NOx RECLAIM WORKING GROUP MEETING

JULY 12, 2018
SCAQMD
DIAMOND BAR, CA

Agenda

- Upcoming Rule Meetings
- Additional Details on BARCT Analyses for Landing Rules
- Recent Activity for Landing Rules
  - PAR 1146 Series/PR 1100
  - PR 1118.1
  - PR 1109.1
  - PAR 1134
  - PAR 1135
  - PAR 1110.2
- Proposed Amendments to Rules 2001/2002
  - BARCT Compliance plans
  - Opt-out provisions
  - Option to temporarily remain in RECLAIM

2

UPCOMING RULE MEETINGS

3

Upcoming Rule Meetings

Proposed Amended Rules 1146, 1146.1, 1146.2 and Proposed Rule 1100	Proposed Rule 1109.1	Proposed Rule 1118.1	Proposed Amended Rule 1110.2
• Working Group Meeting #5 August 2, 2018 (tentative)	• Working Group Meeting Late July	• Working Group Meeting Late July	• Working Group Meeting #2 3rd quarter 2018

4

Upcoming Rule Meetings

Proposed Amended Rule 1135	Proposed Amended Rule 1134	PARs 2001/2002
• Stationary Source Committee Meeting July 20, 2018	• Working Group Meeting #4 July 25, 2018 (tentative)	• Stationary Source Committee Meeting July 20, 2018

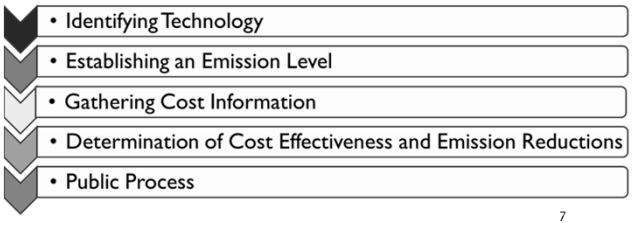
5

ADDITIONAL DETAILS ON BARCT ANALYSES FOR LANDING RULES

6

Background

- February 2018 RECLAIM Working Group Meeting provided overview of BARCT analysis
  - Information included in the RECLAIM Transition Plan (Version I.0)
- Staff is progressing through BARCT analyses for various landing rules
- Stakeholders have commented on the BARCT analyses staff is conducting
- Presentation will provide additional information on
  - Technology Assessment
  - Establishing BARCT emission level
- Next Working Group Meeting will cover
  - Cost-effectiveness
  - Emission reductions



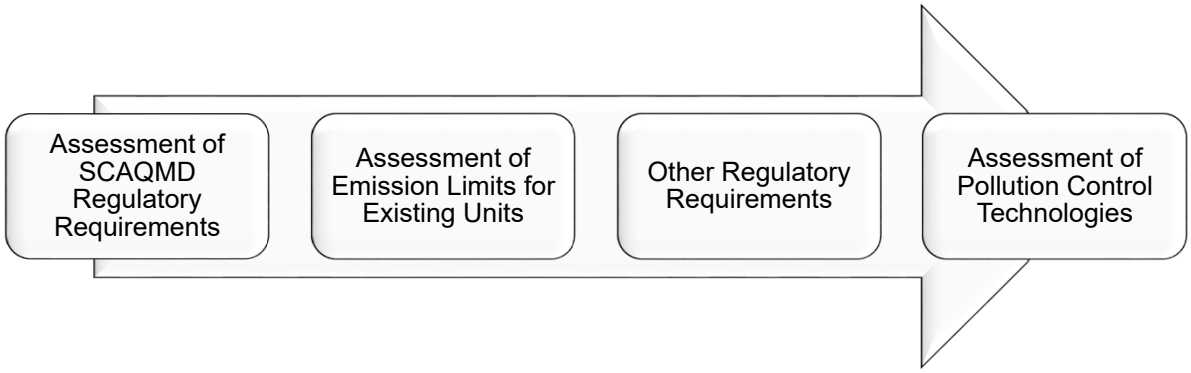
7

Objective of Technology Assessment

- Overall objective of Technology Assessment is to assess applicable technologies to identify a possible BARCT emission standard
  - Cost-effectiveness analysis must be completed before BARCT recommendation can be made
- Technology Assessment is specific to the equipment, plus fuel-type, and takes into account size and application of the equipment
- Each step of the Technology Assessment should identify possible emission limit
  - Four steps in the Technology Assessment

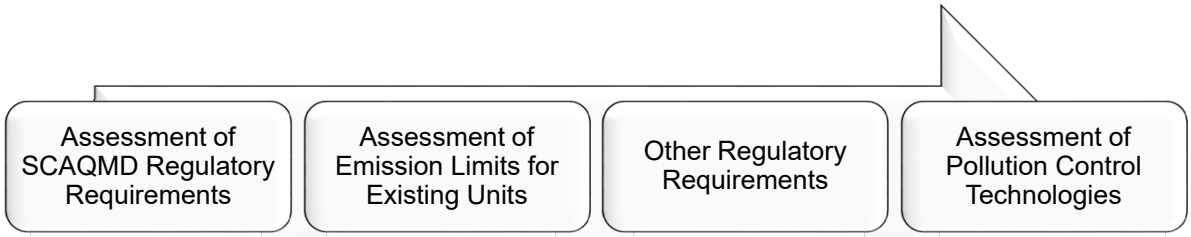
8

Overview of Technology Assessment



9

Overview of Technology Assessment



Purpose: Identify existing SCAQMD regulatory requirements for that particular source category

Purpose: Evaluate existing units to identify emission levels achieved based on permitted and actual levels

Purpose: Identify any other regulatory requirements with lower emission limits

Purpose: Identify pollution control technologies and potential emission reductions

10

Assessment of SCAQMD Regulatory Requirements

Assessment of SCAQMD Regulatory Requirements

- Evaluation of applicable SCAQMD rule
  - What are the current requirements?
  - Are there other rules regulating the source category (other pollutants such as toxic air contaminants or other criteria pollutants)?
  - Are there existing exemptions?
- Review previous rule amendments to understand potential issues identified
- Consideration if new BARCT analysis is expanding the applicability – size, application of equipment, fuel types, etc.

11

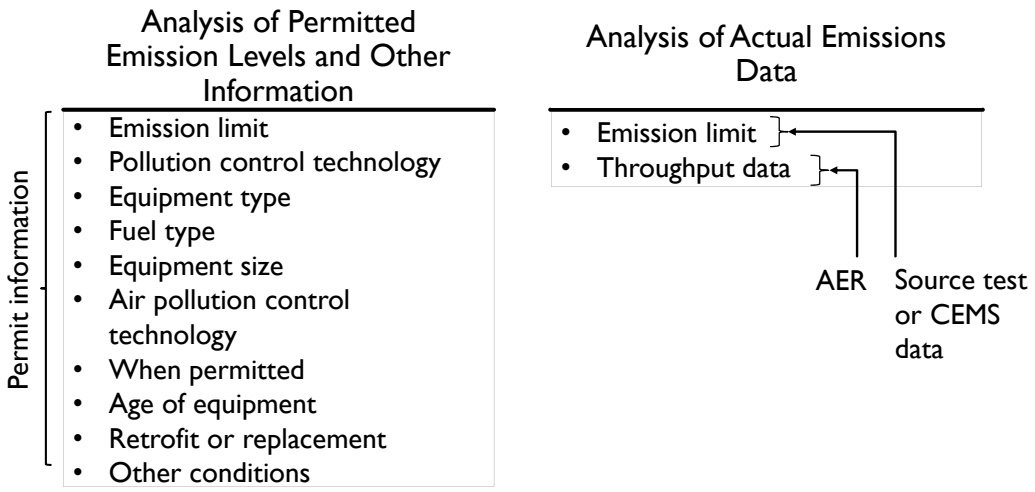
Assessment of Emission Limits for Existing Units

Assessment of Emission Limits for Existing Units

- Evaluation focuses on the emission limit currently being achieved (concentration, emission rate) and pollution control technology
- Permitted emission limits obtained from SCAQMD permits
  - Consideration for additional conditions that may affect the emission limit such as monitoring and averaging time, ammonia slip, other pollutants, etc.
- Actual emission limits can be obtained from:
  - Source tests
  - Continuous emissions monitoring systems (CEMS)

12

Information Needed for Evaluating Existing Units



13

Review of Other Regulatory Requirements

Other Regulatory Requirements

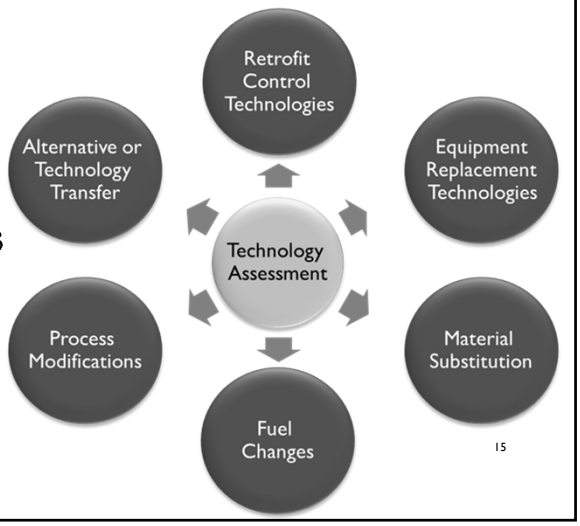
- Assessment of other rules and regulations outside of SCAQMD's jurisdiction that regulate same source(s)
- Assessment is not limited to California
- Considerations
  - Implementation date
  - Applicability
  - Alternative compliance approaches (mitigation fee)

14

Assessment of Pollution Control Technologies

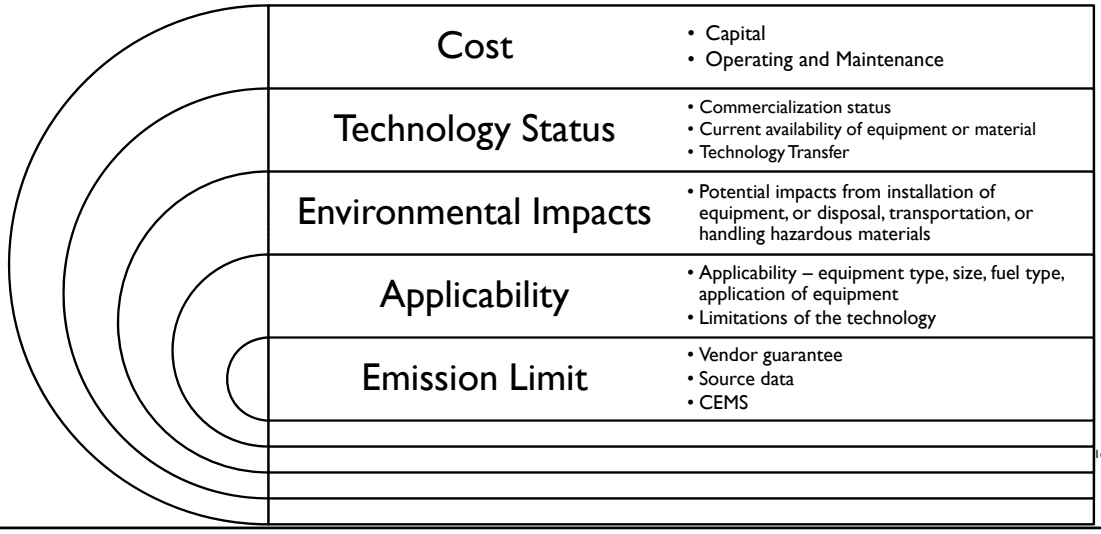
Assessment of Pollution Control Technologies

- Technology assessment is all encompassing
  - Existing and emerging technologies
  - Technology transfer
- Assess potential emission reductions
- Consideration for
  - Equipment-specific considerations and limitations
  - Environmental impacts



15

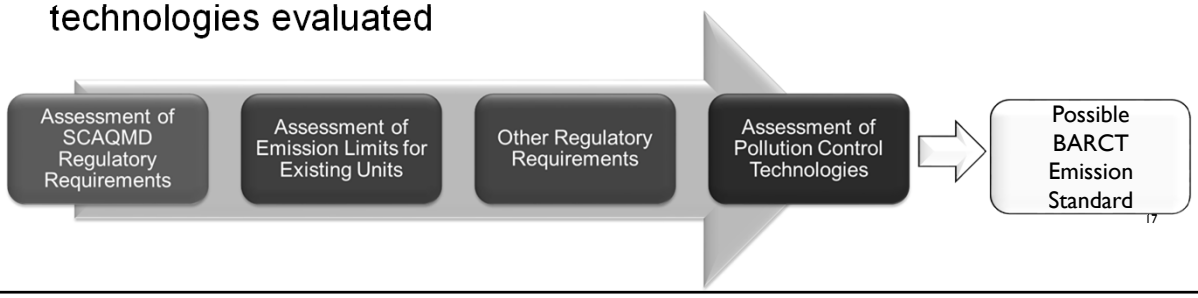
Scope of Technology Assessment



16

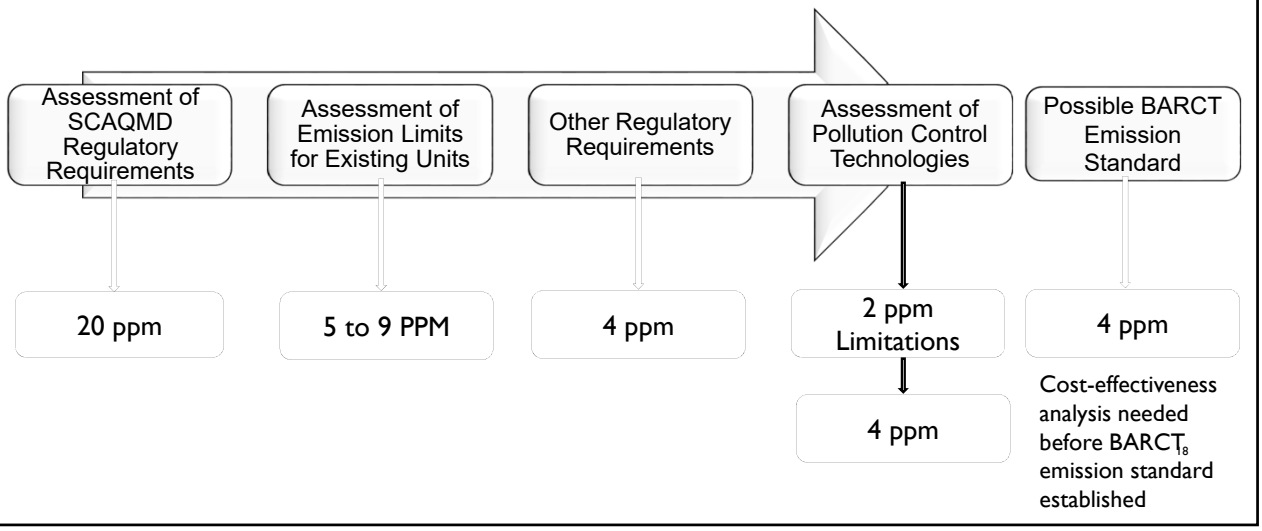
Possible BARCT Emission Standard

- Technology Assessment will provide information for possible BARCT emission standard
- Each step of the Technology Assessment should provide information of the applicable emission limit that corresponds to the technologies evaluated



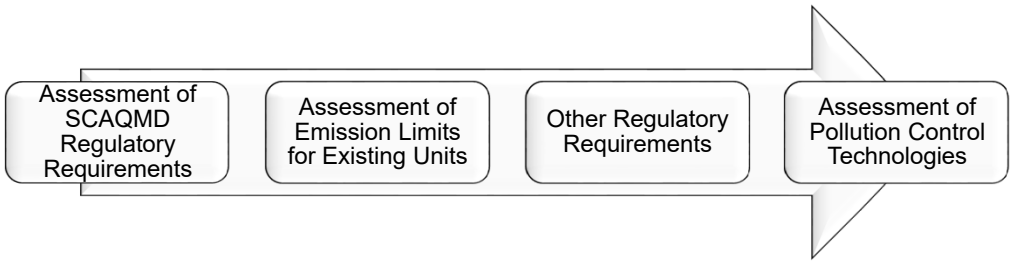
17

Example of BARCT Analysis



18

Status of BARCT Technology Assessments in Landing Rules



PAR1146+	○	●	●	●
PR 1109.1	○			
PR 1118.1	○	○	○	○
PAR 1134	○	○	○	○
PAR 1135	○	○	○	○
PAR 1110.2	○			

RECENT ACTIVITY FOR LANDING RULES

20

PAR 1146 Series and PR 1100

- Landing rules for boilers, steam generators, and process heaters
- Comments received regarding BARCT analysis at May 2018 Set Hearing
  - Board delayed Set Hearing
- Staff is continuing work on Technology Assessment
  - Re-assessment of existing emission limits, other regulatory requirements, and assessment of pollution control technologies

21

PAR 1146 Series and PR 1100 – Cost Effectiveness

- Staff has gathered cost information

Capital Cost	Annual Operating Cost
Equipment	Additional electricity
Installation	Additional operation and maintenance
Permitting fees	Additional monitoring
	Ammonia
	Catalyst

- To be presented at the next Working Group meeting

22

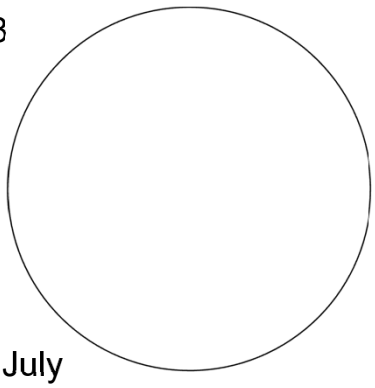
PAR 1146 Series and PR 1100 – Tentative Schedule

Next Working Group Meeting	August 2, 2018
Public Workshop	September 2018
Stationary Source Committee	October 19, 2018
Set Hearing	November 2, 2018
Public Hearing	December 7, 2018

23

PR1118.1 Summary

- Last Working Group Meeting held June 12, 2018
- Met with stakeholders representing:
  - Bulk terminals
  - Oil and gas operations
  - Outer continental shelf oil extraction
- Held technical meetings with:
  - District staff
  - Flare manufacturer
- Next Working Group Meeting scheduled for late July



24

PR1118.1 BARCT Assessment Summary

- SCAQMD regulatory requirements for flares
  - Rule 1118 – Refinery Flares
  - Rule 1147 – NOx Reductions from Miscellaneous Sources
  - Rule 1150.1 – Control of Gaseous Emissions from Municipal Solid Waste Landfills
  - BACT requirements for biogas, landfill gas, oil and gas extraction
- Other agencies' regulatory requirements for flares
  - San Joaquin Valley Air Pollution Control District (APCD) Rule 4311 – Flares
  - Santa Barbara APCD Rule 359 – Flares and Oxidizers
  - Bureau of Land Management Proposed Waste Prevention Rule
  - World Bank Zero Routine Flaring Initiative

25

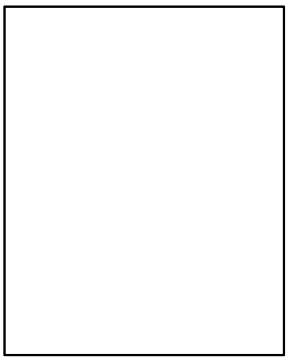
PR1118.1 BARCT Assessment Summary (cont.)

- Pollution control technologies
  - Aereon Certified Ultra-Low Emissions Burner (CEB®)
  - John Zink Ultra Low Emissions Flare (ZULE)
  - Beneficial use of flare gas (e.g., turbines, fuel cells, transportation fuel)
- Ongoing evaluation of existing units, routine flaring, and beneficial use
  - Examining universe based on proposed flare definition
  - Re-evaluating emission baseline
- Goal to reduce NOx emissions and routine flaring
  - Working with stakeholders to identify a threshold that would trigger flare minimization or flare replacement
  - Evaluate cost effectiveness once rule concept is established

26

PR1109.1 Summary

- Last Working Group Meeting held June 14, 2018
- Developing Request For Proposal for third party consultant to evaluate staff's BARCT assessment
- Scheduling meetings and site visits
- Next Working Group Meeting scheduled for late July



27

PR1109.1 BARCT Assessment Summary

- Evaluating for next Working Group Meeting
  - SCAQMD regulatory requirements for each source category
  - Other agencies' regulatory requirements for each source category
  - Pollution control technologies (e.g., SCR, low and ultra-low NOx burners)
- Ongoing evaluation of existing units
  - Presented overview of equipment (e.g., categories, permitted emission limits, fuel type)
  - Currently assessing permit limits versus CEMs/Source Testing data
  - Survey data from affected facilities due by August 10th to enhance evaluation
- Future evaluation
  - Cost-effectiveness and incremental cost-effectiveness

28

PAR 1134 Rule Development

- SCAQMD regulatory requirements for gas turbines
  - Rule 1134 for existing units
  - BACT Guidelines for new units
  - 2015 RECLAIM amendments established limits for existing units
- Assessment of emission limits for existing units grouped by
  - Fuel type: natural gas, landfill gas, digester gas, process gas
  - Equipment type: simple or combined cycle

PAR 1134 Rule Development

- Other regulatory requirements
  - San Joaquin Valley Air Pollution Control District
  - Bay Area Air Quality Management District
- Pollution control technologies
  - Steam/water injection
  - Lean premixed combustion
  - SCR
  - Alternatives (catalytic combustion and catalytic absorption)
- Examined cost-effectiveness at proposed limits

PAR 1134 BARCT Analysis Summary

Gas Turbine Fuel	Proposed Limit (ppmv @ 15% O_2)	Cost-Effectiveness (cost per ton of NOx reduced)
Natural Gas		
Simple Cycle	2.5	$16,800[1]
Combined Cycle	2.0	$15,200[1,2]
Landfill Gas	12.5	$42,000 to $82,000[3]
Sewage Digester Gas	18.8	Still assessing costs
Process Gas	5 – 9 (25 for liquid fuel)	$36,000 to $48,000

1 – Excludes low-use units
2 – Excludes turbines already permitted at 2.5 ppm NOx @ 15% O_2
3 – Equipment replacement for unit w/out SCR, plus significant structural modifications

31

Additional PAR 1134 Considerations

- Continuing analyses for turbines used in uncommon circumstances
  - Alternative fuels, variable fuel flow rates
- Include 5 ppm concentration limit @ 15% O_2 for ammonia slip on new units
- Retain continuous emission monitoring system for units ≥ 2.9 MW
  - Additional provisions for Relative Accuracy Test Audits and Relative Accuracy Audits
- Remove RECLAIM-specific reporting requirements

32

PAR 1134 Tentative Schedule

Next Working Group Meeting	July 2018
Public Workshop	Summer 2018
Stationary Source Committee	Fall 2018
Set Hearing	Fall 2018
Public Hearing	1st Quarter 2019

33

PAR 1135 Technology Assessment

- PAR 1135 affects equipment at Electricity Generating Facilities (EGFs)
- Assessment of SCAQMD regulatory requirements
  - Rule 1135 was last amended July 19, 1991
  - Rule 2009 affected RECLAIM EGFs
  - SCAQMD BACT requirements for equipment at EGFs
- Assessment of Emission Limits for Existing Units
  - Permit limits
  - Types of control
  - Retrofit or replacement
  - Age of installation

34

PAR 1135 Technology Assessment

- Other regulatory requirements also assessed from other air Districts
  - San Joaquin Valley Air Pollution Control District
  - Bay Area Air Quality Management District
- NOx control technologies identified
  - Dry Low-NOx combustion
  - Steam/water injection
  - Catalytic combustion
  - SCR
  - Catalytic absorption systems

35

PAR 1135 Rule Development

- Presented BARCT analyses for EGFs at working group meeting
  - Boilers
  - Combined cycle gas turbines
  - Internal combustion engines (diesel)
  - Simple cycle gas turbines
- Examined cost-effectiveness at proposed limits
  - Most boilers being repowered because of Clean Water Act requirements
  - Nearly 90% of gas turbine emissions from units that already meet proposed BARCT limits
  - Proposed NOx limit for internal combustion engines is cost-effective for 5 of the 6 units
    - Average (excluding 51 ppm unit): $22,757/ton NOx

36

Emission Limitations for PAR 1135 Boilers and Turbines

Equipment Type	NOx (ppmv)	Ammonia Slip (ppmv)	Oxygen Correction (%, dry)
Boilers	5.0	5.0	3
Turbine - Combined Cycle	2.0	5.0	15
Turbine - Simple Cycle	2.5	5.0	15

- Limits reflect BARCT assessment provided in last working group meeting
- Limits averaged over one hour (except for existing equipment with alternative averaging time permit conditions)
- Limits exclude start-up and shutdown periods
- Effective Date: January 1, 2024

37

Emission Limitations for PAR 1135 Internal Combustion Engines

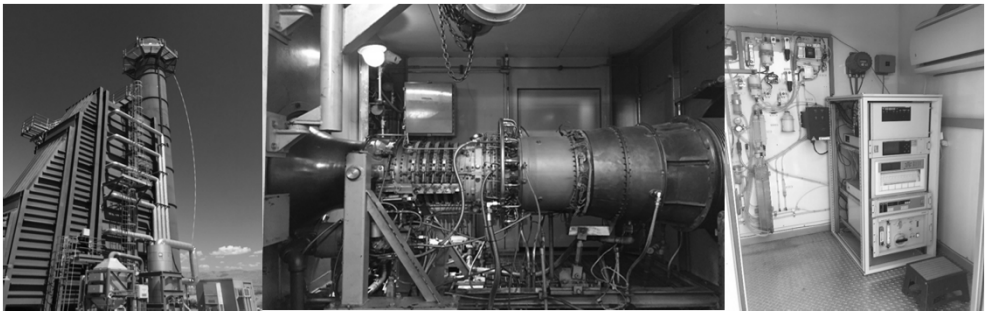
Equipment Type	NOx (ppmv)	Ammonia Slip (ppmv)	Oxygen Correction (%, dry)
Internal Combustion Engine (Diesel)	45.0	5.0	15

- Limits based on Tier IV Final engine
- Limit averaged over one hour
- Limit excludes start-up and shutdown periods
- Effective Date: Under Consideration
- CO, VOC, and PM limits to be included and will be based on Tier IV Final, permit conditions, and Rule 1110.2, as applicable

38

Additional PAR 1135 Considerations

- Retain continuous emission monitoring system requirements
- Remove RECLAIM-specific reporting requirements



39

PAR 1135 Tentative Schedule

Stationary Source Committee	July 20, 2018
Public Workshop	August 2, 2018
Set Hearing	September 7, 2018
Public Hearing	October 5, 2018

40

PAR 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines

- First Working Group Meeting held on June 28, 2018
- Items that were discussed:
  - BARCT analysis
  - Initial rule concepts
  - Universe of sources
- Initial work has begun for Technology Assessment and BARCT analysis
- SCAQMD regulatory requirements for internal combustion engines are contained in Rule 1110.2
  - Current requirements established in 2008 for most engines (2012 for biogas)
- Next working group meeting to be held in the third quarter of 2018

41

PROPOSED AMENDMENTS TO RULES 2001 AND 2002

42

Need for the Proposed Amendments

- Initial Determination Notifications were sent to 37 facilities to begin the process for exiting RECLAIM
- However, some facilities did not receive an Initial Determination Notification
  - Some were not included in the first group of 37 facilities identified as ready to transition
  - Others have made modifications and are in compliance with landing rules

43

Need for the Proposed Amendments (continued)

- Stakeholders have also raised concerns regarding transitioning facilities before key issues are resolved, such as New Source Review and permitting
- Stakeholders have requested for an option to remain in RECLAIM until these matters are resolved, even if issued Initial Determination Notifications
- Facilities that elect to remain in RECLAIM during the interim transition period must comply with BARCT requirements in adopted landing rules
- BARCT Compliance Plan provisions will be evaluated at a future time for a separate rulemaking

44

Summary of Proposed Amendments

PAR 2001

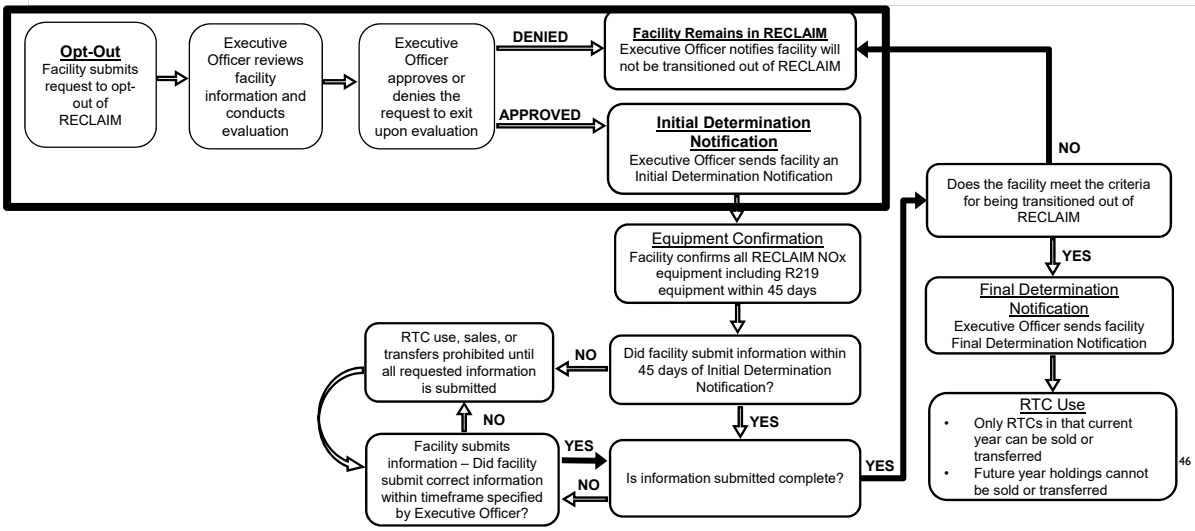
Would provide a pathway to exit RECLAIM for facilities meeting the criteria to exit, but have not received an Initial Determination Notification

PAR 2002

Would provide facilities the option to remain in RECLAIM for a limited time upon receiving an Initial Determination Notification

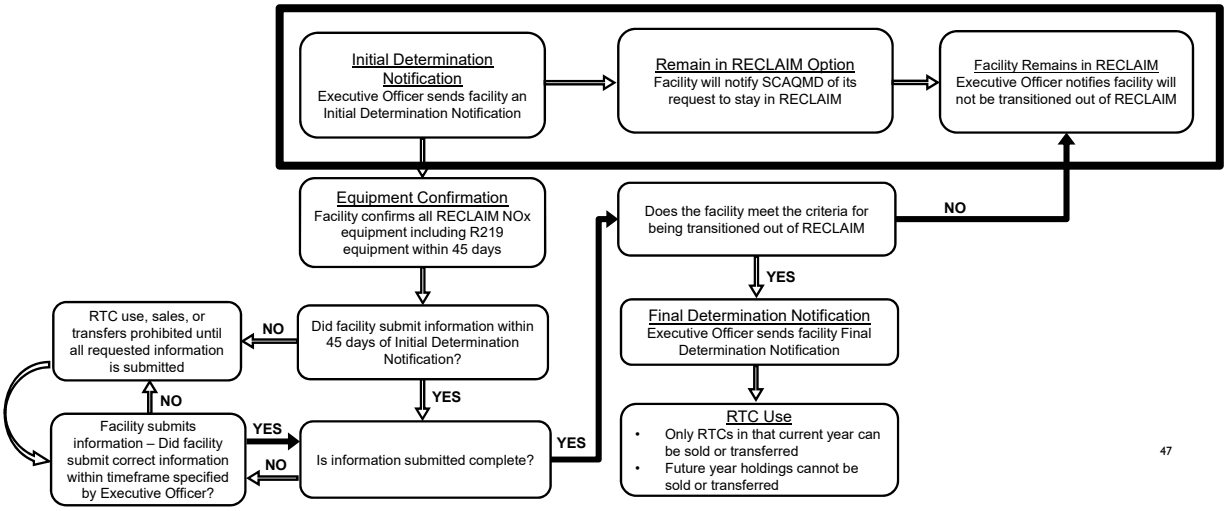
45

Overview of RECLAIM Transition Process w/ Opt-Out



46

Overview of RECLAIM Transition Process w/ Option to Remain in RECLAIM



47

PARs 2001/2002 Rule Development Schedule

Stationary Source Committee	July 20, 2018
Public Workshop	August 9, 2018
Set Hearing	September 7, 2018
Public Hearing	October 5, 2018

48

Contacts

General RECLAIM Questions	Proposed Amended Rules 1146, 1146.1, 1146.2 and Proposed Rule 1100	Proposed Rule 1109.1
• Gary Quinn, P.E. Program Supervisor 909-396-3121 gquinn@aqmd.gov • Kevin Orellana Program Supervisor 909-396-3492 korellana@aqmd.gov	• Gary Quinn, P.E. Program Supervisor 909-396-3121 gquinn@aqmd.gov • Kalam Cheung Program Supervisor 909-396-3281 kcheung@aqmd.gov	• Heather Farr Program Supervisor 909-396-3672 hfarr@aqmd.gov • Jong Hoon Lee Air Quality Specialist 909-396-3903 jhlee@aqmd.gov

Contacts

Proposed Rule 1118.1	Proposed Amended Rule 1135	Proposed Amended Rule 1134
• Heather Farr Program Supervisor 909-396-3672 hfarr@aqmd.gov • Steve Tsumura Air Quality Specialist 909-396-2549 stsumura@aqmd.gov	• Michael Morris Planning and Rules Manager 909-396-3282 mmorris@aqmd.gov • Uyen-Uyen Vo Air Quality Specialist 909-396-2238 uvo@aqmd.gov	• Michael Morris Planning and Rules Manager 909-396-3282 mmorris@aqmd.gov • Uyen-Uyen Vo Air Quality Specialist 909-396-2238 uvo@aqmd.gov

Contacts

Proposed Amended Rule 1110.2
• Kevin Orellana Program Supervisor 909-396-3492 korellana@aqmd.gov • Rodolfo Chacon Air Quality Specialist 909-396-2726 rchacon@aqmd.gov

51