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
UPCOMING RULE MEETINGS
Upcoming Rule Meetings

- Proposed Amended Rules 1146, 1146.1, 1146.2 and Proposed Rule 1100
  - Working Group Meeting #5
  - August 2, 2018 (tentative)

- Proposed Rule 1109.1
  - Working Group Meeting
  - Late July

- Proposed Rule 1118.1
  - Working Group Meeting
  - Late July

- Proposed Amended Rule 1110.2
  - Working Group Meeting #2
  - 3rd quarter 2018
Upcoming Rule Meetings

- **Proposed Amended Rule 1135**
  - Stationary Source Committee Meeting
  - July 20, 2018

- **Proposed Amended Rule 1134**
  - Working Group Meeting #4
  - July 25, 2018 (tentative)

- **PARs 2001/2002**
  - Stationary Source Committee Meeting
  - July 20, 2018
ADDITIONAL DETAILS ON BARCT ANALYSES FOR LANDING RULES
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

- Identifying Technology
- Establishing an Emission Level
- Gathering Cost Information
- Determination of Cost Effectiveness and Emission Reductions
- Public Process
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
Overview of Technology Assessment

- Assessment of SCAQMD Regulatory Requirements
- Assessment of Emission Limits for Existing Units
- Other Regulatory Requirements
- Assessment of Pollution Control Technologies
Overview of Technology Assessment

- **Assessment of SCAQMD Regulatory Requirements**
  - **Purpose:** Identify existing SCAQMD regulatory requirements for that particular source category

- **Assessment of Emission Limits for Existing Units**
  - **Purpose:** Evaluate existing units to identify emission levels achieved based on permitted and actual levels

- **Other Regulatory Requirements**
  - **Purpose:** Identify any other regulatory requirements with lower emission limits

- **Assessment of Pollution Control Technologies**
  - **Purpose:** Identify pollution control technologies and potential emission reductions
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.
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)
### Information Needed for Evaluating Existing Units

#### Analysis of Permitted Emission Levels and Other Information
- Emission limit
- Pollution control technology
- Equipment type
- Fuel type
- Equipment size
- Air pollution control technology
- When permitted
- Age of equipment
- Retrofit or replacement
- Other conditions

#### Analysis of Actual Emissions Data
- Emission limit
- Throughput data

- Permit information

- AER Source test or CEMS data
Review of 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)
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
## Scope of Technology Assessment

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Technology Status</th>
<th>Environmental Impacts</th>
<th>Applicability</th>
<th>Emission Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Capital</td>
<td>• Commercialization status</td>
<td>• Potential impacts from installation of equipment, or disposal, transportation, or handling hazardous materials</td>
<td>• Applicability – equipment type, size, fuel type, application of equipment</td>
<td>• Vendor guarantee</td>
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<td>• Operating and Maintenance</td>
<td>• Current availability of equipment or material</td>
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<td>• Limitations of the technology</td>
<td>• Source data</td>
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<td></td>
<td>• Technology Transfer</td>
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<td></td>
<td>• CEMS</td>
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</table>

### Source Data
- CEMS
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
Example of BARCT Analysis

Assessment of SCAQMD Regulatory Requirements
- 20 ppm

Assessment of Emission Limits for Existing Units
- 5 to 9 PPM

Other Regulatory Requirements
- 4 ppm

Assessment of Pollution Control Technologies
- 2 ppm Limitations
- 4 ppm

Possible BARCT Emission Standard
- 4 ppm

Cost-effectiveness analysis needed before BARCT emission standard established
## Status of BARCT Technology Assessments in Landing Rules

### Table: Assessment Status

<table>
<thead>
<tr>
<th></th>
<th>Assessment of SCAQMD Regulatory Requirements</th>
<th>Assessment of Emission Limits for Existing Units</th>
<th>Other Regulatory Requirements</th>
<th>Assessment of Pollution Control Technologies</th>
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RECENT ACTIVITY FOR LANDING RULES
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
Staff has gathered cost information

- Capital Cost
  - Equipment
  - Installation
  - Permitting fees

- Annual Operating Cost
  - Additional electricity
  - Additional operation and maintenance
  - Additional monitoring
  - Ammonia
  - Catalyst

To be presented at the next Working Group meeting
<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Next Working Group Meeting</td>
<td>August 2, 2018</td>
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<tr>
<td>Public Workshop</td>
<td>September 2018</td>
</tr>
<tr>
<td>Stationary Source Committee</td>
<td>October 19, 2018</td>
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<tr>
<td>Set Hearing</td>
<td>November 2, 2018</td>
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<tr>
<td>Public Hearing</td>
<td>December 7, 2018</td>
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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
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
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
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
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
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

<table>
<thead>
<tr>
<th>Gas Turbine Fuel</th>
<th>Proposed Limit (ppmv @ 15% O₂)</th>
<th>Cost-Effectiveness (cost per ton of NOx reduced)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
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<tr>
<td>Simple Cycle</td>
<td>2.5</td>
<td>$16,800¹</td>
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<tr>
<td>Combined Cycle</td>
<td>2.0</td>
<td>$15,200¹,²</td>
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<tr>
<td>Landfill Gas</td>
<td>12.5</td>
<td>$42,000 to $82,000³</td>
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<tr>
<td>Sewage Digester Gas</td>
<td>18.8</td>
<td>Still assessing costs</td>
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<tr>
<td>Process Gas</td>
<td>5 – 9 (25 for liquid fuel)</td>
<td>$36,000 to $48,000</td>
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</tbody>
</table>

¹ – Excludes low-use units
² – Excludes turbines already permitted at 2.5 ppm NOx @ 15% O₂
³ – Equipment replacement for unit w/out SCR, plus significant structural modifications
Additional PAR 1134 Considerations

- Continuing analyses for turbines used in uncommon circumstances
  - Alternative fuels, variable fuel flow rates
- Include 5 ppm concentration limit @ 15% O₂ 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
<table>
<thead>
<tr>
<th>Event</th>
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</tr>
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<tbody>
<tr>
<td>Next Working Group Meeting</td>
<td>July 2018</td>
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<tr>
<td>Public Workshop</td>
<td>Summer 2018</td>
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<tr>
<td>Stationary Source Committee</td>
<td>Fall 2018</td>
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<tr>
<td>Set Hearing</td>
<td>Fall 2018</td>
</tr>
<tr>
<td>Public Hearing</td>
<td>1st Quarter 2019</td>
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</tbody>
</table>
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
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
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
Emission Limitations for PAR 1135 Boilers and Turbines

- 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

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>NOx (ppmv)</th>
<th>Ammonia Slip (ppmv)</th>
<th>Oxygen Correction (% dry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boilers</td>
<td>5.0</td>
<td>5.0</td>
<td>3</td>
</tr>
<tr>
<td>Turbine - Combined Cycle</td>
<td>2.0</td>
<td>5.0</td>
<td>15</td>
</tr>
<tr>
<td>Turbine - Simple Cycle</td>
<td>2.5</td>
<td>5.0</td>
<td>15</td>
</tr>
</tbody>
</table>
Emission Limitations for PAR 1135 Internal Combustion Engines

- 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

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>NOx (ppmv)</th>
<th>Ammonia Slip (ppmv)</th>
<th>Oxygen Correction (% dry)</th>
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</thead>
<tbody>
<tr>
<td>Internal Combustion Engine (Diesel)</td>
<td>45.0</td>
<td>5.0</td>
<td>15</td>
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</table>
Additional PAR 1135 Considerations

- Retain continuous emission monitoring system requirements
- Remove RECLAIM-specific reporting requirements
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<tr>
<td>Public Hearing</td>
<td>October 5, 2018</td>
</tr>
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</table>
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
PROPOSED AMENDMENTS TO RULES 2001 AND 2002
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
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.
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.
Overview of RECLAIM Transition Process w/ Opt-Out

- **Opt-Out**
  - Facility submits request to opt-out of RECLAIM

- **Executive Officer**
  - Reviews facility information and conducts evaluation

- **Executive Officer**
  - Approves or denies the request to exit upon evaluation

- **Facility Remains in RECLAIM**
  - Executive Officer notifies facility will not be transitioned out of RECLAIM

- **Initial Determination Notification**
  - Executive Officer sends facility an Initial Determination Notification

- **Equipment Confirmation**
  - Facility confirms all RECLAIM NOx equipment including R219 equipment within 45 days

- **RTC Use**
  - Only RTCs in that current year can be sold or transferred
  - Future year holdings cannot be sold or transferred

- **RTC Use, sales, or transfers prohibited until all requested information is submitted**

- **RTC Use, sales, or transfers prohibited until all requested information is submitted**

- **Facility submits information**
  - Did facility submit correct information within timeframe specified by Executive Officer?

- **Is information submitted complete?**

- **Final Determination Notification**
  - Executive Officer sends facility a Final Determination Notification

- **Does the facility meet the criteria for being transitioned out of RECLAIM**

- **RTC Use**
  - Only RTCs in that current year can be sold or transferred
  - Future year holdings cannot be sold or transferred
Overview of RECLAIM Transition Process w/ Option to Remain in RECLAIM

**Initial Determination Notification**
Executive Officer sends facility an Initial Determination Notification

Did facility submit information within 45 days of Initial Determination Notification?

**Equipment Confirmation**
Facility confirms all RECLAIM NOx equipment including R219 equipment within 45 days

RTC use, sales, or transfers prohibited until all requested information is submitted

Did facility submit information within 45 days of Initial Determination Notification?

Is information submitted complete?

Remain in RECLAIM Option
Facility will notify SCAQMD of its request to stay in RECLAIM

Final Determination Notification
Executive Officer sends facility Final Determination Notification

Does the facility meet the criteria for being transitioned out of RECLAIM

RTC Use
- Only RTCs in that current year can be sold or transferred
- Future year holdings cannot be sold or transferred

Facility Remains in RECLAIM
Executive Officer notifies facility will not be transitioned out of RECLAIM

RTC use, sales, or transfers prohibited until all requested information is submitted

Facility submits information – Did facility submit correct information within timeframe specified by Executive Officer?

YES

NO

YES

NO

NO

YES

YES
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
Contacts

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Proposed Amended Rules

1146, 1146.1, 1146.2 and 
Proposed Rule 1100

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Proposed Rule 1109.1

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