Proposed Amended Rule 1134
Public Workshop & CEQA Scoping
Background
Public Process

- Four Working Group Meetings
  - February 22, 2018
  - April 26, 2018
  - June 13, 2018
  - August 10, 2018
- Eight site visits
- Seven individual meetings
Background

- **2016 Air Quality Management Plan**
  - Control Measure CMB-05 called for further NOx reductions from an assessment of the RECLAIM program, including:
    - A 5 ton per day NOx reduction to be achieved no later than 2025; and
    - Sunsetting the RECLAIM program and transitioning to a command-and-control regulatory structure that requires Best Available Retrofit Control Technology (BARCT) level controls

- **AB 617 (2017)**
  - Expedited schedule for implementation of BARCT for facilities in the greenhouse gas cap-and-trade program
    - Implementation schedule to be developed by 1/1/2019
    - Full BARCT implementation by 12/31/2023
Regulatory Timeline for Stationary Gas Turbines

1989
Adoption of Rule 1134

1989 - Applicable to gas turbines existing as of August 4, 1989

1993
Adoption of RECLAIM

1993 - Many gas turbines subject to RECLAIM

1990 - Present

1990 - Facilities installing new gas turbines no longer subject to Rule 1134

1990 - Present - Few turbines (approximately eight) actually subject to Rule 1134 at this time
Proposed Rule
Language
Overview

- Rule language based on rule concepts with input from stakeholders
- Limits provided in rule from BARCT assessment
  - Special consideration for low-use and units close to proposed NOx limit
- Presentation will highlight key provisions of proposed rule language
The purpose of the rule is to reduce oxides of nitrogen (NOx) from stationary gas turbines.
Applicability – Subdivision (b)

- Applies to turbines, regardless of installation date
- Retain size threshold of ≥ 0.3 MW output
- Does not apply to turbines subject to:
  - Electricity Generating Facilities (Rule 1135)
  - Landfills (Proposed Rule 1150.3)
  - Petroleum Refineries (NAICS 324110/Proposed Rule 1109.1)
  - Publicly Owned Treatment Works (Proposed Rule 1179.1)
Key Definitions – Subdivision (c)

- **Annual Capacity Factor** – Ratio between measured heat input from fuel consumption and potential heat input if operated continuously over a year
- **Start-Up** – Start-Up ends when the turbine generates electricity for sale or for use including on-site use
  - Consistent with U.S. EPA definition of Start-Up for gas turbines
Key Definitions – Subdivision (c) (continued)

- Landfill – Solid waste disposal facility (SCAQMD Rule 1150.1)
- Natural Gas – Pipeline quality gas (SCAQMD Rule 2000)
- Produced Gas – Gas associated with the production, gathering, separation, or processing of crude oil (SCAQMD Rule 1148.1)
- Publicly Owned Treatment Works – Wastewater treatment or reclamation plants (SCAQMD Rule 1179)
Existing Requirements – Paragraphs (d)(1) and (d)(2)

- Current emission limits retained during interim for existing turbines until emission concentration limits in paragraph (d)(3) are met or become effective.
- Current emission limits do not apply to:
  - Turbines exiting RECLAIM
  - Turbines in operation after August 1989
  - Applying current limits would add costs and slow progress to meet BARCT limits
- Retains notice of applicability of Regulation XIII if CO emissions increase when NOx controls installed
  - Informational statement that Regulation XIII applies if there are emission increases on other pollutants
  - No CO emission limits in PAR 1134
BARCT analysis is conducted for each equipment category and fuel type.
Table I: Emissions Limits for Stationary Gas Turbines

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>NOx (ppmv @ 15% O2)</th>
<th>Ammonia (ppmv @ 15% O2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid – Outer Continental Shelf</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>Natural Gas – Combined Cycle</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Natural Gas – Pipeline Gas Turbine</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Natural Gas – Simple Cycle</td>
<td>2.5</td>
<td>5</td>
</tr>
<tr>
<td>Produced Gas</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Produced Gas – Outer Continental Shelf</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>12.5</td>
<td>5</td>
</tr>
</tbody>
</table>

- Effective Date: January 1, 2024
  - Analyzing effective date for facilities with multiple equipment
Start-Up, Shutdown, and Tuning Requirements – Paragraph (d)(4)

- Emission limits in Table I not applicable during Start-Up, Shutdown, and Tuning
- SCAQMD permits establish provisions for start-up, shutdown, and tunings
  - Specifies duration, mass emissions, frequency for start-up and shutdown
  - Permit may contain additional conditions for tunings
Units installed or retrofitted after rule amendment shall average emission limits over a 60 minute rolling average

- 60 minute rolling average requires software modification
- Permits will contain similar requirement

Units installed prior to rule that comply with proposed limits shall retain current averaging time requirements specified in the permit

- Existing averaging times vary widely
Prohibition of Liquid Fuel – Paragraph (d)(6)

- Prohibits use of liquid fuel except for gas turbines located on Outer Continental Shelf
  - Liquid fuel needed when produced gas is insufficient; no access to pipeline natural gas
- Fuel must be 10% or greater liquid content by volume to qualify for higher limit
Permit Reconciliation – Paragraph (d)(7)

- Permits for stationary gas turbines shall submit an application by July 2022 to reconcile permit with changes to Rule 1134
  - Removes RECLAIM requirements and includes new Rule 1134 provisions
SCAQMD is currently working on adopting Rule 113 – Monitoring, Reporting, and Recordkeeping (MRR) Requirements for NOx and SOx Sources.

Once Rule 113 is adopted, all Rule 1134 facilities will transition to Rule 113 for MRR.

In the interim, the intention of the PAR 1134 MRR is to maintain current MRR for all facilities.
### Monitoring, Reporting, and Recordkeeping – Subdivision (e)

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Rule Paragraph</th>
<th>MRR Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-RECLAIM</td>
<td>(e)(1)</td>
<td>Comply with SCAQMD Rule 218</td>
</tr>
<tr>
<td>RECLAIM</td>
<td>(e)(3)</td>
<td>Comply with SCAQMD Rule 2012</td>
</tr>
<tr>
<td>Former RECLAIM</td>
<td>(e)(4)</td>
<td>Comply with SCAQMD Rule 2012 excluding reporting requirements</td>
</tr>
</tbody>
</table>
Require source testing for turbines rated ≤ 2.9 MW
  ➢ Adding SCAQMD Test Method 207.1 for ammonia – Paragraph (f)(1)

Retain annual source test for NOx and ammonia for turbines emitting 25 tons or more of NOx per calendar year

Source testing every three calendar years otherwise
  ➢ Previously was every 8,400 hours
  ➢ New requirement provides consistency and predictability

Includes SCAQMD Test Method 207.1 for ammonia
Require data acquisition system to record compliance with emission concentration limits in rule

- Monthly emission summary removed
- Provides needed information to determine compliance without requiring extensive reporting
Exemptions – Paragraphs (h)(1) through (h)(5), excluding (h)(4)

- Removed exemptions for equipment no longer in SCAQMD jurisdiction or no longer existing – paragraphs (h)(1) and (h)(2)
- Exempt existing combined cycle turbines from Table 1 limits that are already permitted at 2.5 ppmv NOx or less at 15% oxygen
  - Found not to be cost-effective
- Turbines that do not use SCR are not required to conduct ammonia concentration testing
Some turbines are operated sporadically
- Low-use units are not cost-effective to install additional control equipment

NOx concentration not applicable for turbines that:
- Operate less than 25% of annual capacity factor in one year;
- Operate less than 10% averaged over three years;
- Retain NOx and NH3 limits, averaging times, and start-up, shutdown, and tuning requirements in current permit; and
- Apply for permit condition limiting annual capacity factor by July 2022
Ensures that low-use threshold is maintained and provides instructions if exceedance

- Demonstrate each March that turbine remains below annual capacity factor threshold
- If exceedance:
  - Submit permit application within six months from reported date
  - Submit CEMS Plan within six months
  - Operate in compliance with limits in Table I by two years from date of reported exceedance
Cost-Effectiveness and Emission Reductions
Cost-Effectiveness

- AQMP has a threshold is $50,000/ton NOx reduced – provides guidance on threshold for BARCT rules
- Calculated using Discounted Cash Flow Method
  - Cost Effectiveness = Present Value / Emissions Reduction Over Equipment Life
  - Present Value = Capital Cost + (Annual Operating Costs * Present Value Formula)
    - Present Value Formula incorporates nominal interest rate
Baseline Emissions
- Determined by using reported fuel consumption and permit emission limit

PAR 1134 Emissions
- Determined by using reported fuel consumption and proposed emission limit

Emission Reductions = Baseline Emissions - PAR 1134 Emissions
Cost Estimates

- Retrofit costs determined using U.S. EPA’s Air Pollution Control Cost Estimation Spreadsheet for Selective Catalytic Reduction\(^1\)
  - Methodology based on U.S. EPA Clean Air Markets Division Integrated Planning Model
  - Size and costs of SCR based on size, fuel burned, NOx removal efficiency, reagent consumption rate, and catalyst costs
  - Capital costs annualized over 25 years at 4% interest rate
  - Annual MW output based on 2015 annual reported emissions
  - Values reported in 2015 dollars
- Stakeholders are welcome to provide staff with their own costs and cost effectiveness calculations

## Summary of Cost-Effectiveness

<table>
<thead>
<tr>
<th>Category</th>
<th>Meeting Proposed BARCT Limit</th>
<th>Cost-Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined Cycle Turbines and Duct Burners</td>
<td>• 7 of 17 (41%)</td>
<td>$5,900/ton NOx reduced</td>
</tr>
<tr>
<td></td>
<td>• Remaining 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>have average cost-effectiveness of $5,900/ton NOx reduced</td>
<td></td>
</tr>
<tr>
<td>Simple Cycle Turbines</td>
<td>• 2 of 27 (7%)</td>
<td>$6,100/ton NOx reduced</td>
</tr>
<tr>
<td></td>
<td>• Remaining 14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>have average cost-effectiveness of $6,100/ton NOx reduced</td>
<td></td>
</tr>
<tr>
<td>Produced Gas Turbines</td>
<td>• 1 of 5 (20%)</td>
<td>$43,600/ton NOx reduced</td>
</tr>
<tr>
<td></td>
<td>• Remaining four</td>
<td></td>
</tr>
<tr>
<td></td>
<td>have average cost-effectiveness of $43,600/ton NOx reduced</td>
<td></td>
</tr>
<tr>
<td>Outer Continental Shelf Produced Gas Turbines</td>
<td>• None currently meet proposed BARCT limit</td>
<td>$3,600/ton NOx reduced</td>
</tr>
</tbody>
</table>

- BARCT: Best Available Control Technology
Emission Inventory and Reductions

- 2015 Inventory is 3.1 tons per day
- After implementation, PAR 1134 will reduce 2.6 tons per day of NOx
California Environmental Quality Act (CEQA)

- California State Law adopted 1970
- Purpose [CEQA Guidelines Section 15002(a)]
  - Inform governmental decision-makers and public about potential significant effects of projects
  - Identify ways to avoid or reduce adverse impacts
  - Require feasible alternatives and mitigation measures to prevent significant environmental damage
  - Disclose to the public why a project was approved
- Applies to projects undertaken by a Public Agency such as SCAQMD adoption of rules [CEQA Guidelines Section 15002(b)]
  - Required to comply with CEQA when approving a project [CEQA Guidelines Section 15002(d)]
  - Required for discretionary approvals [CEQA Guidelines Section 15002(i)]
- Lead Agency = SCAQMD
  - Oversight and legal responsibility for appropriate CEQA document preparation, circulation, response to comments, and approval/certification
PAR 1134 is a project subject to CEQA

PAR 1134 contains changes that are revisions to the March 2017 Final Program Environmental Impact Report (EIR) for the 2016 Air Quality Management Plan (AQMP)

- New potentially significant adverse impacts to the topics of air quality and hazards and hazardous materials are expected that were not analyzed in the March 2017 Program EIR
- CEQA Guidelines Section 15162(b) allows preparation of a SEA based on project changes or new information available after adoption of a previous EIR

Decision to prepare 45-day Draft Subsequent Environmental Assessment (SEA) to the March 2017 Final Program EIR for the 2016 AQMP

Due to potentially significant adverse impacts, a CEQA scoping meeting is required pursuant to Public Resources Code Section 21083.9(a)(2)
Draft SEA will:
- Analyze alternatives and mitigation measures
- Focus on potentially significant adverse impacts to the topics of air quality and hazards and hazardous materials
- Include comment letters received at CEQA scoping meeting and responses
- Be released for 45-day public review and comment period, upon completion

Final SEA will:
- Include comment letters submitted relative to draft SEA and responses
- Additional modifications to reflect any changes to the project since the release of the draft SEA
- Be presented to the governing board for consideration and certification, if the project is approved
Scope of Socioeconomic Impact Assessment
Legal Requirements California Health & Safety Code Sections 40440.8(a) and (b)

- Socioeconomic Impact Assessment considers:
  - Type of affected industries, including small businesses
  - Impact on employment and the regional economy
  - Range of probable costs, including costs to industry or business
  - Availability and cost effectiveness of alternatives
  - Socioeconomic impacts of CEQA Alternatives

- Governing Board shall:
  - Actively consider socioeconomic impacts
  - Make a good faith effort to minimize adverse socioeconomic impacts
Cost Considerations

- One-time compliance costs
  - Capital cost of new equipment
    - SCR retrofit
    - Turbine replacement
  - Permitting

- Recurring costs
  - Source testing
  - Increased ammonia usage

- Opportunity costs for facilities exiting RECLAIM
  - Lost revenues for facilities with excess RTC holdings
  - Cost savings for facilities with insufficient RTC holdings
Key Assumptions

- Analysis horizon: 2020 to 2045
- Equipment life: 25 years
- Discount rate: 1% & 4%
- Cost-effectiveness threshold: $50,000/ton
Schedule
Current Tentative Schedule

- Stationary Source Committee: February 15, 2019
- Set Hearing: March 1, 2019
- Public Hearing: April 5, 2019
Contacts
PAR 1134 Development
Michael Morris, mmorris@aqmd.gov, (909) 396-3282
Uyen-Uyen Vo, uvo@aqmd.gov, (909) 396-2238

CEQA Questions
Ryan Banuelos, rbanuelos@aqmd.gov, (909) 396-3479

Socioeconomic Questions
Ryan Finseth, rfinseth@aqmd.gov, (909) 396-3575

RECLAIM Questions
Gary Quinn, P.E., gquinn@aqmd.gov, (909) 396-3121
Kevin Orellana, korellana@aqmd.gov, (909) 396-3492

General Questions
Susan Nakamura, snakamura@aqmd.gov, (909) 396-3105