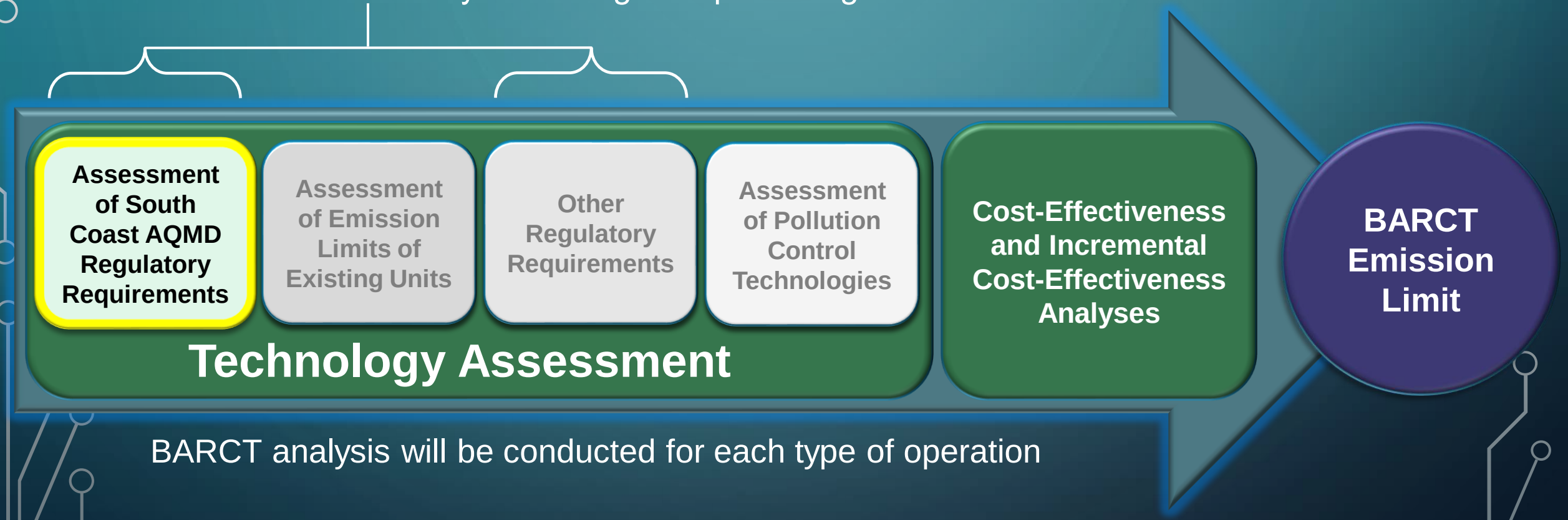
BARCT ANALYSIS PROCESS

BARCT Analysis – Background

- Best Available Retrofit Control Technology (BARCT) analysis required when establishing emission limits
- California Health and Safety Code Section 40406 defines BARCT as:
  - "…an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source."
- Technology assessment to establish BARCT conducted when assessing new NOx limits or when re-assessing existing NOx limits
- BARCT assessment includes a cost-effectiveness and incremental cost-effectiveness analysis
  - Current threshold to demonstrate NOx limits are cost effective is $50,000 per ton of NOx reduced

BARCT Assessment

To be discussed at today's Working Group Meeting

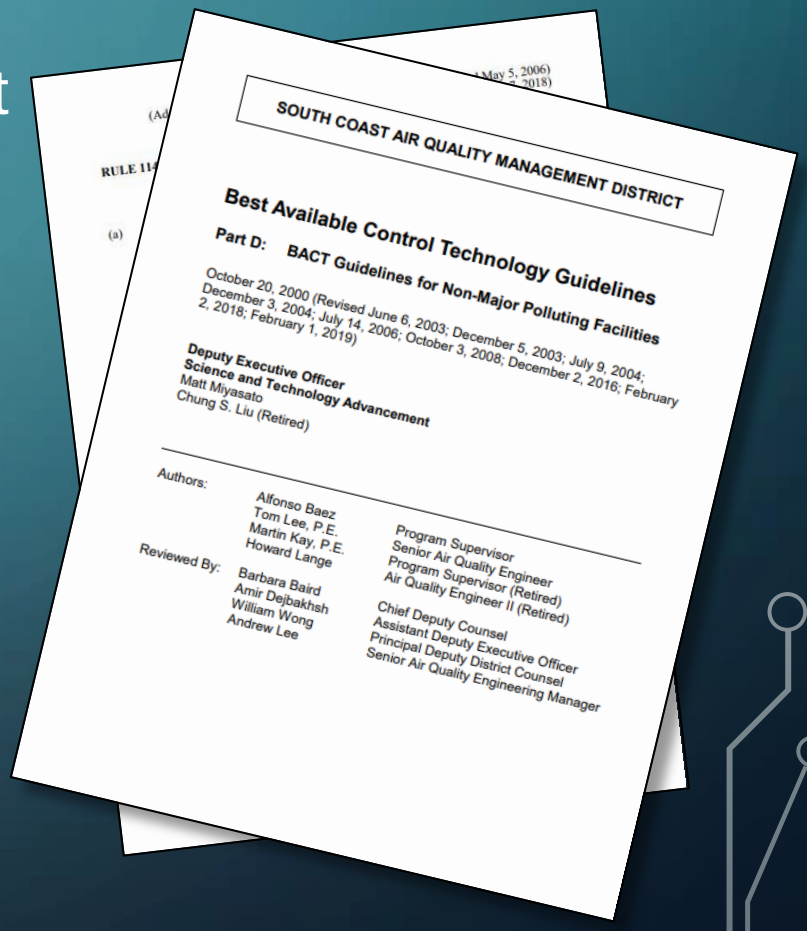


BARCT analysis will be conducted for each type of operation

Assessment of South Coast AQMD Regulatory Requirements

South Coast AQMD Regulatory Requirements

- Objective is to evaluate any existing South Coast AQMD regulatory requirements for similar operations or equipment
- Staff reviews:
  - Existing South Coast AQMD source specific rules
  - Best Available Control Technology (BACT) Guidelines under Regulation XIII
- Data used to assess potential BARCT NOx emission limits


SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Best Available Control Technology Guidelines

Part D: BACT Guidelines for Non-Major Polluting Facilities

October 20, 2000 (Revised June 6, 2003; December 5, 2003; July 9, 2004; December 3, 2004; July 14, 2006; October 3, 2008; December 2, 2016; February 2, 2018; February 1, 2019)

Deputy Executive Officer
Science and Technology Advancement
Matt Miyasato
Chung S. Liu (Retired)

Authors: Alfonso Baez — Program Supervisor
Tom Lee, P.E. — Senior Air Quality Engineer
Martin Kay, P.E. — Program Supervisor (Retired)
Howard Lange — Air Quality Engineer II (Retired)

Reviewed By: Barbara Baird — Chief Deputy Counsel
Amir Dejbakhsh — Assistant Deputy Executive Officer
William Wong — Principal Deputy District Counsel
Andrew Lee — Senior Air Quality Engineering Manager

South Coast AQMD Regulatory Requirements (*cont.*)

South Coast AQMD Source Specific Rule Requirements

- No source specific NOx rule for precious metal reclamation, metal finishing, or expanded graphite foil production that use nitric acid

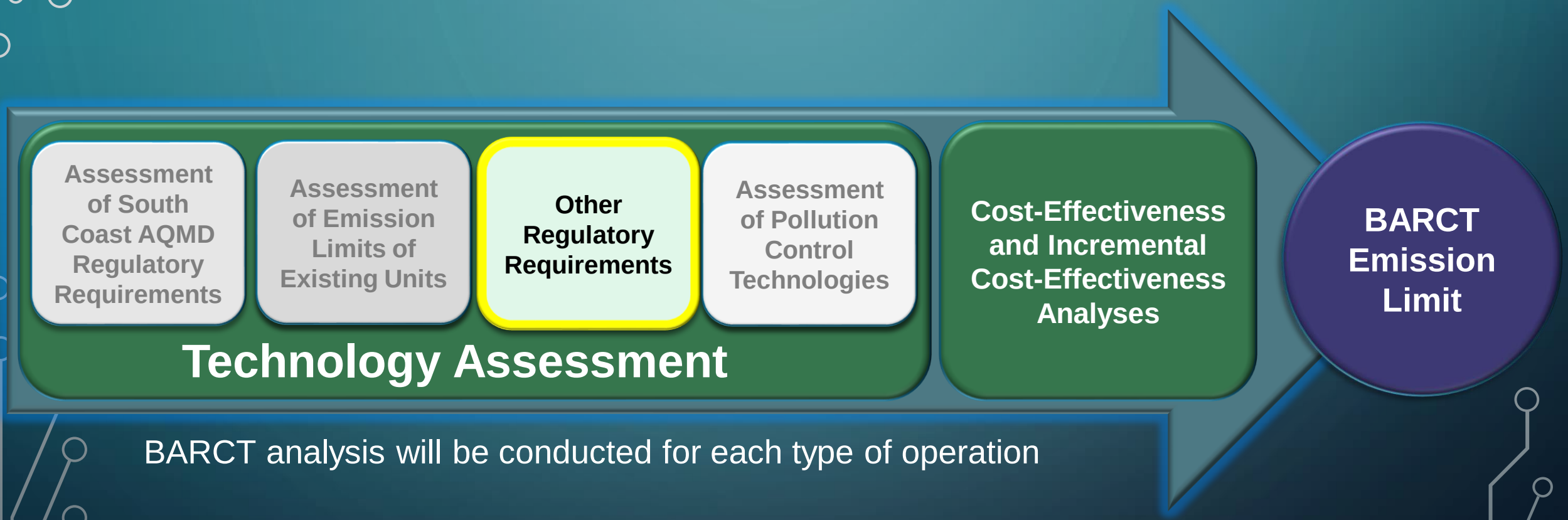
BACT Applicability and Requirements

Equipment subject to NSR (new, modified, or relocated) resulting in a 1.0 lb/day or greater increase in NOx emissions

BACT Guidelines for Non-Major Polluting Facilities

- Chemical Milling (Nickel Alloys, Stainless Steel, and Titanium) – Packed Bed Scrubber
- Precious Metal Reclamation (Chemical Recovery and Chemical Reactions) – 3-Stage NOx Reduction Scrubber

BARCT Assessment



BARCT analysis will be conducted for each type of operation

Other Regulatory Requirements

- Objective is to assess existing regulatory requirements on a local, state, and national level to:
  - Evaluate emission limits established by other air agencies across the country on similar equipment or processes
- Data used to assess potential BARCT NOx emission limits

Other Regulatory Requirements *(cont.)*

Other Air District Regulations

- Staff did not identify any other air district regulations for similar operations or equipment

Federal Regulations

- Staff did not identify any federal regulations for similar operations or equipment

NEXT STEPS

NEXT STEPS

Continue BARCT Assessment

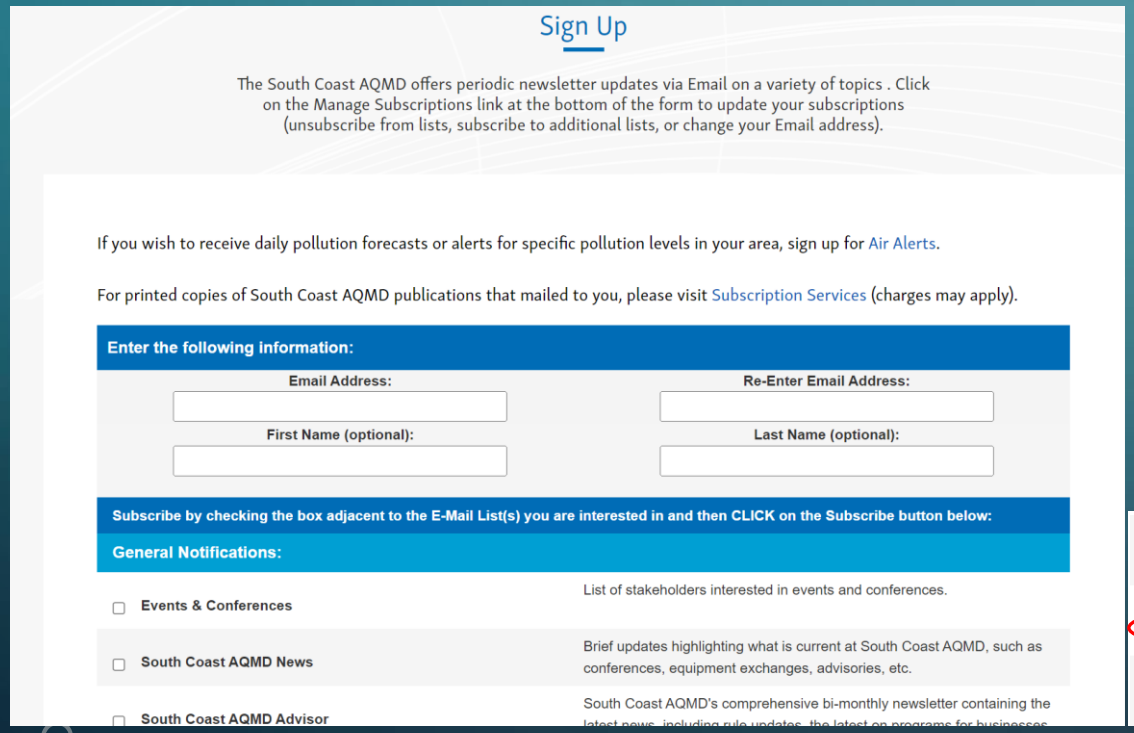
Conduct additional site visits

Continue to meet with stakeholders

Present rule concepts for PR 1159.1

Staying Updated with PR 1159.1

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



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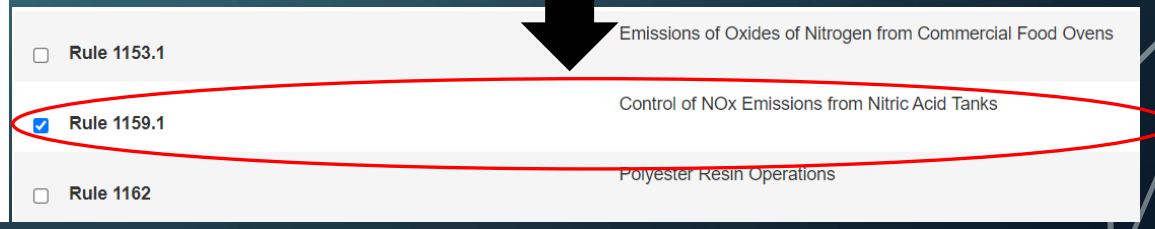

☐ Rule 1153.1	Emissions of Oxides of Nitrogen from Commercial Food Ovens
☑ Rule 1159.1	Control of NOx Emissions from Nitric Acid Tanks
☐ Rule 1162	Polyester Resin Operations

PR 1159.1 STAFF CONTACTS

Min Sue
Air Quality Specialist
(909) 396-3241
msue@aqmd.gov

Neil Fujiwara
Program Supervisor
(909) 396-3512
nfujiwara@aqmd.gov

Heather Farr
Planning and Rules Manager
(909) 396-3672
hfarr@aqmd.gov

Michael Krause
Assistant Deputy Executive Officer
(909) 396-2706
mkrause@aqmd.gov