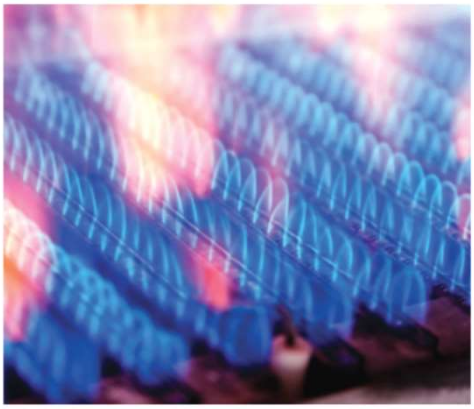
PROPOSED AMENDED RULES 1147 AND 1100 WORKING GROUP MEETING #8

MARCH 10, 2021
SOUTH COAST AQMD
DIAMOND BAR, CA

Zoom Meeting:	https://scaqmd.zoom.us/j/91386076148
Meeting ID:	913 8607 6148
Passcode:	053701
Conference Call:	1 (669) 900-6833

AGENDA

- Summary of Previous Working Group
- Proposed Implementation Approach
- Status of BARCT Assessment
- Cost-Effectiveness Analysis
  - Absorption Chillers
  - Microturbines (Distillate Fuel/Natural Gas)
  - Diesel Tar Pot
- Next Steps



2

PREVIOUS WORKING GROUP RECAP

Working Group #7

- Presented cost-effectiveness analysis for:
  - Afterburner, Thermal Oxidizer, RTO, and Oxidizer
  - Evaporator, Fryer, Heated Process Tank, and Parts Washer
  - Burn-off Furnace, Burnout Oven, Incinerator, Crematory with or without Integrated Afterburner
  - Tenter Frame, Fabric or Carpet Dryer

3

PROPOSED IMPLEMENTATION APPROACH

4

Overview of Existing Rule 1147 Implementation Approach

- The current approach for Rule 1147 is to have "units" comply with rule limits based on the daily emissions and unit age
  - Units with NOx emissions ≥1 pound per day are required to comply when unit is 15 years old
  - Units with NOx emissions <1 pound per day are required to comply when unit is 35 years old
    - Option to allow continued operation with biennial testing
- Units are required to comply with rule limit by July 1 of the year unit meets age requirements and submit permit applications by December 1 of the year prior

5

Overview of Proposed Implementation Approach

- Staff is proposing an implementation approach for RECLAIM and non-RECLAIM facilities, that is generally modeled after existing Rule 1147
- Two implementation schedules
  - All units, except low-emitting or near-limit units, must submit permit applications to meet the proposed NOx and CO limits when the burner reaches 12 years
  - Low-emitting or near-limit units must submit permit applications to meet the proposed NOx and CO limits when the burner reaches 32 years
- Regardless of the implementation schedule, the proposed NOx and CO limits must be met if there is a combustion system modification, combustion system or burner replacement, unit relocation, or unit replacement
- Units that meet the proposed NOx and CO limits through a source test will not be required to replace their burner; however, operators may need to modify their permit to reflect the proposed BARCT limit

6

Proposed Compliance for Units Subject to 12 Year Provisions

- When the burner reaches 12 years, the operator must:
  1. By the following January 1st, submit a permit application to meet the proposed NOx and CO limits
  2. Meet proposed NOx and CO limits 12 months after the permit to construct is issued
- Assuming an 18-month permit approval process, operators must meet the proposed NOx and CO limits when the burner is about 15 years old – similar to the 15 years allowed under Rule 1147
- Basing this provision on burner age instead of unit age ensures that all units meet the proposed NOx and CO limits
- The "two-step" implementation ensures that the operator has the full 12 months to meet the proposed NOx and CO limits once permit to construct is issued

7

Proposed Compliance for Units Subject to 32 Year Provisions

- PAR 1147 expands this concept for low-emitting units to also include units that are near the proposed NOx limit referred to as "near-limit units"
- For low-emitting and near-limit units, when the burner reaches 32 years the operator must:
  - First: Submit a permit application to meet the proposed NOx and CO limits (6 months to submit permit application)
  - Second: Meet proposed NOx and CO limits 12 months after the permit to construct is issued
- Requiring operators to meet the proposed NOx and CO limits when the burner about 35 years old is similar to the 35 years allowed under Rule 1147
- The "two-step" implementation ensures that the operator has the full 12 months to meet the proposed NOx and CO limits once a permit to construct is issued

8

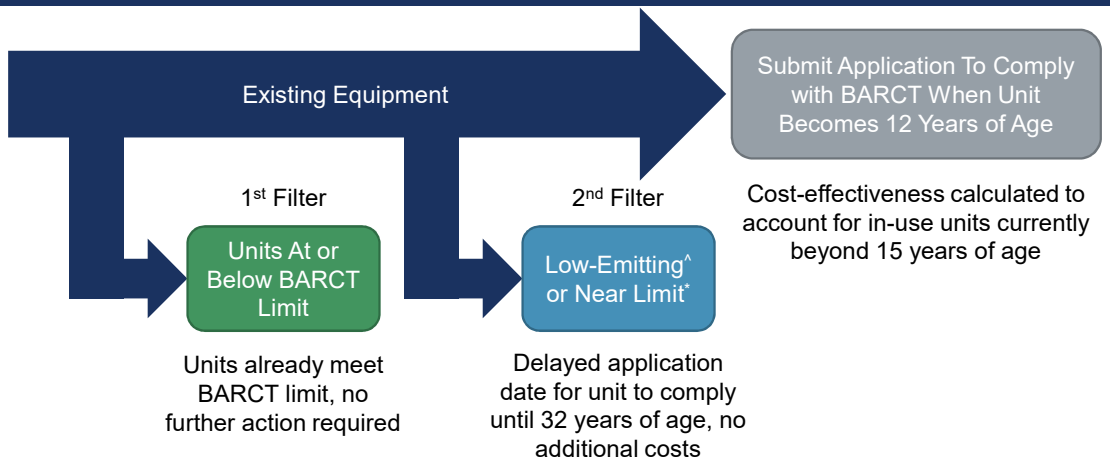
Defining Low-Emitting and Near-Limit Units Subject to 32 Year Provision

- PAR 1147 will use the same threshold as existing Rule 1147 for defining low-emitting units at < 1 lb/day
  - Units that qualify as low-emitting to meet proposed NOx and CO limits when the burner reaches 35 years
- Propose near-limit units with a permit limit at or below existing Rule 1147 limits
  - This approach will address units with high cost-effectiveness values, but still requires that operators to meet the proposed NOx limit when the burner reaches 35 years
  - Use of a near-limit provision may also include other conditions such as limiting annual capacity factor[1] to address higher use units that are near limit and cost-effective to meet the proposed NOx emission limit

[1] Annual capacity factor threshold will be calculated per equipment category

9

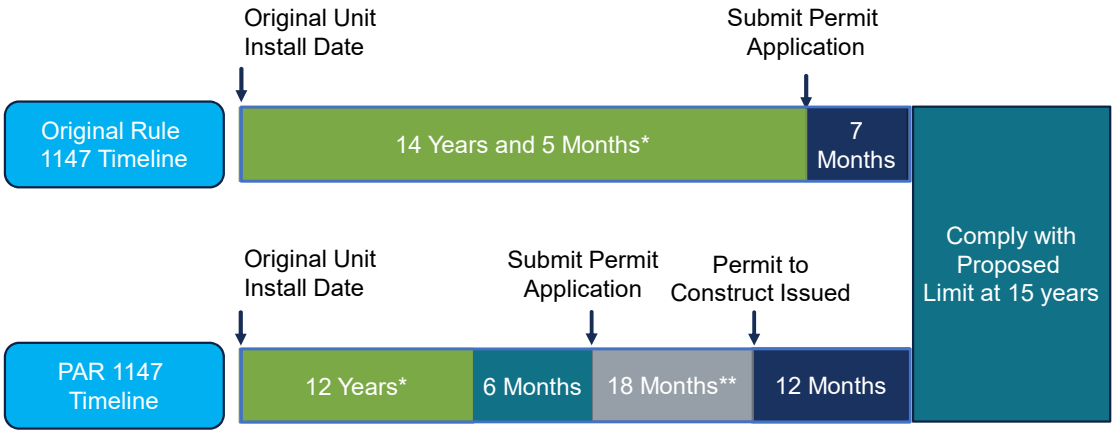
SUMMARY OF IMPLEMENTATION APPROACH



^ Low-emitting units are defined as equipment with NOx emissions of below 1 pound per day as determined by Rule 1147(c)(6)
* Near limit units are defined as equipment that are in compliance with existing Rule 1147 limits with low annual capacity factor

10

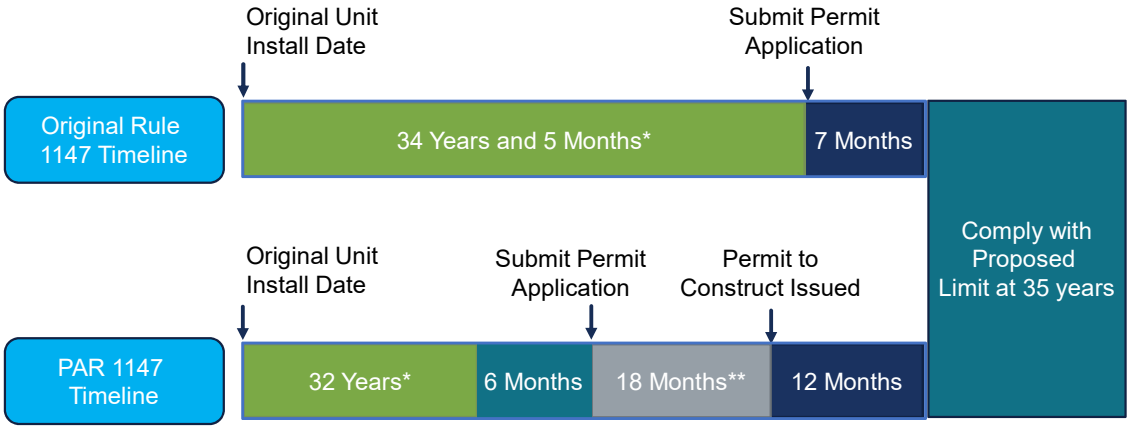
Implementation Timelines (≥1 Pound Per Day NOx)



* Not to scale
** Permitting timeline subject to vary, assume permit to construct to be issued after 6 months of application submittal

11

Implementation Timelines (<1 Pound Per Day NOx)



* Not to scale

* Permitting timeline subject to vary, assume permit to construct to be issued after 6 months of application submittal

12

Summary of Implementation Approach for RECLAIM and Non-RECLAIM

Applicability	Implementation
All Units (Except Low-Emitting and Near Limit Units)	• Beginning July 1, 2021 and every July thereafter, when a burner reaches 12 years submit a permit application by January 1st of the following calendar year that the burner reaches 12 years • Must meet proposed NOx and CO limit 12 months after Permit to Construct is issued
Low-Emitting Units Unit with NOx emissions below 1 lb/day Near-Limit Units Unit with permit limit meeting existing Rule 1147 Limit with low annual capacity factor[1]	• Beginning July 1, 2021 and every July thereafter, when a burner reaches 32 years submit a permit application by January 1st of the following calendar year that the burner reaches 32 years • Must meet proposed NOx and CO limit 12 months after Permit to Construct is issued
All Units	• Regardless of the implementation schedule above, operators must meet proposed NOx limit if there is a combustion system modification, combustion system or burner replacement, unit relocation, or unit replacement • Regardless of the implementation schedule above, operators must meet proposed CO limit at the time of meeting proposed NOx limit

[1] Annual capacity factor threshold will be calculated per equipment category

13

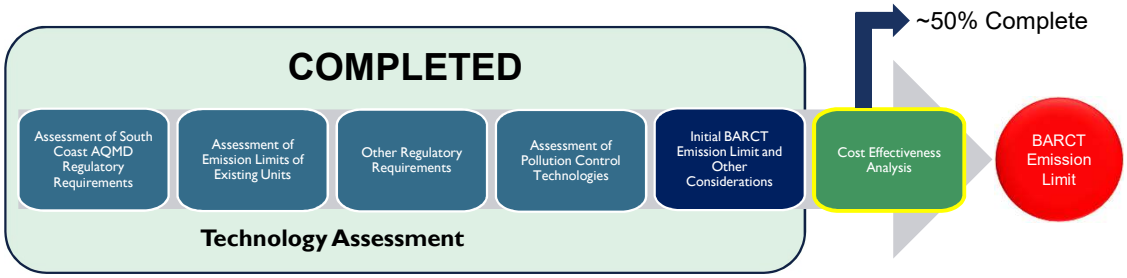
Cost-Effectiveness Analysis

STATUS OF BARCT ASSESSMENT

14

PROGRESS OF RULE 1147 BARCT ASSESSMENT

- As of Previous Working group meeting:
  - Technology Assessment has been completed for both existing Rule 1147 categories and new proposed categories
  - Cost-effectiveness analysis is in progress with six categories completed and analysis of six additional categories remaining



15

REMAINING CATEGORIES

Existing Rule 1147 Categories	Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank	Other Unit and Process Temperature	All Liquid Fuel-Fired Units
New Proposed Categories	Autoclaves	Absorption Chillers Microturbines (NG)	Microturbines (Distillate Fuel)

- Based on stakeholder feedback, new equipment categories are proposed to be included in Proposed Amended Rule 1147 that were previously categorized in existing categories
- During this working group meeting, the cost-effectiveness analysis will be presented for the following categories:
  - Absorption Chillers
  - Microturbines (Natural Gas)
  - Microturbines (Distillate Fuel)
  - Diesel Tar Pot

16

STATUS SUMMARY OF BARCT ASSESSMENT

Cost-Effectiveness Analysis

Equipment Category	Equipment Size	Operating Temperature	Current Rule Limit^	Initial BARCT Limit^	Cost-Effectiveness*	Proposed BARCT Limit
Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank	<40 MMBtu/hr	<1,200°F	30 ppm	20 ppm	**$12,700/Ton**	**20 ppm**
		≥1,200°F	60 ppm	30 ppm	**$5,600/Ton**	**30 ppm**
	≥40 MMBtu/hr	<1,200°F	30 ppm	5 ppm	**Pending**	
		≥1,200°F	60 ppm	5 ppm	**Pending**	
Afterburner, Degassing Unit, Remediation Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator	All	All	60 ppm	20 ppm	**$12,300/Ton**	**20 ppm**
Evaporator, Fryer, Heated Process Tank, and Parts Washer	All	All	60 ppm	30 ppm	**$31,300/Ton**	**60 ppm**
Burn-off Furnace, Burnout Oven, Incinerator, Crematory with or without Integrated Afterburner	All	All	60 ppm	30 ppm	**$25,800/Ton**	**30 ppm**
Tenter Frame, Fabric or Carpet Dryer	All	All	30 ppm	20 ppm	**$23,600/Ton**	**20 ppm**
Other Unit and Process Temperature	All	<1,200°F	30 ppm	No Change	**Pending**	
	All	≥1,200°F	60 ppm			

^ *NOx concentrations are corrected to 3% O_2 dry*
* *Cost-effectiveness for RECLAIM facilities to meet NOx limit by January 1, 2024*

17

STATUS SUMMARY OF BARCT ASSESSMENT (CONT'D)

Cost-Effectiveness Analysis

Equipment Category	Equipment Size	Operating Temperature	Current Rule Limit^	Initial BARCT Limit*	Cost-Effectiveness	Proposed BARCT Limit^
Absorption Chillers	All	All	30 ppm	20 ppm	**Pending**	
Micro-Turbines (Natural Gas)	All	All	N/A	9 ppm^	**Pending**	
Micro-Turbines (Distillate Fuel)	All	All	40 ppm	77 ppm^	**Pending**	
Auto-Claves	All	All	30 ppm	30 ppm	**Pending**	
All Liquid Fuel-Fired Units	All	<1,200°F	40 ppm	40 ppm	**Pending**	
	All	≥1,200°F	60 ppm	60 ppm	**Pending**	

* *NOx concentrations are corrected to 3% O_2 dry*
^ *NOx concentrations for microturbines are corrected to 15% O_2 dry*

18

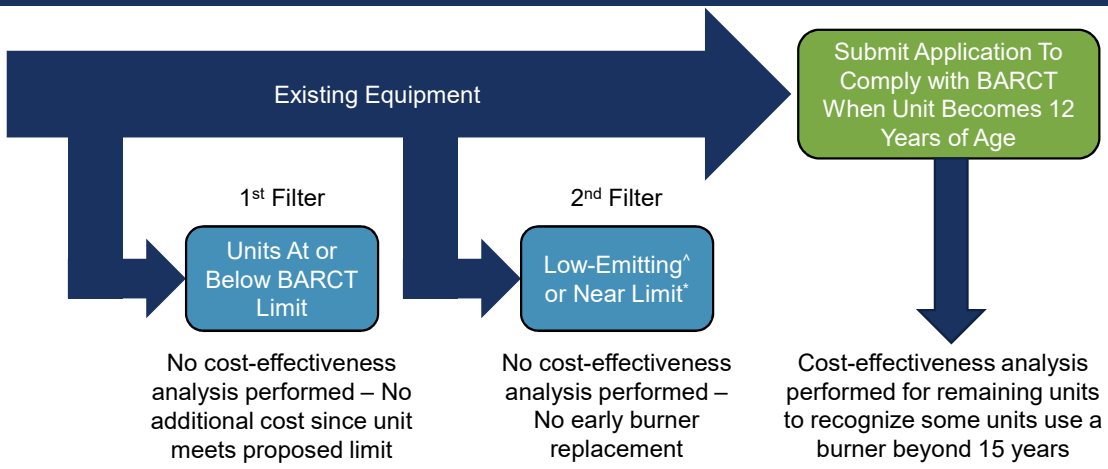
Cost-Effectiveness Analysis

COST-EFFECTIVENESS ANALYSIS

Absorption Chillers

19

COST-EFFECTIVENESS BASED ON



^ Low-emitting units are defined as equipment with NOx emissions of below 1 pound per day as determined by Rule 1147(c)(6)
* Near limit units are defined as equipment that are in compliance with existing Rule 1147 limits with annual fuel usage of <90 MMSCF

20

ABSORPTION CHILLERS - BACKGROUND

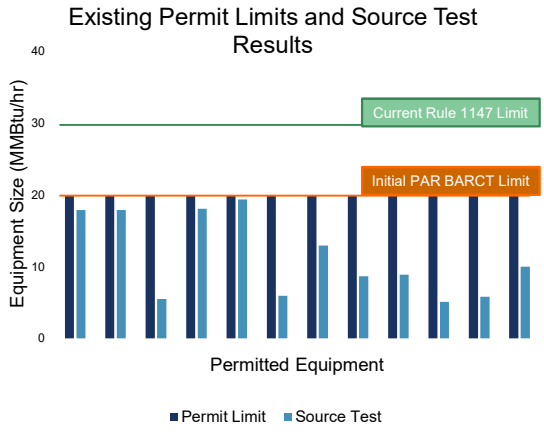
Cost-Effectiveness Analysis

- Rule 1147 currently categorizes absorption chillers under the "Other Unit and Process Temperature"
- Current Rule 1147 limit for the "other" category is 30 to 60 ppm depending on process temperature
  - Staff is proposing a separate category for absorption chillers within Rule 1147

21

INITIAL BARCT NOX LIMIT FOR ABSORPTION CHILLERS

Cost-Effectiveness Analysis

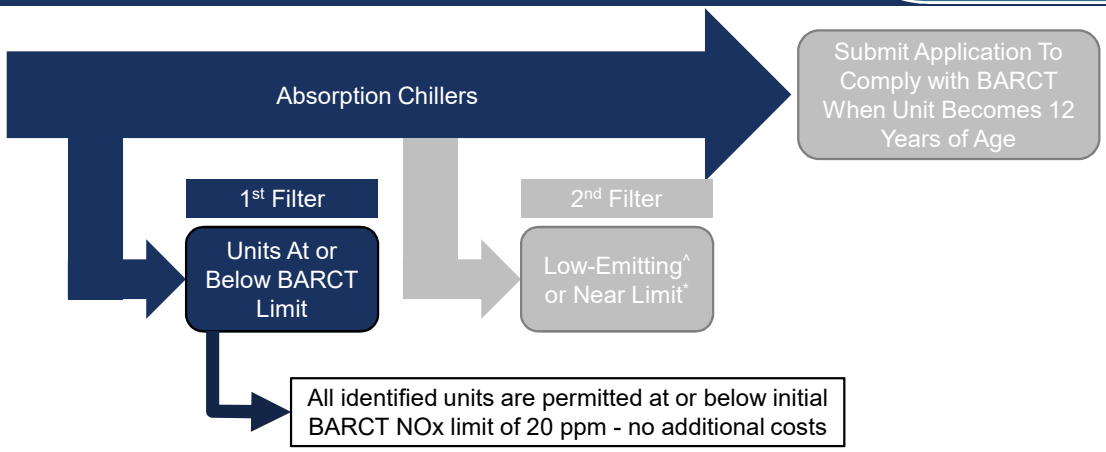


- Staff is recommending an initial BARCT NOx limit of 20 ppm
- Identified 23 units applicable to the absorption chiller category
  - Permit limits for all units are at 20 ppm NOx
  - Source test results available for 12 of the 23 units that ranged between 5 to 19 ppm

22

IMPLEMENTATION APPROACH
ABSORPTION CHILLERS

Cost-Effectiveness Analysis



^ Low-emitting units are defined as equipment with NOx emissions of below 1 pound per day as determined by Rule 1147(c)(6)
* Near limit units are defined as equipment that are in compliance with existing Rule 1147 limits

23

PROPOSED BARCT NOX LIMIT
ABSORPTION CHILLERS

Operating Temp	Existing Units+^		Rule 1147 Limit^	Existing Permit Limits	BARCT Technology Review^	Initial BARCT Analysis
	Source Test Results	Units Meeting 20 ppm Limit				
<1,200° F	5 to 20 ppm	3 of 3 RECLAIM 9 of 9 Non-RECLAIM	30 ppm	20 ppm^	20 ppm	20 ppm

Proposed NOx Limit for Absorption Chillers: 20 ppm
No additional cost since all units currently permitted at or below proposed NOx limit

+ Emissions data collected from source test results
^ NOx concentrations are corrected to 3% O_2 dry
 # Oxygen corrections for NOx concentrations vary depending on regulatory agency
[1] Sacramento Metropolitan AQMD Rule 419: http://www.airquality.org/ProgramCoordination/Documents/rule419.pdf

24

MICROTURBINES (DISTILLATE FUEL)

Cost-Effectiveness Analysis

- Microturbines <0.3 MW are not currently regulated in any South Coast AQMD Rule
- Distillate fuel microturbines are currently under the "liquid fuel" category in Rule 1147
  - Staff's proposal will create a new Rule 1147 category for liquid fuel-fired Microturbines
- Units fired on liquid fuel are subject to a NOx limit of 40 ppm @ 3% O_2
- Oxygen correction for turbine emissions is 15%

25

CATEGORY BACKGROUND
MICROTURBINES (DISTILLATE FUEL)

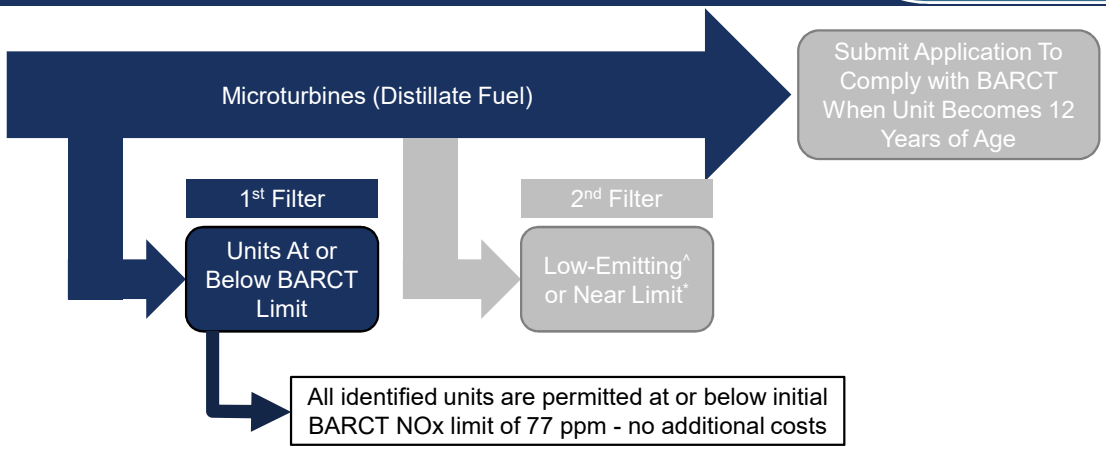
Cost-Effectiveness Analysis

- Staff is recommending an initial BARCT NOx limit of 77 ppm
- Identified three distillate fuel turbines, all located at one RECLAIM facility
  - Units are fueled with diesel fuel
- Units are rated to 6.46 MMBtu/hr and used as back-up for commercial airplane starter turbines
  - Permit limit of 77 ppm NOx @ 15% O_2
  - Source test results from three units ranged between 65 to 68 ppm

26

IMPLEMENTATION APPROACH
MICROTURBINES (DISTILLATE FUEL)

Cost-Effectiveness Analysis



^ Low-emitting units are defined as equipment with NOx emissions of below 1 pound per day as determined by Rule 1147(c)(6)
* Near limit units are defined as equipment that are in compliance with existing Rule 1147 limits

27

PROPOSED BARCT NOX LIMIT
MICRO-TURBINES (DISTILLATE FUEL)

Fuel Type	Existing Units+*		Rule 1147 Limit^	Existing Permit Limits	BARCT Technology Review^	Initial BARCT Limit^
	Source Test Results	Units Meeting 77 ppm Limit				
Distillate Fuel	65 to 68 ppm	3 of 3 RECLAIM	40 ppm	77 ppm	77 ppm	77 ppm

Proposed NOx Limit for Distillate Fuel Microturbines: 77 ppm
No additional cost since all units currently permitted at or below proposed NOx limit

+ *Emissions data collected from source test results*
^ *NOx concentrations are corrected to 15% O_2 dry*

28

MICROTURBINES (NATURAL GAS)

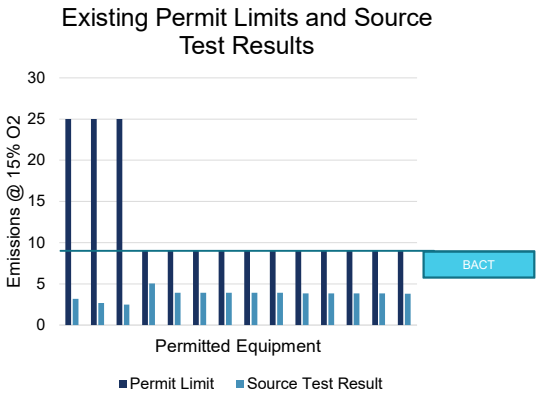
Cost-Effectiveness Analysis

- Microturbines <0.3 MW are not currently regulated in any South Coast AQMD Rule
  - Staff's proposal will create a new Rule 1147 category for natural gas fired Microturbines
- BACT for this category is 9 ppm NOx @ 15% O_2

29

CATEGORY BACKGROUND
MICROTURBINES (NATURAL GAS)

Cost-Effectiveness Analysis



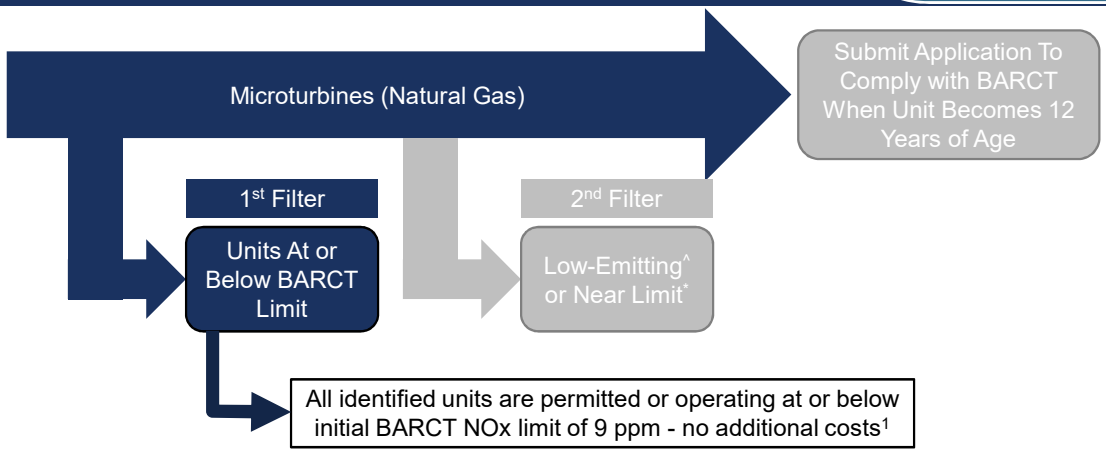
- Staff is recommending an initial BARCT NOx limit of 9 ppm
- Identified 32 natural gas microturbines
  - 29 out of 32 units are permitted to 9 ppm
    - Source tests evaluated for 14 units with results between 3 to 5 ppm corrected to 15% O_2
  - 3 out of 32 units are permitted to 25 ppm
    - All three units source test results show emissions between 2 to 4 ppm corrected to 15% O_2

[1] http://www.aqmd.gov/docs/default-source/bact/bact-guidelines/part-d---bact-guidelines-for-non-major-polluting-facilities.pdf

30

IMPLEMENTATION APPROACH
MICROTURBINES (NATURAL GAS)

Cost-Effectiveness Analysis



^ *Low-emitting units are defined as equipment with NOx emissions of below 1 pound per day as determined by Rule 1147(c)(6)*
* *Near limit units are defined as equipment that are in compliance with existing Rule 1147 limits*
[1] *Three units identified with permit limits of 25 ppm must submit permit applications to reflect BARCT limit*

31

INITIAL BARCT NOX LIMIT
MICRO-TURBINES (NATURAL GAS)

Initial BARCT Emission Limit

Fuel Type	Existing Units+		Rule 1147 Limit^	Existing Permit Limits	BARCT Technology Review^	Initial BARCT Limit*
	Source Test Results	Units Meeting 9 ppm Limit				
Natural Gas	3 to 6 ppm	6 of 6 RECLAIM 11 of 11 Non-RECLAIM	30 ppm	9 to 25 ppm	9 ppm	9 ppm

Proposed NOx Limit for Natural Gas Microturbines: 9 ppm
No additional cost[1] since all units currently permitted or operating at or below proposed NOx limit

+ *Emissions data collected from source test results*
^ *NOx concentrations are corrected to 15% O_2 dry*
[1] *Three units identified with permit limits of 25 ppm must submit permit applications to reflect BARCT limit*

32

ALL LIQUID FUEL UNITS (EXCEPT DISTILLATE FUEL MICROTURBINES)

Cost-Effectiveness Analysis

- Units fired on liquid fuel are subject to a NOx limit of 40 ppm @ 3% O2
- Liquid fuel-fired units are generally found on portable combustion sources such as pressure washers and back up fuel for industrial boilers & steam generators
  - Liquid fueled boilers and steam generators are subject to Rule 1146 series
  - Liquid fuel pressure washers up to 550,000 btu/hr are exempt per Rule 219(b)(4)
  - Rule 219 exemption for diesel fuel heaters apply to units below 250,000 btu/hr under Rule 219(b)(3)

33

FURTHER EVALUATION OF RECLAIM DIESEL TAR POT

Cost-Effectiveness Analysis

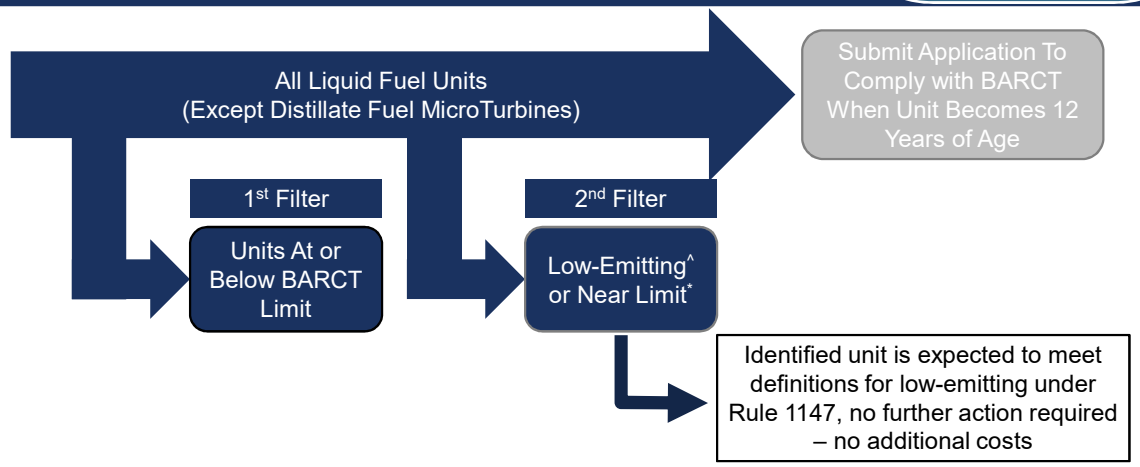
- Staff identified one diesel fueled tar pot in RECLAIM that would be subject to this category
  - Same unit operates under a non-RECLAIM various locations permit when operated at non-RECLAIM facilities owned by the same operator
  - No other liquid fuel-fired equipment subject to Rule 1147 in non-RECLAIM
- Identified unit is used to patch asphalt at a RECLAIM facility
- Unit is equipped with a diesel internal combustion engine rated <50 hp and a diesel fuel-fired thermal fluid heater rated at 420,000 btu/hr
  - Unit was never source tested
- Equipment usage logs show daily emissions of <1 lb/day
  - Operation logs are required to be kept under RECLAIM reporting

34

IMPLEMENTATION APPROACH

ALL LIQUID FUEL UNITS
(EXCEPT DISTILLATE FUEL MICROTURBINES)

Cost-Effectiveness Analysis



^ Low-emitting units are defined as equipment with NOx emissions of below 1 pound per day as determined by Rule 1147(c)(6)
* Near limit units are defined as equipment that are in compliance with existing Rule 1147 limits

35

UPDATED STATUS SUMMARY OF BARCT ASSESSMENT

Cost-Effectiveness Analysis

Equipment Category	Equipment Size	Operating Temperature	Current Rule Limit^	Initial BARCT Limit^	Cost-Effectiveness	Proposed BARCT Limit
Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank	<40 MMBtu/hr	<1,200°F	30 ppm	20 ppm	**$12,700/Ton**	**20 ppm**
		≥1,200°F	60 ppm	30 ppm	**$5,600/Ton**	**30 ppm**
	≥40 MMBtu/hr	<1,200°F	30 ppm	5 ppm	**Pending**	
		≥1,200°F	60 ppm	5 ppm	**Pending**	
Afterburner, Degassing Unit, Remediation Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator	All	All	60 ppm	20 ppm	**$12,300/Ton**	**20 ppm**
Evaporator, Fryer, Heated Process Tank, and Parts Washer	All	All	60 ppm	30 ppm	**$31,300/Ton**	**60 ppm**
Burn-off Furnace, Burnout Oven, Incinerator, Crematory with or without Integrated Afterburner	All	All	60 ppm	30 ppm	**$25,800/Ton**	**30 ppm**
Tenter Frame, Fabric or Carpet Dryer	All	All	30 ppm	20 ppm	**$23,600/Ton**	**20 ppm**
Other Unit and Process Temperature	All	<1,200°F	30 ppm	No Change	**Pending**	
	All	≥1,200°F	60 ppm			

^ *NOx concentrations are corrected to 3% O_2 dry*

36

UPDATED STATUS SUMMARY OF BARCT ASSESSMENT (CONT'D)

Cost-Effectiveness Analysis

Equipment Category	Equipment Size	Operating Temperature	Current Rule Limit^	Initial BARCT Limit^	Cost-Effectiveness	Proposed BARCT Limit^
Absorption Chillers	All	All	30 ppm	20 ppm	**No Additional Costs**	**20 ppm**
Micro-Turbines (Natural Gas)	All	All	N/A	9 ppm*	**No Additional Costs**	**9 ppm**
Micro-Turbines (Distillate Fuel)	All	All	40 ppm	40 to 77 ppm*	**No Additional Costs**	**77 ppm**
Auto-Claves	All	All	30 ppm	30 ppm	**Pending**	
All Liquid Fuel-Fired Units	All	<1,200°F	40 ppm	40 ppm	**No Additional Costs**	**40 ppm**
	All	≥1,200°F	60 ppm	60 ppm	**No Additional Costs**	**60 ppm**

No additional liquid fuel equipment identified other than diesel tar pot and diesel microturbines <0.3 MW
Staff propose to maintain existing limits for "All Liquid Fuel-Fired Units"

^ *NOx concentrations are corrected to 3% O_2 dry*

37

NEXT STEPS

- Conduct cost-effectiveness analysis for remaining categories
- Continue to hold stakeholder meetings
- Next Working Group Meeting – April 2021

38

CONTACTS

<table>
<tr><th>General RECLAIM Questions</th><th>Proposed Amended Rules 1147 and 1100</th><th>Proposed Rule 1147.1</th><th>Proposed Amended Rules 1147, 1100 and Proposed Rule 1147.2</th></tr>
<tr><td rowspan="2">Gary Quinn, P.E.
Program Supervisor
909-396-3121
<u>gquinn@aqmd.gov</u></td><td rowspan="2">Shawn Wang
Air Quality Specialist
909-396-3319
<u>swang@aqmd.gov</u></td><td>Shawn Wang
Air Quality Specialist
909-396-3319
<u>swang@aqmd.gov</u></td><td rowspan="2">James McCreary
Assistant Air Quality Specialist
909-396-2451
<u>jmccreary@aqmd.gov</u></td></tr>
<tr><td>Yanrong Zhu
Air Quality Specialist
909-396-3289
<u>yzhu1@aqmd.gov</u></td></tr>
<tr><td></td><td colspan="2">Gary Quinn, P.E.
Program Supervisor
909-396-3121
<u>gquinn@aqmd.gov</u></td><td>Rodolfo Chacon
Program Supervisor
(W.O.C)
909-396-2726
<u>rchacon@aqmd.gov</u></td></tr>
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39