PROPOSED AMENDED RULES 1147, 1100, & PROPOSED RULE 1147.1 WORKING GROUP MEETING #2

APRIL 17, 2019 SCAQMD

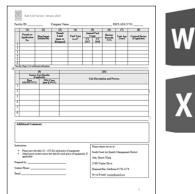
DIAMOND BAR, CA

AGENDA

- ➤ Update on Rule 1147 Survey
- ➤ Summary of Working Group #1
- ➤ Overview of Rule 1147 Series
- ➤ Preliminary BARCT Analysis
 - □ Assessment of SCAQMD Regulatory Requirements
 - ☐ Assessment of Emission Limits of Existing Units
- > Additional Considerations
- ➤ Next Steps

UPDATE ON FACILITY SURVEY

- □Physical surveys were mailed out on 03/22/2019
- □Objective: To identify permit limits and annual usage for existing equipment located in SCAQMD
- □Completed survey requested by April 26, 2019





SUMMARY OF PREVIOUS WORKING GROUP

- ☐ Background on RECLAIM transition
- □ Overview of BARCT assessment
 - > Technology Assessment
 - > Cost Effectiveness
- ☐ Initial concepts of PAR 1147, PR 1147.1 and PR 1100
- ☐ Initial evaluation of affected universe
- ☐ Rule 1147 Survey to collect additional information to quantify impacted equipment

OVERVIEW OF RULE 1147 SERIES

Proposed Amended Rule 1147

- NOx reductions from miscellaneous sources
- Approximately 2701 facilities

Proposed Rule 1147.1

- NOx reductions from large miscellaneous combustion
- To be determined

Proposed Rule 1147.2

- NOx reductions from metal melting and heat treating furnaces
- Approximately 243 facilities

Proposed Rule 1147.3

- NOx reductions for equipment at asphalt and aggregate facilities
- Approximately 8 facilities

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BARCT ANALYSIS** OVERVIEW

*BARCT analysis is conducted for each equipment category and fuel type

[†]This analysis does not include equipment from PR 1147.2 and 1147.3 universe

Assessment of SCAQMD Regulatory Requirements

Assessment of Emission Limits of Existing Units Other Regulatory Requirements Assessment of Pollution Control Technologies Initial BARCT Emission Limit and Other Considerations

Cost Effectiveness Analysis BARCT Emission Limit

Technology Assessment

CURRENT RULE 1147 LIMITS (3% O_2 , DRY)

Assessment of SCAQMD Regulatory Requirements

	Pro	cess Tempe	rature
Gaseous Fuel-Fired Equipment	≤ 800° F	> 800 ° F < 1200° F	≥ 1200 ° F
Asphalt Manufacturing Operation	40 ppm		
Afterburner, Degassing Unit, Remediation Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator	60 ppm		
Burn-off Furnace, Burnout Oven, Incinerator or Crematory with or without Integrated Afterburner	60 ppm		
Evaporator, Fryer, Heated Process Tank, or Parts Washer	60	ppm	
Metal Heat Treating, Metal Melting Furnace, Metal Pot, or Tar Pot		60 ppm	
Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank	30	ppm	60 ppm
Make-Up Air Heater or other Air Heater located outside of building with temperature controlled zone inside building	30	ppm	
Tenter Frame or Fabric or Carpet Dryer	30 ppm		
Other Unit or Process Temperature	30	ppm	60 ppm
Liquid Fuel-Fired Equipment			
All liquid fuel-fired Units	40	opm	60 ppm

2015 RECLAIM BARCT FOR MISC. COMBUSTION EQUIPMENT (FOR REFERENCE ONLY)

Assessment of SCAQMD Regulatory Requirements

Equipment Type	BARCT Emission Factor		Comma	trol Limit	
			≤ 800° F	> 800 ° F < 1200° F	≥ 1200 ° F
Asphalt Heater, Concrete	0.036 lb/mmbtu	30 ppm	40 ppm		
Delacquering Furnace	0.036 lb/mmbtu	30 ppm	60 ppm		
Iron/Steel Foundry	0.055 lb/mmbtu	45 ppm	60 ppm		
Metal Heat Treating Furnace	0.055 lb/mmbtu	45 ppm	60 ppm		
Metal Forging Furnace (Preheated Combustion Air)	0.055 lb/mmbtu	45 ppm	60 ppm		
Metal Melting Furnaces	0.055 lb/mmbtu	45 ppm		60 ppm	
Other Heater (24F-1)	0.036 lb/mmbtu	30 ppm	30	opm	60 ppm
Ovens, Kilns, Calciners, Dryers, Furnaces	0.036 lb/mmbtu	30 ppm	30	opm	60 ppm
Steel Hot Plate Furnace	0.055 lb/mmbtu	45 ppm	30	opm	60 ppm
Sec. Aluminum	0.055 lb/mmbtu	45 ppm		60 ppm	8
Sec. Lead	0.055 lb/mmbtu	45 ppm		60 ppm	

RULE 1147 COMPLIANCE SCHEDULE (UNITS ≥325,000 BTU/HR)

Assessment of SCAQMD Regulatory Requirements

Equipment Category	Emissions Greater Than One Pound Per Day	Emissions Less Than One Pound Per Day
New Units		
Any unit installed after January 1, 2010	Demonstrate compliance with Rule 1147 at th	e time of permitting
Existing Units		
Any unit in-use (operating) before January 1, 2010	Demonstrate compliance with rule NOx limits when unit or combustion system is modified or replaced; OR unit becomes 15 years old	Demonstrate compliance with NOx limits when unit or combustion system is modified, replaced, or relocated*; OR unit becomes 35 years old*
Specific Existing Units		
Heated process tanks, parts washers, and evaporators in-use (operating) before January 1, 2010 Heated process tanks, parts washers, and evaporators installed and operating with an SCAQMD permit before January 1, 2014 Remediation units installed between December 5,2008 and March 1, 2012	Demonstrate compliance with rule NOx limits when unit or combustion system is or replaced *Relocation exemption available for existing less than 1 pound/day units when owner relocates entire facility *Facilities may choose to conduct biennial emissions test in lieu of meeting rule requirements	

RULE 1147 DETERMINATIONS FOR NOX EMISSIONS OF LESS THAN 1 POUND PER DAY

Assessment of SCAQMD Regulatory Requirements

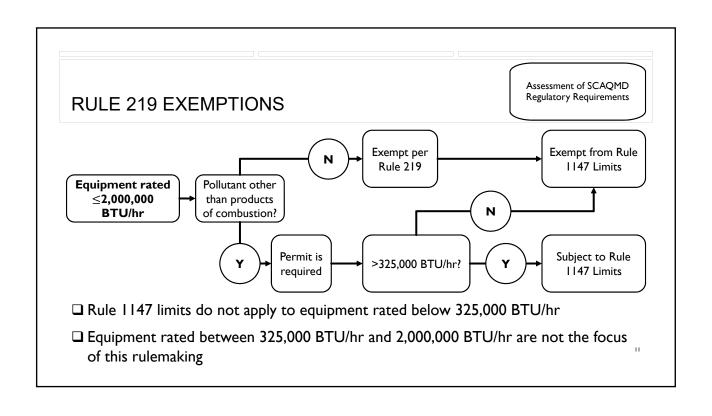
Facilities may demonstrate NOx emissions of < 1 LB/Day by complying with one of the following:

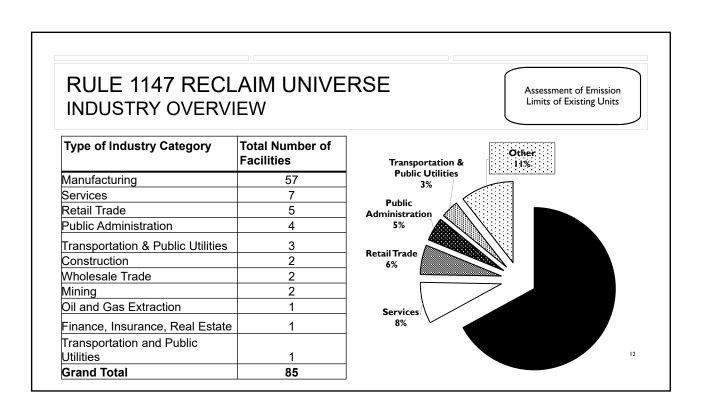
- Unit heat input rating of <325,000 BTU/hr
- 2. Unit with permit condition limiting NOx emissions of < 1 LB/Day
- Recordkeeping* of monthly average emissions of < 1 LB/Day*
- 4. Recordkeeping* of total monthly emissions of < 22 LBs/Month*

* Demonstration of recordkeeping requirements must be based off of a unit-specific non-resettable time meter or fuel meter

- 5. Recordkeeping* of natural gas usage of <7,692 cubic feet per day*
- 6. Daily recordkeeping* of unit operation and the following specified rated heat input capacities operating less than or equal to the specified number of hours per day in the following table:

Unit Rating (BTU/hr)	Daily Hour Limit	Monthly Hour Limit
325,000 to 400,000	16	352
400,001 to 500,000	14	308
500,001 to 800,000	8	176
800,001 to 1,000,000	6	132
1,000,001 to 1,200,000	5	110





RULE 1147 RECLAIM UNIVERSE EQUIPMENT OVERVIEW

Assessment of Emission Limits of Existing Units

Type of Equipment	Total Number
Oven/Dryer/Heater/Furnace/Kiln/Heated Process Tanks	219
Afterburner/Thermal Oxidizer/Oxidizer/Regenerative Thermal Oxidizer	80
Autoclave	16
Fryer	13
Crematory	5
Burn-off Oven/ Incinerator	8
Chiller	3
Turbine (Diesel)	3
Spray Coating Operation ¹	3
Kettle/Tar Pot	2
Singeing Machine	2
Grand Total	355

¹ Some heated spray booths are permitted under heater

RULE 1147 RECLAIM UNIVERSE EMISSION LIMIT ASSESSMENT OF EXISTING UNITS

Assessment of Emission Limits of Existing Units

- □Staff conducted analysis of each Rule 1147 category for applicable RECLAIM equipment
- □Information analyzed for each equipment category:
 - > Total number of impacted units
 - > Units with Emission limit greater than that of Rule 1147 limits
 - ➤ Units with Emission limit less than or equal to Rule 1147 limits

Emission Limit Assessment:

Ovens, Dryers, Heaters, Furnaces, Kilns, and Heated Process Tanks

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RULE 1147 RECLAIM UNIVERSE

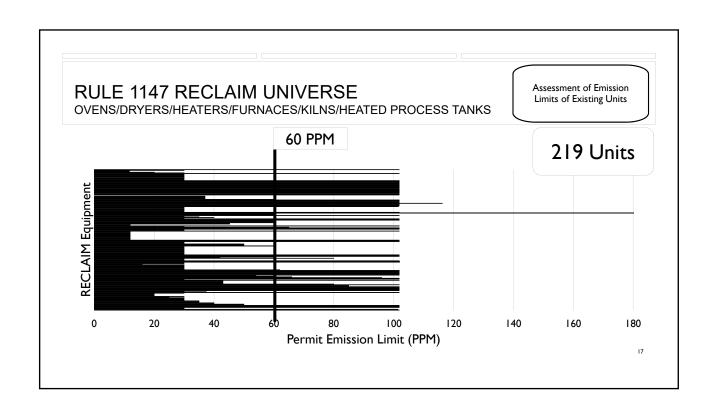
OVENS/DRYERS/HEATERS/FURNACES/KILNS/HEATED PROCESS TANKS

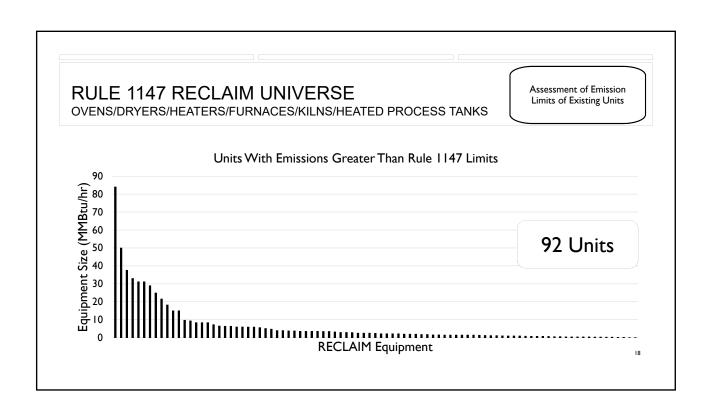
Assessment of Emission Limits of Existing Units

- $\hfill \square$ Total of 219 ovens, dryers, heaters, furnaces kilns and heated process tanks
- ☐ Equipment in this category is used in a large variety of processes and industries
- □ Current Rule 1147 Limit:

	Process Temperatu	ıre
≤ 800° F	> 800 ° F < 1200° F	≥ 1200 ° F
30	ppm	60 ppm

- □ 92 out of 219 impacted units permitted with emission limits above 60 ppm
- □ 127 out of 219 impacted units permitted with emission limits below or equal to 60 ppm
- ☐ Those complying with limits 30 ppm or lower are likely due to BACT





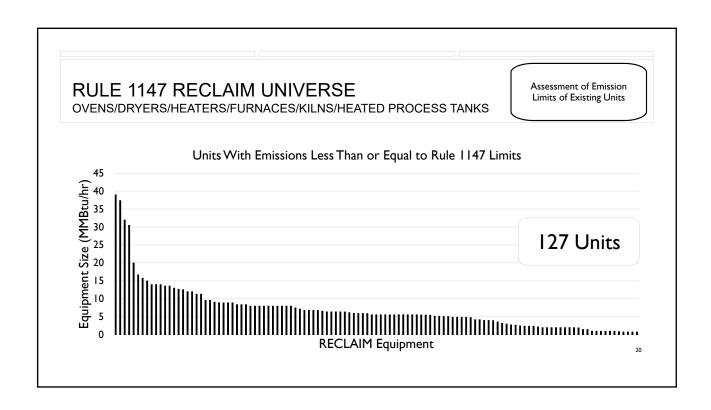
RULE 1147 RECLAIM UNIVERSE

OVENS/DRYERS/HEATERS/FURNACES/KILNS/HEATED PROCESS TANKS

Assessment of Emission Limits of Existing Units

□Of the 92 units that are > 60 ppm:

- > Equipment sizes ranged from 0.08 to 84 MMBtu/hr
- > 12 units were rated greater than or equal to 10 MMBtu/hr
- > 15 units were rated between 10 MMBtu/hr and 5 MMBtu/hr
- > 65 units were rated below 5 MMBtu/hr
- □Further investigation will be conducted for two units that are >130 lbs/mmscf (~102 ppm)



RULE 1147 RECLAIM UNIVERSE

OVENS/DRYERS/HEATERS/FURNACES/KILNS/HEATED PROCESS TANKS

Assessment of Emission Limits of Existing Units

□Of the 127 units that are ≤ 60 ppm:

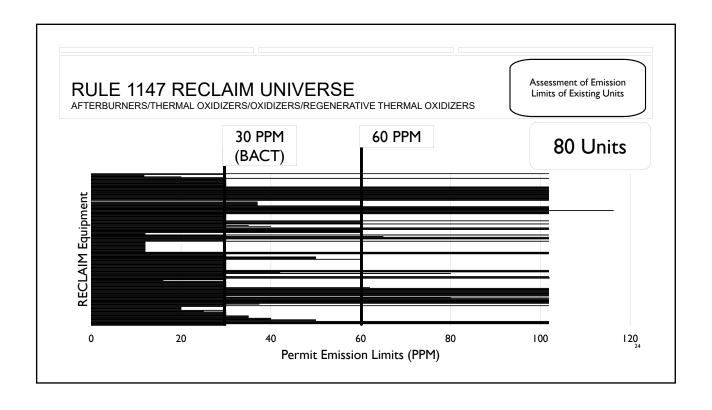
- > Equipment sizes ranged from 0.8 to 39 MMBtu/hr
- > 22 units were rated greater than or equal to 10 MMBtu/hr
- > 61 units were rated between 10 MMBtu/hr and 5 MMBtu/hr
- > 44 units were rated below 5 MMBtu/hr

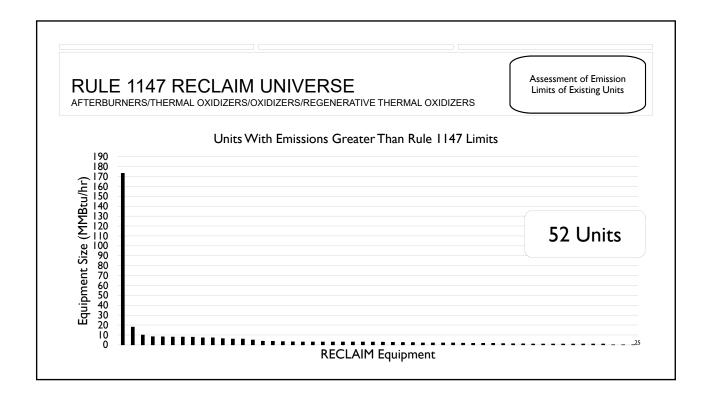
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Emission Limit Assessment:

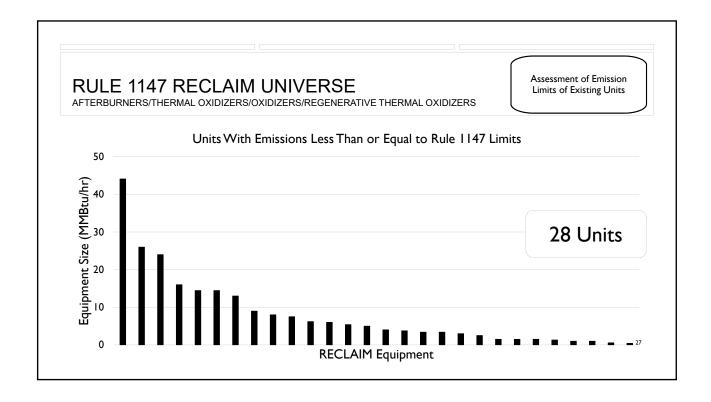
Afterburners, Thermal Oxidizers, Oxidizers, Regenerative Thermal Oxidizers

Assessment of Emission **RULE 1147 RECLAIM UNIVERSE** Limits of Existing Units AFTERBURNERS/THERMAL OXIDIZERS/OXIDIZERS/REGENERATIVE THERMAL OXIDIZERS □ 80 afterburners, thermal oxidizers, oxidizers, regenerative thermal oxidizers □ Equipment in this category are used as pollution control equipment for pollutants such as VOC □ Current Rule 1147 Limit: **Process Temperature** > 800 ° F ≤ 800° F ≥ 1200 ° F < 1200° F 60 ppm □ 52 out of 80 units have emission limits above 60 ppm □ 28 out of 80 units have emission limits below or equal to 60 ppm





RULE 1147 RECLAIM UNIVERSE AFTERBURNERS/THERMAL OXIDIZERS/OXIDIZERS/REGENERATIVE THERMAL OXIDIZERS Dof the 52 units > 60 ppm: Equipment sizes ranged from 0.17 to 173 MMBtu/hr 3 units were rated greater than or equal to 10 MMBtu/hr 11 units were rated between 10 MMBtu/hr and 5 MMBtu/hr 38 units were rated below 5 MMBtu/hr Some thermal oxidizers identified meet the definition of Flares in Rule 1118.1



RULE 1147 RECLAIM UNIVERSE

AFTERBURNERS/THERMAL OXIDIZERS/OXIDIZERS/REGENERATIVE THERMAL OXIDIZERS

Assessment of Emission Limits of Existing Units

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- > Equipment sizes ranged from 0.43 to 44.1 MMBtu/hr
- > 7 units were rated greater than or equal to 10 MMBtu/hr
- > 7 units were rated between 10 MMBtu/hr and 5 MMBtu/hr
- > 14 units were rated below 5 MMBtu/hr
- □Current BACT* for afterburners, thermal oxidizers, and catalytic oxidizer is 30 ppm @ 3% O2 (burner emissions only)

*From 02/01/2019 revision of South Coast AQMD BACT Guidelines

Emission Li	mit Assessn	nent:	
	111117 10000011	ICITC.	
Autoclaves		<u> </u>	
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		<u>10111.</u>	

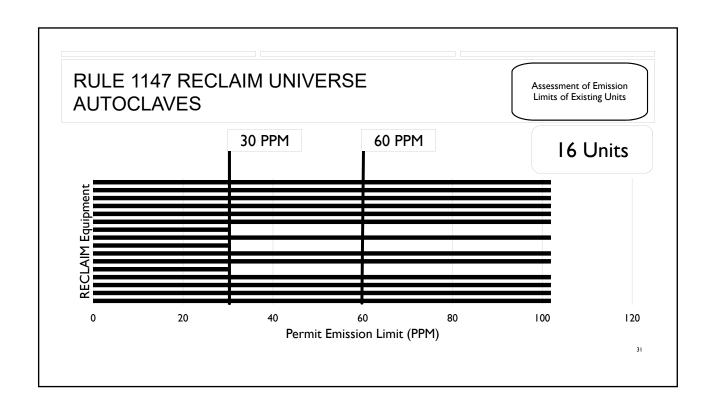
RULE 1147 RECLAIM UNIVERSE AUTOCLAVES

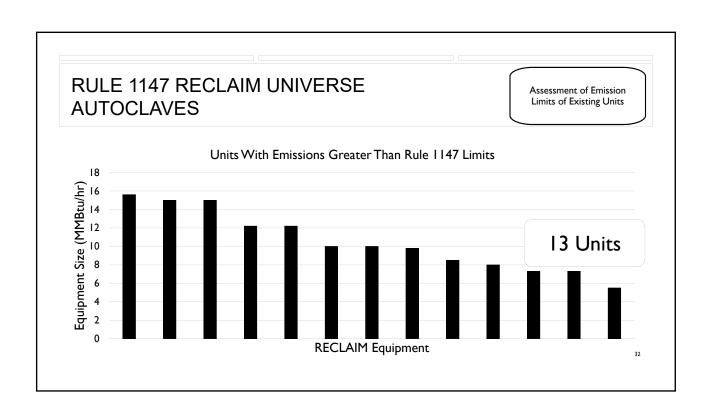
Assessment of Emission Limits of Existing Units

- 16 autoclaves
- ☐ Equipment in this category are used primarily in the aerospace applications

	Process Temperatu	ıre
≤ 800° F	> 800 ° F < 1200° F	≥ 1200 ° F
30) ppm	60 ppm

- □ 13 out of 16 impacted units permitted with emission limits above 60 ppm
- □ 3 out of 16 impacted units permitted with emission limits below or equal to 60 ppm

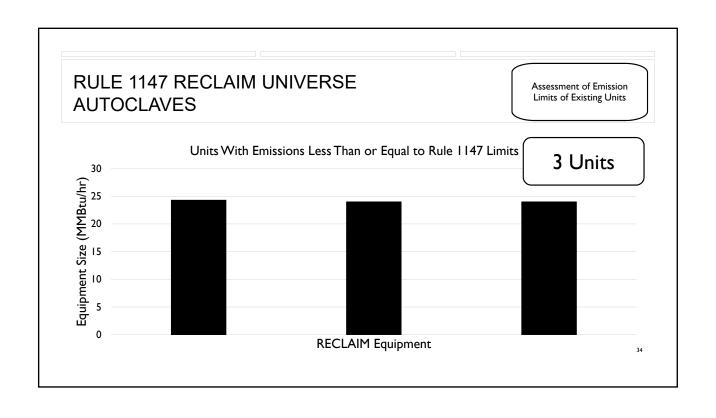




RULE 1147 RECLAIM UNIVERSE AUTOCLAVES

Assessment of Emission Limits of Existing Units

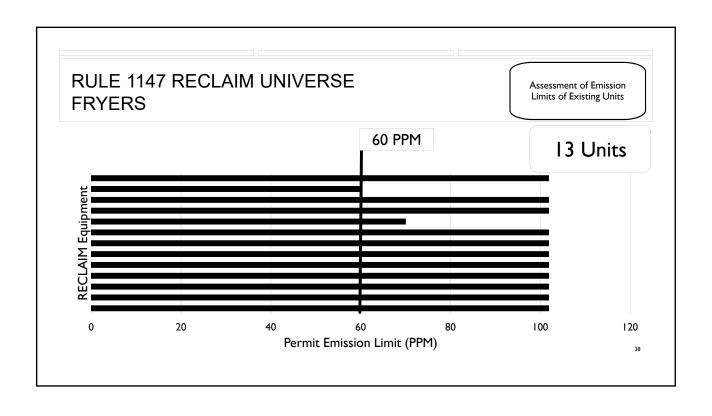
- □Of the 13 units > 60 ppm:
 - > Equipment sizes ranged from 5.5 to 15.6 MMBtu/hr
 - > 7 units were rated greater than or equal to 10 MMBtu/hr
 - > 6 units were rated between 10 MMBtu/hr and 5 MMBtu/hr
- □Low size variation among impacted equipment
- □Equipment located across 4 facilities

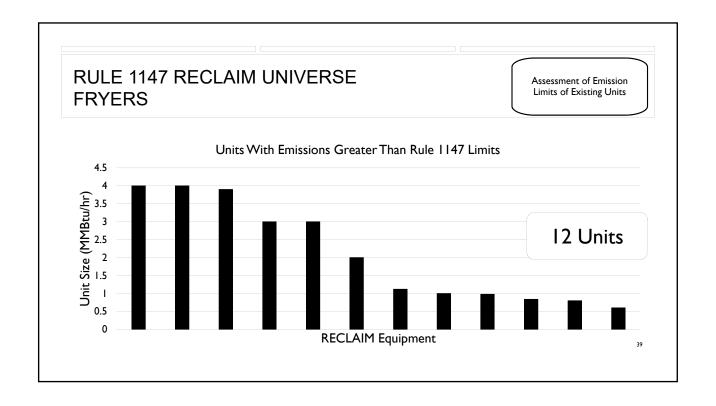


RULE 1147 RECLAIM UNIVERSE AUTOCLAVES Assessment of Emission Limits of Existing Units Demonstrates that 30 ppm: Demonstrates that 30 ppm emission limits for autoclaves are achievable

Emission Limit Assessment: Fryers

RULE 1147 RECLAIM UNIVERSE FRYERS □ 13 fryers □ Equipment in this category are used primarily in food preparation □ Current Rule 1147 Limit: □ Process Temperature □ > 800 ° F □ > 800 ° F □ 12000 ° F □ 12 out of 13 impacted units permitted with emission limits above 60 ppm □ 1 out of 13 impacted units permitted with emission limits below or equal to 60 ppm





RULE 1147 RECLAIM UNIVERSE FRYERS

Assessment of Emission Limits of Existing Units

□Of the 13 units > 60 ppm:

- ➤ 12 units have emission limits greater than Rule 1147 limits
 - Equipment sizes ranged from 0.6 to 4.0 MMBtu/hr
 - 9 out of 13 pieces of equipment located at one facility
- ➤ One unit with emission limit less than or equal to 60 ppm is rated to 0.98 MMBtu/hr

Emission L	imit Accoca	emont:	
	IIIII Assess	omem.	
Crematory			
			41

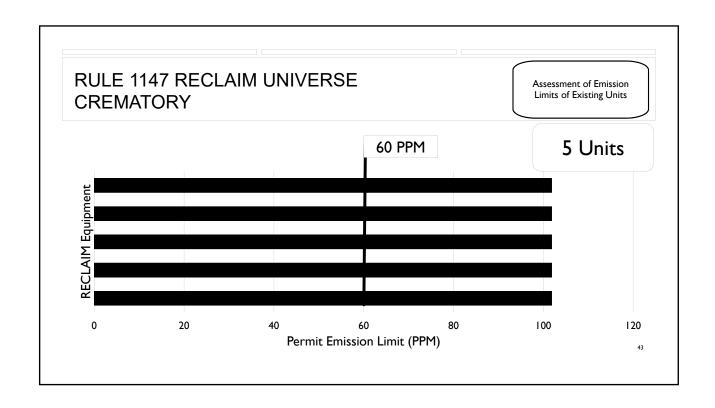
RULE 1147 RECLAIM UNIVERSE CREMATORY

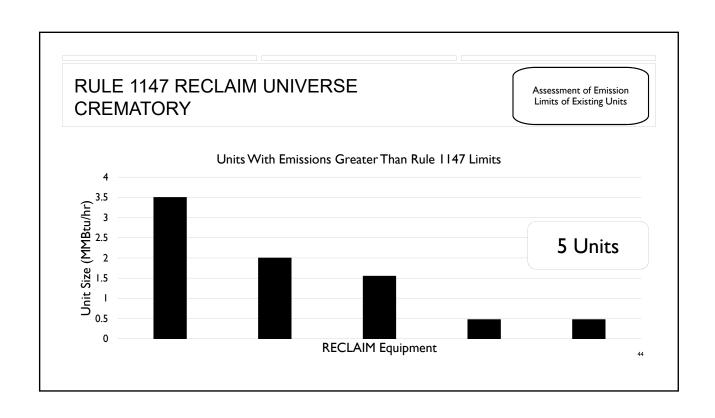
Assessment of Emission Limits of Existing Units

- □ 5 crematory units
- □ Equipment in this category are used to burn away various organic materials at high temperatures
- □ Current Rule 1147 Limit:

	Process Temperatu	ıre
≤ 800° F	> 800 ° F < 1200° F	≥ 1200 ° F
	60 ppm	

 $\ \square$ All 5 impacted units were permitted with emission limits above 60 ppm





RULE 1147 RECLAIM UNIVERSE CREMATORY Assessment of Emission Limits of Existing Units Assessment of Emission Limits of Emission L

Emission Limit Assessment:

Burn-Off Ovens and Incinerators

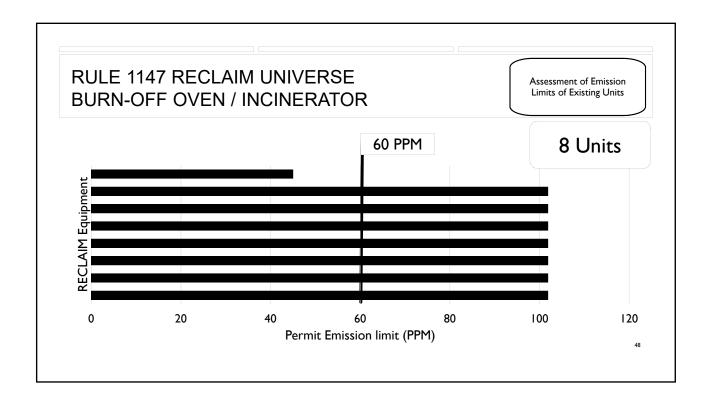
RULE 1147 RECLAIM UNIVERSE BURN-OFF OVEN / INCINERATOR

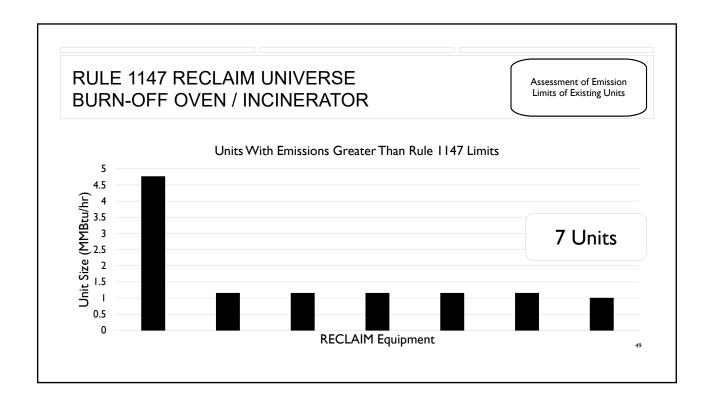
Assessment of Emission Limits of Existing Units

- 8 burn-off oven/incinerator units
- ☐ Equipment in this category are used to burn away various in-organic materials at high temperatures
- □ Current Rule 1147 Limit:

Process Temperature			
≤ 800° F	> 800 ° F < 1200° F	≥ 1200 ° F	
	60 ppm		

- ☐ 7 out of 8 impacted units permitted with emission limits above 60 ppm
- □ 1 out of 7 impacted units permitted with emission limits below or equal to 60 ppm





RULE 1147 RECLAIM UNIVERSE BURN-OFF OVEN / INCINERATOR

Assessment of Emission Limits of Existing Units

- □Of the 7 units > 60 ppm:
 - Equipment sizes ranged from 1.00 to 4.76 MMBtu/hr
- ➤One unit ≤ 60 ppm
 - Unit is rated at 14 MMBtu/hr

<u>Emission</u>	Limit As	<u>sessment</u>	<u>.</u>	
Adsorption	Chillers			

RULE 1147 RECLAIM UNIVERSE ADSORPTION CHILLERS

Assessment of Emission Limits of Existing Units

- □ 3 adsorption chillers
- □ Adsorption Chillers are exempt from the "Boiler or Steam Generator" definition of Rule 1146(b) which puts them into Rule 1147
- □ Adsorption Chillers are considered as "Other Unit or Process Temperature" in Rule 1147 with the following current rule limit:

Process Temperature		
≤ 800° F	> 800 ° F < 1200° F	≥ 1200 ° F
30 ppm		60 ppm

□ All 3 impacted units were permitted with emission limits of 20 ppm (below 30 ppm limit of Rule 1147)

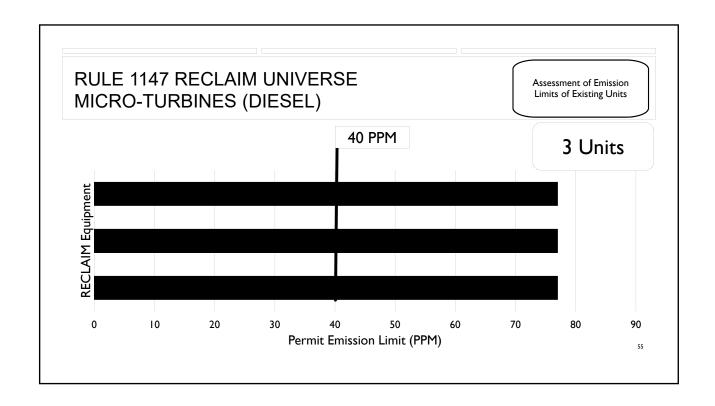
Emission Limit Assessment: Micro-Turbines (Diesel)	
	53

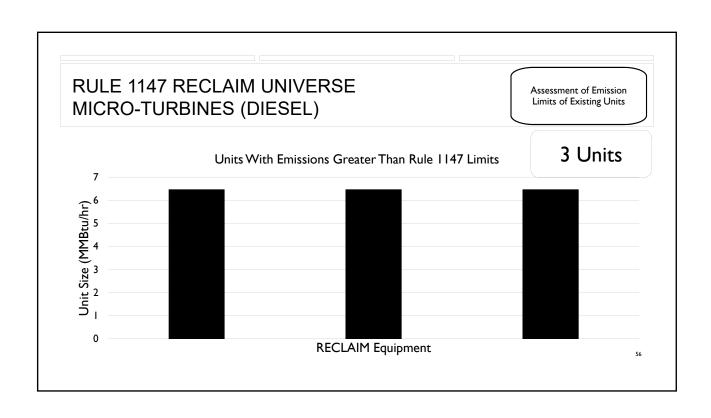
RULE 1147 RECLAIM UNIVERSE MICRO-TURBINES (DIESEL)

Assessment of Emission Limits of Existing Units

- □ 3 diesel fired micro-turbines
- □ Turbines that are less than 0.3 megawatt (MW) are exempt from the applicability of Rule 1134 and diesel fueled micro-turbines do not qualify for the exemption under Rule 219(b)(1) which puts them into Rule 1147 applicability
 - > Staff is contemplating removing exemption for turbines in Rule 1147 applicability

 $\hfill \square$ All 3 impacted units were permitted with emission limits of 77 ppm

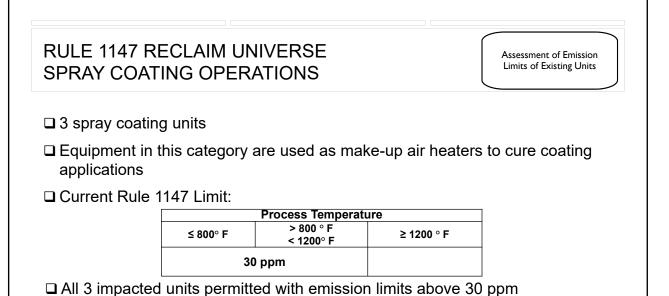


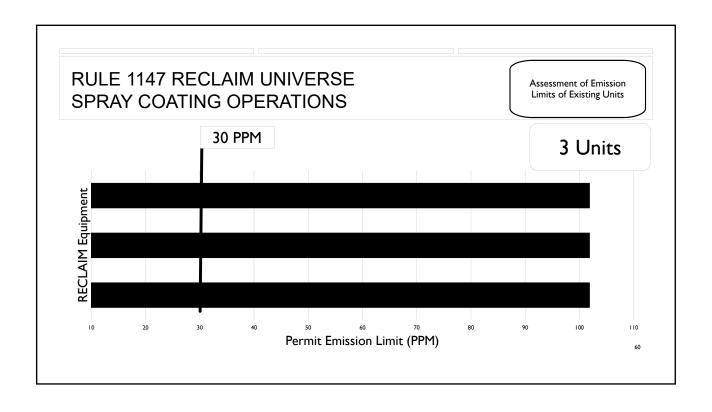


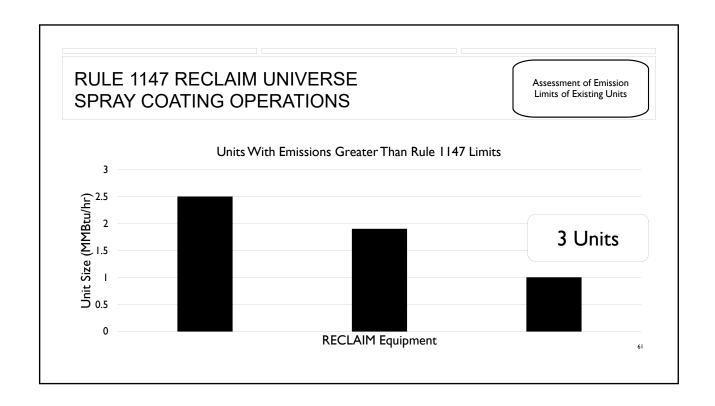
RULE 1147 RECLAIM UNIVERSE MICRO-TURBINES (DIESEL)	Assessment of Emission Limits of Existing Units
□All three micro-turbines are located at t	he same facility
□Units are currently permitted to meet 7 limited to less than 300 hours of operate	• •
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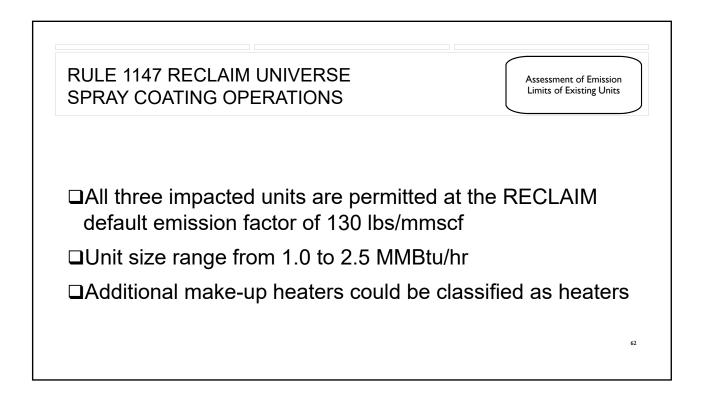
Emission Limit Assessment:

Spray Coating Operations









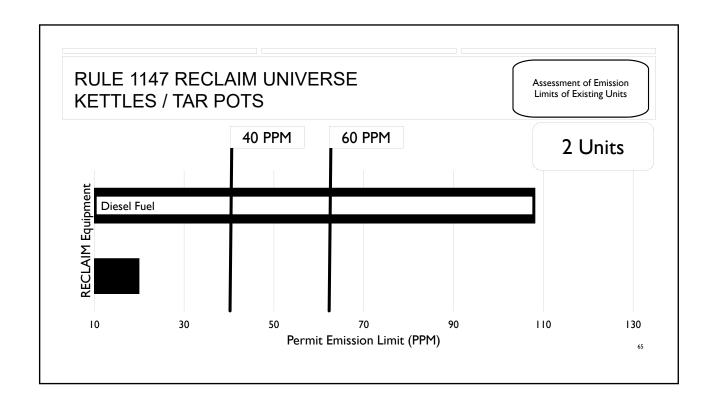
Emission	Limit A	<u>ssessmen</u>	<u>)t:</u>	
Kettles and	l Tar Po	ots		

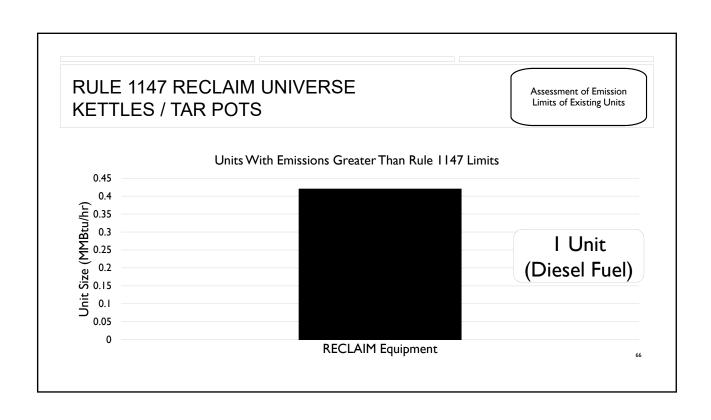
RULE 1147 RECLAIM UNIVERSE KETTLES / TAR POTS

Assessment of Emission Limits of Existing Units

- 2 kettle and tar pots
 - ☐ One natural gas fired Kettle
 - One diesel fuel fired Tar Pot
- □ Kettles are classified as "Other Unit or Process Temperature" and diesel fueled tar pots are classified under "Liquid Fuel-Fired Units" in Rule 1147 with the following current rule limit:

	Process Temperature		
Equipment Categories	≤ 800° F	> 800 ° F < 1200° F	≥ 1200 ° F
Other Unit or Process Temperature	30 ppm 60		60 ppm
All Liquid Fuel-Fired Units	40 ppm		64





RULE 1147 RECLAIM UNIVERSE KETTLES / TAR POTS Assessment of Emission Limits of Existing Units Property of Existing Units Assessment of Emission Limits of Existing Units Assessment of Emission Limits of Existing Units Property of Existing Units Assessment of Emission Limits of Emission Limits

Emission Limit Assessment:

Singeing Machines

RULE 1147 RECLAIM UNIVERSE SINGEING MACHINES

Assessment of Emission Limits of Existing Units

- □ 2 singeing machines
- ☐ Impacted equipment are used to burn off projecting fibers (such as hairs and textile)
- □ Singeing machines are considered as "Other Unit or Process Temperature" in Rule 1147 with the following current rule limit:

Process Temperature		
≤ 800° F	> 800 ° F < 1200° F	≥ 1200 ° F
30 ppm		60 ppm

- ☐ Both units are permitted at RECLAIM default emission factor of 130 lbs/mmscf
- ☐ Both units are located at the same facility

RULE 1147 RECLAIM UNIVERSE SINGEING MACHINES

30 PPM

60 PPM

2 Units

Permit Emission Limit (PPM)

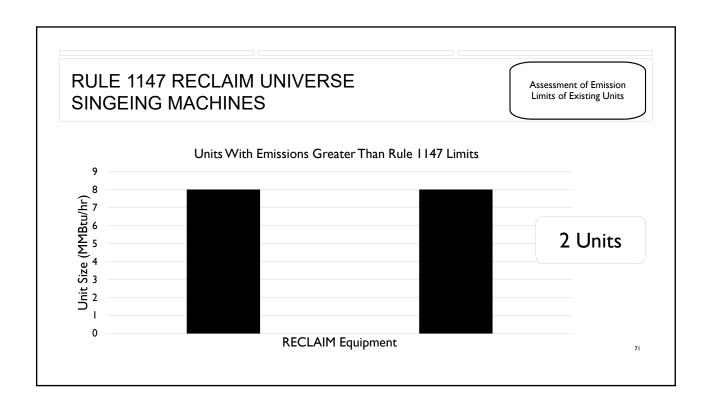
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AFTERBURNER/THERMAL Additional Considerations OXIDIZER/OXIDIZER/REGENERATIVE THERMAL OXIDIZER **Process Temperature Gaseous Fuel-Fired Equipment** > 800 ° F ≤ 800° F ≥ 1200 ° F < 1200° F Afterburner, Degassing Unit, Remediation Unit, Thermal Oxidizer, 60 ppm Catalytic Oxidizer or Vapor Incinerator □ Current Rule 1147 limits all afterburner, degassing unit, remediation unit, thermal oxidizer, catalytic oxidizer or vapor incinerator to 60 ppm NOx for all process temperatures As recommended from third party review of the February 2017 Final Technology Assessment for Rule 1147 Small and Low Emissions Sources Also noted that preferred burner type of afterburner applications cannot easily meet 30 ppm NOx in process less that 800 F □ Current BACT* for afterburners, thermal oxidizers, and catalytic oxidizer is 30 ppm @ 3% O2 (burner emissions only) *From 02/01/2019 revision of SCAQMD BACT Guidelines

NEXT STEPS Evaluate Survey Results – Due April 26, 2019 BARCT Analysis - Sample equipment from all applicable Rule 1147 categories Next Working Group Meeting – Late May

CONTACTS

General RECLAIM Questions

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Proposed Amended Rules 1147, 1100 and Proposed Rule 1147.1

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Proposed Amended Rule 1100 and Proposed Rule 1147.2

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Proposed Amended Rule 1100 and Proposed Rule 1147.3

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