



SJVAPCD Rule Changes

Rules 4306 and 4320

AJ Feliz

Director of Engineering

R.F. MacDonald Co.



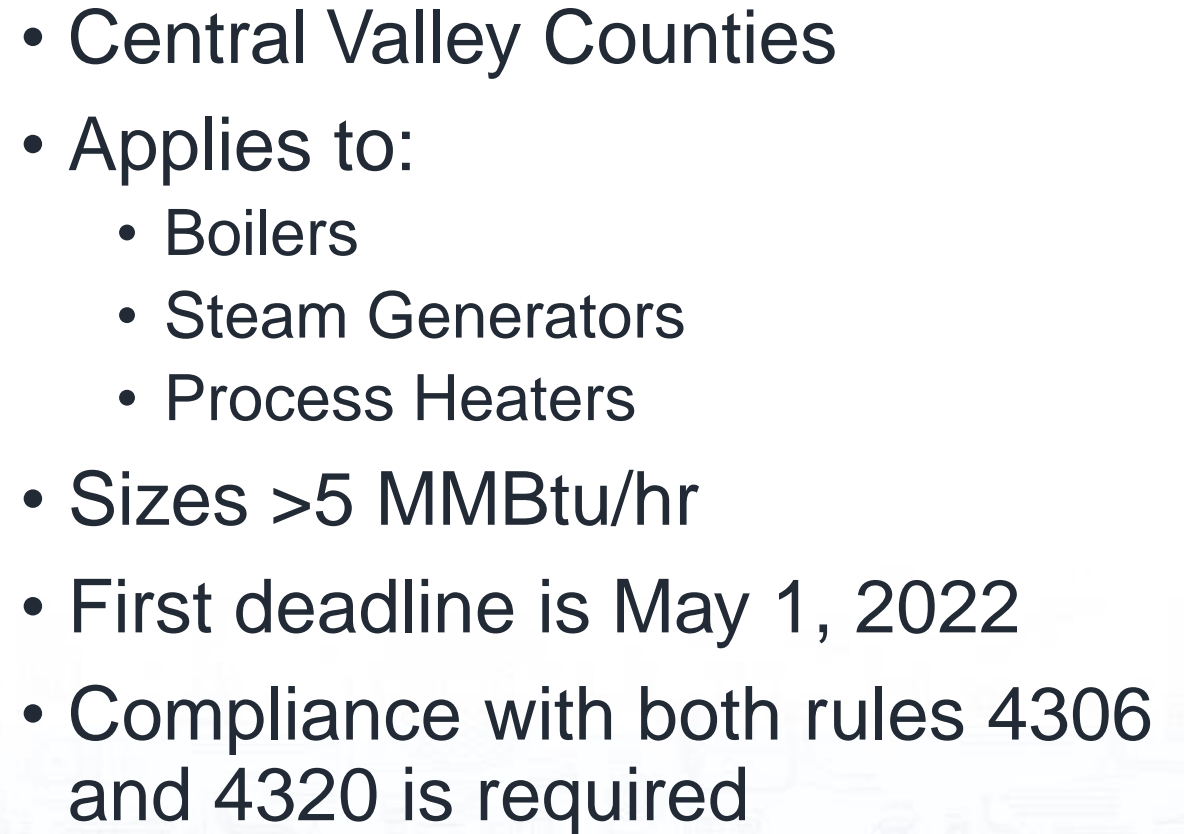
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your boiler & pump solutions team

Welcome

Thank you for joining us for our first of a series of informational workshops on the San Joaquin Valley Air Pollution Control District Rules 4306 and 4320 that take effect May 1, 2022.



- AJ Feliz
- Director of Engineering
- ME degree out of Cal Poly Pomona
- With R.F. MacDonald Co. for 18 years
- Specializing in custom emission control systems utilizing SCR



Rule 4306

- Establishes a baseline for all units across the district
- End users broken down by categories:
 - A – General, 5-20MMBtu
 - B – General, >20MMBtu
 - C – Oilfield Steam Generators
 - D – Refineries
 - E – Limited Use Permits

Rule 4306

- Category A - Units >5 MMBtu/hr and units ≤ 20 MMBtu/hr
(approx. 119HP – 476HP)

Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NOx Limit	CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
A. Units with a total rated heat input > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr, except for Categories C through G unit				
1. Fire Tube Boilers	7 ppmv or 0.0085 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
2. Units at Schools	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
3. Units fired on Digester Gas	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
4. Thermal Fluid Heaters	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
5. All other units	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400

Rule 4306

- Category A - Units >5 MMBtu/hr and units ≤ 20 MMBtu/hr
(approx. 119HP – 476HP)

Category	Emission Control Plan	Authority to Construct	Compliance Deadline
A. Units with a total rated heat input > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr, except for Categories C through G unit			
1a. Fire Tube Units permitted greater than 9 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
1b. Fire Tube Units permitted less than or equal to 9 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029
2. Units at Schools	May 1, 2022	May 1, 2022	December 31, 2023
3. Units fired on Digester Gas	May 1, 2022	May 1, 2022	December 31, 2023
4. Thermal Fluid Heaters	May 1, 2022	May 1, 2022	December 31, 2023
5a. All other units permitted greater than 12 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
5b. All other units permitted less than or equal to 12 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029

Rule 4306

- Category B - Units >20 MMBtu/hr
(approx. >476HP)

Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NOx Limit	CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
B. Units with a total rated heat input > 20.0 MMBtu/hr, except for Categories C through G units				
1. Fire Tube Boilers with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour	7 ppmv or 0.0085 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
2. All other units with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour	7 ppmv or 0.0085 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
3. Units with a rated heat input > 75 MMBtu/hour	5 ppmv or 0.0061 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400



Rule 4306

- Category B - Units >20 MMBtu/hr
(approx. >476HP)

Category	Emission Control Plan	Authority to Construct	Compliance Deadline
B. Units with a total rated heat input > 20.0 MMBtu/hr, except for Categories C through G units			
1a. Fire Tube Boilers with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour permitted greater than 9 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
1b. Fire Tube Boilers with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour permitted less than or equal to 9 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029
2a. All other units with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour permitted greater than 9 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
2b. All other units with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour permitted less than or equal to 9 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029
3a. Units with a rated heat input > 75 MMBtu/hour permitted greater than 7 ppmv as of 6 months from date of rule amendment	May 1, 2022	May 1, 2022	December 31, 2023
3b. Units with a rated heat input > 75 MMBtu/hour permitted less than or equal to 7 ppmv as of 6 months from date of rule amendment	May 1, 2028	May 1, 2028	December 31, 2029

Rule 4306

- Category C – Oil Field Steam Generators

Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NOx Limit	CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
C. Oilfield Steam Generators				
1. Units with a total rated heat input > 5.0 MMBtu/hr and ≤ 20.0 MMBtu/hr	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
2. Units with a total rated heat input > 20.0 MMBtu/hr and ≤ 75.0 MMBtu/hr	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
3. Units with a total rated heat input > 75.0 MMBtu/hr	7 ppmv or 0.0085 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
4. Units firing on less than 50%, by volume, PUC quality gas	15 ppmv or 0.018 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400



Rule 4306

- Category C – Oil Field Steam Generators

Category	Emission Control Plan	Authority to Construct	Compliance Deadline
C. Oilfield Steam Generators			
1. Units with a total rated heat input > 5.0 MMBtu/hr and \leq 20.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
2. Units with a total rated heat input > 20.0 MMBtu/hr and \leq 75.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
3. Units with a total rated heat input > 75.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
4. Units firing on less than 50%, by volume, PUC quality gas	May 1, 2022	May 1, 2022	December 31, 2023

Rule 4306

- Category D – Refinery Units

Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NOx Limit	CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
D. Refinery Units				
1. Boilers with a total rated heat input > 5.0 MMBtu/hr and ≤ 40.0 MMBtu/hr	30 ppmv or 0.036 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
	5 ppmv or 0.0061 lb/MMBtu for replacement units			
2. Boilers with a total rated heat input > 40.0 MMBtu/hr and ≤ 110 MMBtu/hr	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
	5 ppmv or 0.0061 lb/MMBtu for replacement units			
3. Boilers with a total rated heat input > 110 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400



Rule 4306

- Category D – Refinery Units

Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NOx Limit	CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
D. Refinery Units				
4. Process Heaters with a total rated heat input > 5.0 MMBtu/hr and ≤ 40.0 MMBtu/hr	30 ppmv or 0.036 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
	9 ppmv or 0.011 lb/MMBtu for replacement units			
5. Process Heaters with a total rated heat input > 40.0 MMBtu/hr and ≤ 110 MMBtu/hr	15 ppmv or 0.018 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
	9 ppmv or 0.011 lb/MMBtu for replacement units			
6. Process Heaters with a total rated heat input > 110 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400



Rule 4306

- Category D – Refinery Units

Category	Emission Control Plan	Authority to Construct	Compliance Deadline
D. Refinery Units			
1. Boilers with a total heat input > 5.0 MMBtu/hr to ≤ 40.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
2. Boilers with a total rated heat input > 40.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
3. Heaters with a total heat input > 5.0 MMBtu/hr to ≤ 40.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023
4. Heaters with a total rated heat input > 40.0 MMBtu/hr	May 1, 2022	May 1, 2022	December 31, 2023

Rule 4306

- Category E – Low Usage Units

Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NOx Limit	CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
E. Units limited by a Permit to Operate to an annual heat input of 9 billion Btu/year to 30 billion Btu/year	30 ppmv or 0.036 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400

Rule 4320

- Enhanced limits which users have the option to comply with lower limits or pay annual fees in lieu of compliance
- Category A - Units >5 MMBtu/hr and units ≤ 20 MMBtu/hr

Category	NOx Limit	Emission Control Plan	Authority to Construct	Compliance Deadline
A. Units with a total rated heat input > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr, except for Categories C through E units				
1. Fire Tube Boilers	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
2. Units at Schools	9 ppmv or 0.011 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
3. Units fired on Digester Gas	9 ppmv or 0.011 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
4. Thermal Fluid Heaters	9 ppmv or 0.011 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
5. All other units	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023

Same as 4306

Same as 4306

Same as 4306



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Rule 4320

- Category B - Units >20 MMBtu/hr

Category	NOx Limit	Emission Control Plan	Authority to Construct	Compliance Deadline
B. Units with a total rated heat input > 20.0 MMBtu/hr, except for Categories C through E units				
1. Fire Tube Boilers with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour	2.5 ppmv or 0.003 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
2. All other units with a total rated heat input > 20.0 MMBtu/hour and ≤ 75 MMBtu/hour	2.5 ppmv or 0.003 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
3. Units with a rated heat input > 75 MMBtu/hour	2.5 ppmv or 0.003 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023



Rule 4320

- Category C – Oil Field Steam Generators

Category	NOx Limit	Emission Control Plan	Authority to Construct	Compliance Deadline
C. Oilfield Steam Generators				
1. Units with a total rated heat input > 5.0 MMBtu/hr and ≤ 20.0 MMBtu/hr	6 ppmv or 0.0073 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
2. Units with a total rated heat input > 20.0 MMBtu/hr and ≤ 75.0 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
3. Units with a total rated heat input > 75.0 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
4. Units firing on less than 50%, by volume, PUC quality gas	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023



Rule 4320

- Category D – Refinery Units

Category	NOx Limit	Emission Control Plan	Authority to Construct	Compliance Deadline
D. Refinery units				
1. Boilers with a total heat input > 5.0 MMBtu/hr to ≤ 40.0 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
2. Boilers with a total rated heat input > 40.0 MMBtu/hr to ≤ 110.0 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
3. Boilers with a total rated heat input > 110.0 MMBtu/hr	2.5 ppmv or 0.003 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023

Rule 4320

- Category D – Refinery Units

Category	NOx Limit	Emission Control Plan	Authority to Construct	Compliance Deadline
D. Refinery units				
4. Process Heaters with a total heat input > 5.0 MMBtu/hr to ≤ 40.0 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
5. Process Heaters with a total rated heat input > 40.0 MMBtu/hr to ≤ 110.0 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
6. Process Heaters with a total heat input > 110.0 MMBtu/hr	2.5 ppmv or 0.003 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023

Rule 4320

- Category E – Low Use Units

Category	NOx Limit	Emission Control Plan	Authority to Construct	Compliance Deadline
E. Units limited by a Permit to Operate to an annual heat input >1.8 billion Btu/year but ≤ 30 billion Btu/year.	9 ppmv or 0.011 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023

Rule 4320 Summary

- There is an option to pay an annual fee in lieu of the enhanced emissions requirement
- Annual fee compliance option for NOx will be \$9,350/ton and will be based on the total emissions from an individual source
- An additional 4% will be added for an administrative fee
- For those choosing to go this route, the SJVAPCD will provide invoices to users starting in 2025 for operations in 2024
- The intention to go the annual fee route needs to be submitted to the air district by May 1st, 2022

Rule Change Milestones

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

4306 – Non-Deferred Units Submit
Emission Control Plan/Authority
to Construct

4320 – Submit Emission Control
Plan/Authority to Construct

May 1, 2022

4306 – Non-Deferred Units
Compliance Date

4320 – Compliance Date

Dec 31, 2023

4306 – Deferred Units Submit
Emission Control Plan/Authority
to Construct

May 1, 2028

4306 – Deferred Units Compliance
Date

Dec 31, 2029



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Example 1

SJVAPCD Compliance

Rule 4320 Compliance

Rule 4306 Compliance

Firetube Boilers 5-75MMBTU permitted greater than 9 ppm NOx from date or rule amendment must retrofit to 7 PPM NOx by 12/31/2023

Submit 'Authority to Construct' and 'Emission Control Plan' to SJVAPCD by May 1st, 2022

Units >20MMBTU must retrofit to 2.5 PPM NOx by 12/31/2023

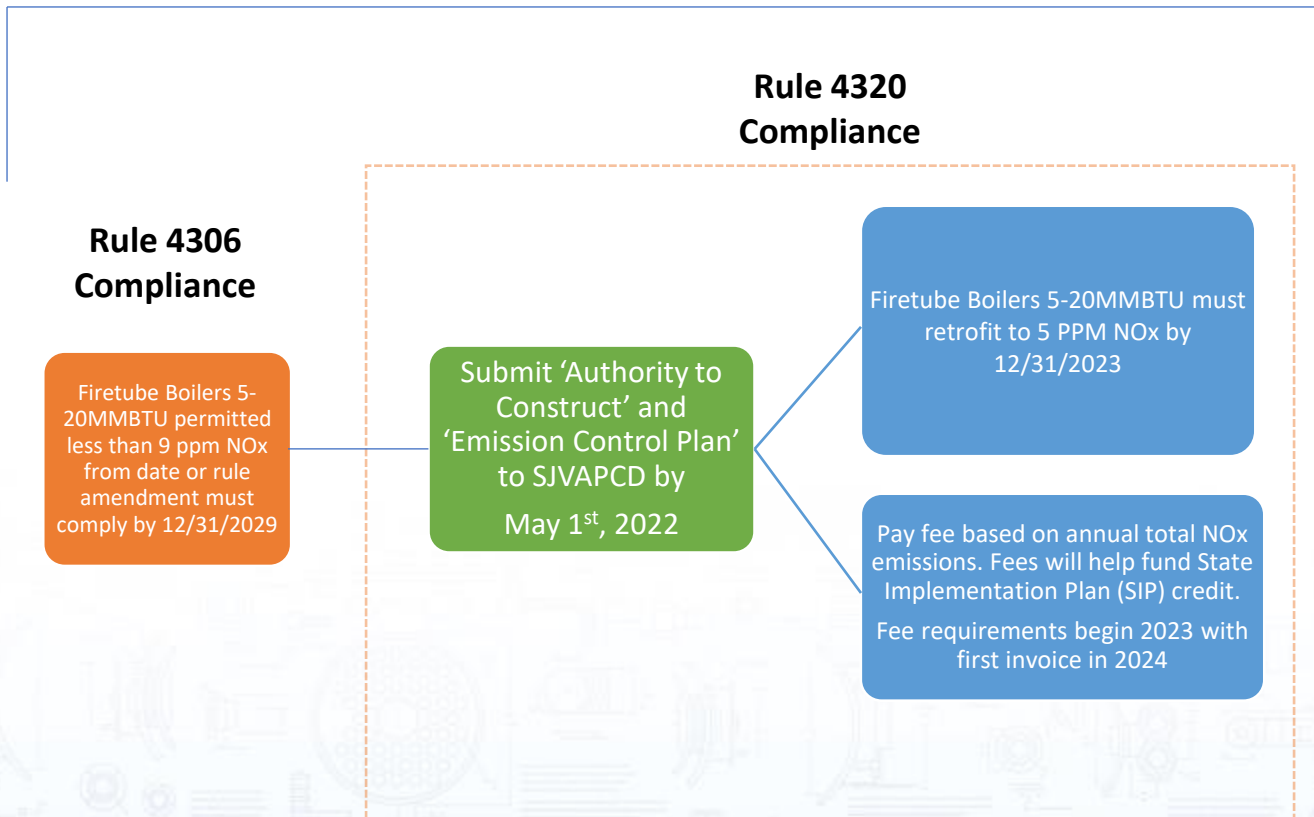
Pay fee based on annual total NOx emissions. Fees will help fund State Implementation Plan (SIP) credit. Fee requirements begin 2023 with first invoice in 2024

- Firetube unit permitted greater than 9PPM must be retrofitted to 7PPM per Rule 4306
- Per Rule 4320, the user can choose to meet 2.5PPM or pay the fee for NOx emissions
- The compliance plan must be submitted to the SJVAPCD by 5/1/2022



Example 2

SJVAPCD Compliance



- Firetube unit permitted less than 9PPM is allowed deferment on 7PPM compliance per Rule 4306. Must comply with 7PPM by 12/31/2029
- Per Rule 4320, the user can choose to meet 5PPM or pay the fee for NOx emissions
- If the choice is to meet the 5PPM requirement, compliance is required by 12/31/2023
- If the choice is to pay the fee, then the unit can remain at the current emissions level and not have to retrofit to 7PPM until 12/31/2029
- The compliance plan detailing the site intentions must be submitted to the SJVAPCD by 5/1/2022

Conclusion



- When navigating the new rule changes, each user will have options to evaluate to see what makes the best sense for them
- Some early adopters have the ability to defer compliance until Dec. 31, 2029
- Regardless of the course of action, all users must have compliance plans submitted to the district by May 1, 2022

Questions



- If you have questions, please contact R.F. MacDonald Co. to go over your specific plan.

Future Online Workshops

ONLINE WORKSHOPS

1

Sept. 22/23

RULES 4306 & 4320
TIMETABLE

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2

Oct. 13/14

BURNER RETROFITS &
CONTROLS SOLUTIONS

R.F. MacDonald Co.
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3

Oct. 27/28

SELECTIVE CATALYTIC
REDUCTION SOLUTIONS

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4

Nov. 10/11

BOILER EQUIPMENT
REPLACEMENT SOLUTIONS

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5

Dec. 1/2

EMISSIONS PLAN
OVERVIEW & CHECKLIST

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rfmacdonald.com/clear-the-air

Future Workshop Solution – Burner Technology

BURNER RETROFIT & CONTROLS UPGRADE



- Ultra Low Emissions Burners on new units down to 5PPM NOx on sizes up to 50 MMBtu/hr input
- Jet burner retrofits to existing units down to 5PPM NOx on sizes up to 30 MMBtu/hr input
- Enhanced PLC controls to maintain repeatability across the firing range while also increasing operational efficiencies






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Future Workshop Solution – SCR Technology

SELECTIVE CATALYTIC REDUCTION



- For Sources with limits below 5 PPM NOx requirements
 - Anhydrous Ammonia – Highest Risk
 - Aqueous Ammonia - Moderate Risk
 - Urea – Low Risk

	 ANHYDROUS	 AQUEOUS	 UREA
Ammonia-Based Reagents			
Hazard Rating (Level of Toxicity): 3 = Extreme 2 = Moderate 1 = Low	3	2	1
Level of Usage Risk:	Highest Risk	Moderate Risk	Lowest Risk
Ease of Use / Operational Readiness:	Ready to Operate	Vaporized before Use	Needs Vaporization & Conversion
Safety Requirements:	Training, Emergency Planning, Fire Dept. Audit	Training, Emergency Planning, Fire Dept. Audit	Training
Most Common Applications:	Power Plants, Industrial Facilities	Food Processing, Agriculture, Utilities	Hospitals, Schools, Universities, Prisons
R.F. MacDonald Co. Offers:	Full Installation Support & Service		



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Future Workshop Solution - Equipment Replacement

**REPLACE
YOUR
EQUIPMENT**



Some Benefits of New Equipment

- Replace older equipment that is at its upper life cycle.
- Replace larger units with multiple smaller boilers that meet requirements.
- Increased efficiency with newer units.



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Equipment Maintenance Program (EMP)

We offer a customizable Boiler Equipment Maintenance Plan to maintain optimum performance, improve system stability, extend equipment life and minimize risk of a boiler system failure.

- Comply with Rule 4320 Section 5.7 for monitoring provisions
- Predictive Maintenance options

Membership Term Options

5 YEARS **Five Year Membership Plan**

- Fixed labor rate for three (3) years
- 15% discount on parts for any equipment
- Two (2) free training classes at a local seminar
- Priority scheduling benefits

3 YEARS **Three Year Membership Plan**

- Fixed labor rate for two (2) years
- 10% discount on parts for equip. in program
- One (1) free training class at a local seminar
- Priority scheduling benefits

2 YEARS **Two Year Membership Plan**

- Fixed labor rate for two (2) years
- 5% discount on parts for equip. in program
- Priority scheduling benefits

1 YEAR **One Year Membership Plan**

- 5% discount on parts for equip. in program
- Priority scheduling benefits

CHOOSE YOUR
PLAN

Monthly **M**

Annual **A**

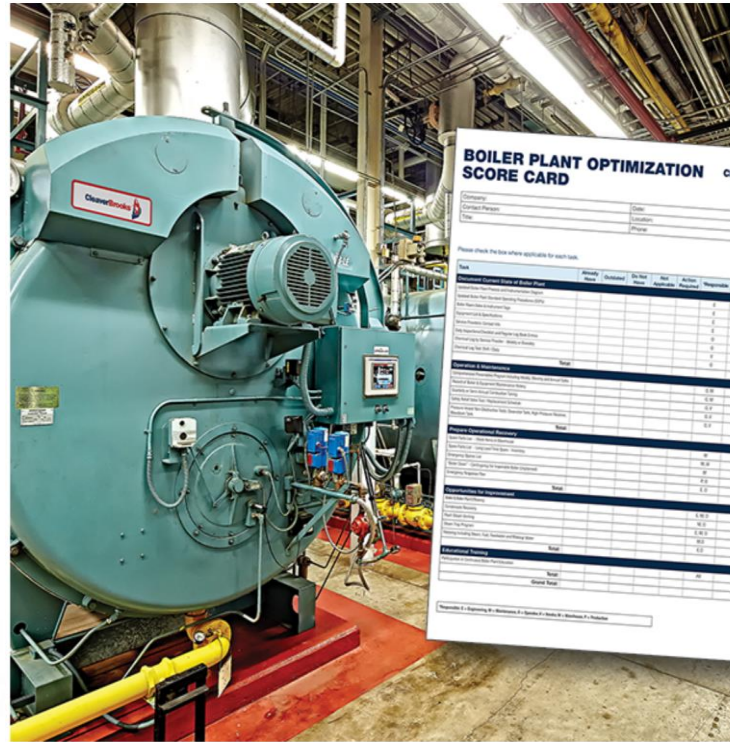
Quarterly/Semi-Annual **Q**



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Cleaver Brooks Boiler Plant Optimization (BPO)

With our Boiler Plant Optimization (BPO) programs, we can assist with a variety of methodologies to create a successful roadmap to improve and address any site-specific issues. We partner with you to inspect and evaluate the four cornerstones of successful plant operation: Safety, Efficiency, Reliability & Sustainability



Contact Information

Thank you for joining us today. A follow up email will be sent to you with your R.F. MacDonald Co. sales rep's contact information and a link to our workshops.

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Disclaimer

- Please note, the information in this presentation is R.F. MacDonald Co.'s best interpretation of Rules 4306 & 4320
- If you have questions specific to your equipment, please contact R.F. MacDonald Co. to go over your options.