ROHM AND HAAS ELECTRONIC MATERIALS

ROHM AND HAAS ELECTRONIC MATERIALS CMP, LLC
451 BELLEVUE ROAD, NEWARK, DE 19713 USA
TELEPHONE (302) 366-0500 FAX (302) 283-2144

VIA OVERNIGHT MAIL

RECEIVED
JUN 10 2021
Division of Air Quality

June 8, 2021

State of Delaware – DNREC
Division of Air Quality
State Street Commons
100 W. Water Street, Suite 6A
Dover, DE 19904
Attn: Ms. Alexa Murphy

Re: Rohm and Haas Electronic Materials CMP, LLC
Title V Operating Permit Number: AQM-003/00033(Renewal 3)
Newark, Delaware, Facility ID: 1000300033
Building 2 Permanent Boilers - Construction Permit Request
NOx MNSR/BACT Analysis and Revised AQM Forms

Dear Ms. Murphy:

Please find enclosed a Minor New Source Review/Best Available Control Technology (MNSR/BACT) analysis for the 500 HP boiler which is part of the permanent boiler installation project in Building 2. The analysis included review of several NOx removal technologies and the RACT/BACT/LAER Clearinghouse Database for similar sized boiler and heater package units. The review concluded that NOx emissions for the 500 HP boiler unit are best controlled using a low NOx burner and flue gas recirculation (FGR). Revised AQM-1, AQM-3.2 and AQM-5 forms for the requested annual NOx emission limit of 5.49 for the 500 HP boiler were also included with the analysis.

Please don't hesitate to contact me at (302) 367-9592 if you have any questions or need additional information.

Sincerely,

Nicholas R. Sapone
Environmental Specialist

Enclosure: MNSR/BACT Analysis and attachment, AQM-1, AQM-3.2 and AQM 5 Forms for the 500 HP boiler

DNREC – Air Quality Management Section
Application to Construct, Operate, or Modify Stationary Sources

Administrative Information

If you are using this form electronically, press F1 at any time for help

All Application Forms Should Be Mailed To:
Air Quality Management
156 South State Street
Dover, Delaware 19901

All Checks Should Be Made Payable To:
State of Delaware

For Department Use Only	
Date Received Stamp	Assigned Permit Number

Company and Site Information

1.	Company Name: **Rohm and Haas Electonic Materials CMP, LLC**		
2.	Company Mailing Address: **451 Bellevue Road**		
	City: **Newark**	State: **DE**	Zip Code: **19713**
3.	Site Name: **Rohm and Haas Electonic Materials CMP, LLC**		
4.	Site Mailing Address: *(if different from above)*		
	City:	State:	Zip Code:
5.	Physical Location of Site: *(if different from above)*		
	City:	State:	Zip Code:
6.	Air Quality Management Facility ID Number: **1000300033**		
7.	Site NAICS Code): **313320** *(list all that apply*		
8.	Site SIC Code: : **2295** *(list all that apply)*		
9.	Site Location Coordinates: **N39.652518 / 75.733767W**		
10.	Is the Facility New or Existing?	☐ NEW	☒ EXISTING
If the Facility is an Existing Facility, Complete the Rest of Question 10. If Not, Proceed to Question 11.			
10.1.	Does the Facility Have Active Air Permits?	☒ YES	☐ NO

Company and Site Information

11. Is this Application For a New Source or Modification of an Existing Source?
☐ New Source
☐ Modification of Existing Source
☒ Other (Specify): **addition to existing source**

If the application is for the modification of an existing source, complete the rest of Question 11. If not, proceed to Question 12.

11.1. Does the Source Have an Active Air Permit? ☒ YES ☐ NO

If the source has an active air permit, complete the rest of Question 11. If not, proceed to Question 12.

11.2. Permit Number of Existing Source: **AQM-003/00033(Renewal 3)**

12. Status of Source Being Applied For: ☐ Natural Minor Source ☒ Synthetic Minor Source ☐ Major Source

13. Facility Status: ☐ Natural Minor Facility ☐ Synthetic Minor Facility ☒ Major Facility

If the source is a Major Source, complete the rest of Question 13. If not, proceed to Question 14.

13.1. Responsible Official Name: **Leslie Croskey**

13.2. Responsible Official Title: **Site Manufacturing Leader**

Contact Information

14. Name of Owner or Facility Manager: **Leslie Croskey**

15. Title of Owner or Facility Manager: **Site Manufacturing Leader**

16. Permit Contact Name: **Nick Sapone**

17. Permit Contact Title: **Environmental Specialist**

18. Permit Contact Telephone Number: **302 781-7479**

19. Permit Contact Fax Number:

20. Permit Contact E-Mail Address: **nicholas.r.sapone@dupont.com**

Proposed Operating Schedule

21. Proposed Operating Schedule: **24** hours/day **7** days/week **365** weeks/year

21.1. Is There Any Additional Information Regarding the Operating Schedule? ☐ YES ☒ NO

If YES, complete the rest of Question 21. If NO, proceed to Question 22.

21.2. Describe the Additional Information: **see attached technical specifications and emissions estimates**

Coastal Zone Information

22. Is the Facility Located in the Coastal Zone? ☐ YES ☒ NO

If the facility is located in the Coastal Zone complete the rest of Question 22. If not, proceed to Question 23.

22.1. Is a Coastal Zone Permit Required for Construction or Operation of the Source Being Applied for? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Determination if it has not been previously submitted

If a Coastal Zone Permit is required complete the rest of Question 22. If not, proceed to Question 23.

22.2. Has a Coastal Zone Permit Been Issued? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Permit if it has not been previously submitted

Local Zoning Information

23. Parcel Zoning: **N/A**

Attach Proof of Local Zoning if it has not been previously submitted

Application Information

24. Is the Appropriate Application Fee Attached? ☒ YES ☐ NO

25. Is the Advertising Fee Attached? ☒ YES ☐ NO

Attach the appropriate fees. Note that your Application will not be considered complete if the appropriate fees are not included.

If the Facility is a New Facility complete Question 26. If not, proceed to Question 27.

26. Is a Copy of the Applicant Background Information Questionnaire on Record at the Department? ☐ YES ☐ NO

If NO, complete the rest of Question 26. If YES, process to Question 27.

26.1 Is a Copy of the Applicant Background Information Questionnaire Attached? ☐ YES ☐ NO

Attach a copy of the Applicant Background Information Questionnaire if applicable.

27. Check Which Application Forms are Attached:

☒ AQM-1	☐ AQM-3.4	☐ AQM-3.9	☐ AQM-3.14	☐ AQM-4.4	☐ AQM-4.9	☐ AQM-6
☒ AQM-2	☐ AQM-3.5	☐ AQM-3.10	☐ AQM-3.15	☐ AQM-4.5	☐ AQM-4.10	
☐ AQM-3.1	☐ AQM-3.6	☐ AQM-3.11	☐ AQM-4.1	☐ AQM-4.6	☐ AQM-4.11	
☒ AQM-3.2	☐ AQM-3.7	☐ AQM-3.12	☐ AQM-4.2	☐ AQM-4.7	☐ AQM-4.12	
☐ AQM-3.3	☐ AQM-3.8	☐ AQM-3.13	☐ AQM-4.3	☐ AQM-4.8	☒ AQM-5	

28. Check Which Documents are Attached:

☐ Coastal Zone Determination
☐ Coastal Zone Permit
☐ Proof of Local Zoning
☒ Application Fee
☒ Advertising Fee
☐ Applicant Background Information Questionnaire
☐ Claim of Confidentiality
☒ Manufacturer Specification(s)
☐ Material Safety Data Sheets (MSDSs)
☒ Supporting Calculations
☒ Other (Specify): **Manufacturer spec sheets**

Confidentiality Information

29. Do You Consider Any of the Information Submitted With this Application Confidential? ☐ YES ☒ NO

If a Claim of Confidentiality is made it MUST meet the requirements of Section 6 of DNREC's Freedom of Information ("FOIA") Regulation at the time the Application is submitted.

Signature Block

I, the undersigned, hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all of its attachments as to the truth, accuracy, and completeness of this information. I certify based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete. By signing this form, I certify that I have not changed, altered, or deleted any portions of this application. I acknowledge that I cannot commence construction, alteration, modification or initiate operation until I receive written approval (i.e. permit, registration, or exemption letter) from the Department. I acknowledge that I may be required to perform testing of the equipment to receive construction or operation approval, and that if I do not receive approval to construct or operate that I may appeal the decision.

Leslie Croskey
Owner or Authorized Agent

Leslie Croskey
Signature of Owner or Authorized Agent

June 8, 2021
Date

All Application Forms Should Be Mailed To:
Air Quality Management
156 South State Street
Dover, Delaware 19901

All Checks Should Be Made Payable To:
State of Delaware

Boiler Application

If you are using this form electronically, press F1 at any time for help

General Information

1.	Facility Name: **Rohm and Haas Electonic Materials CMP, LLC**		
2.	Equipment ID: **500 HP Boiler**		
3.	Manufacturer: **Burnham**		
4.	Model: **LN3P-500-50-G-RLO**		
5.	Serial Number: **TBD**		
6.	Rated Heat Input: **24.807** MMBTU/hr		
7.	Maximum Power Output: **500 horsepower**		
8.	Date of Manufacture: **February 2021**		
9.	Date of Installation: **June 2021**		
10.	Primary Fuel:	☒ Natural Gas ☐ Diesel ☐ No. 2 Fuel Oil ☐ No. 4 Fuel Oil ☐ No. 6 Fuel Oil	☐ Propane ☐ Biodiesel ☐ Refinery Fuel Gas ☐ Waste Oil ☐ Other (specify):
10.1.	Maximum Annual Primary Fuel Consumption: **207 MMCF**		
10.2.	Heat Content of Primary Fuel: **1,050,000,000 BTU/MMCF**		
10.3.	Maximum Firing Rate: **0.024 MMCF/hr**		
10.4.	Percent Sulfur of Primary Fuel: **<0.2** %		
10.5.	Percent Ash of Primary Fuel: **0** %		
11.	Secondary Fuel:	☐ Natural Gas ☐ Diesel ☐ No. 2 Fuel Oil ☐ No. 4 Fuel Oil ☐ No. 6 Fuel Oil	☐ Propane ☐ Biodiesel ☐ Refinery Fuel Gas ☐ Waste Oil ☐ Other (specify):
11.1.	Maximum Annual Secondary Fuel Consumption: **NA MMCF**		
11.2.	Heat Content of Secondary Fuel: **NA BTU/MMCF**		
11.3.	Maximum Firing Rate: **NA MMCF/hr**		
11.4.	Percent Sulfur of Secondary Fuel: **NA** %		
11.5.	Percent Ash of Secondary Fuel: **NA** %		

Control Device Information

12. Is a Low NO_X Burner Used? ☒ YES ☐ NO

If a Low NO_X Burner is used, complete the rest of Question 12. If not, proceed to Question 13.

12.1. NO_X Emissions from Burner in Parts Per Million (ppm): **30**

13. Is Flue Gas Recirculation Used? ☒ YES ☐ NO

If Flue Gas Recirculation is used, complete the rest of Question 13. If not, proceed to Question 14.

13.1. Percentage of Flue Gas Recirculated: **15-20 %**

14. Are Any Other Control Devices Used? ☐ YES ☒ NO

If YES, complete the rest of Question 14. If NO, proceed to Question 15.

14.1. Is a Fabric Collector or Baghouse Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.6 and attach it to this application.

14.2. Is an Electrostatic Precipitator Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.7 and attach it to this application.

14.3. Is a Venturi Scrubber Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.8 and attach it to this application.

14.4. Is SCR/NSCR/SNCR/Ammonia Injection Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.9 and attach it to this application.

14.5. Is Any Other Control Device Used? ☐ YES ☒ NO

If YES, attach a copy of the Control Device Manufacturer's Specification Sheet(s).

If any other control device is used, complete the rest of Question 14. If not, proceed to Question 15.

14.6. Describe Control Device: **This boiler is equipped with a low NOx burner and flue gas recirculation (FGR).**

14.7. Pollutants Controlled: ☐ VOCs ☐ HAPs ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ NO_X ☐ SO_X ☐ Metals ☐ Other (Specify):

14.8. Control Device Manufacturer: **NA**

14.9. Control Device Model: **NA**

14.10. Control Device Serial Number: **NA**

14.11. Control Device Design Capacity: **NA**

14.12. Control Device Removal or Destruction Efficiency: **NA**

Ash Handling Information

15. Is Ash Handling Equipment Used? ☐ YES ☒ NO

If Yes, Attach the Ash Handling Equipment Manufacturer's Specification Sheets

Ash Handling Information

If Ash Handling Equipment is used, complete the rest of Question 15. If not, proceed to Question 16.

15.1. Type of Ash Handling System: ☐ Pneumatic ☐ Hydraulic ☐ Mechanical ☐ Other (Explain):

15.2. Ash Generation Rate:

15.3. Ash Storage Containment System: ☐ Storage Silos ☐ Settling Basin ☐ Trucked Off Site ☐ Other (Explain):

Soot Blowing Information

16. Is Soot Blowing Conducted? ☐ YES ☒ NO

If Soot Blowing is conducted, complete the rest of Question 16. If not, proceed to Question 17.

16.1. Projected Frequency of Soot Blowing Operation: **NA**

16.2. Projected Duration of Soot Blowing Operation: **NA**

16.3. Projected Time of Day Soot Blowing Is Conducted: **NA**

Stack Information

17. How Does the Process Equipment Vent:
(check all that apply)
☒ Directly to the Atmosphere
☐ Through a Control Device Covered by Forms AQM-4.1 through 4.12
☐ Through Another Control Device Described on This Form

If any of the process equipment vents directly to the atmosphere or through another control device described on this form, proceed to Question 18. If the process equipment vents through a control device, provide the stack parameters on the control device form (AQM-4 Series) and proceed to Question 19.

18. Emission Point Name: **Burnham-500**

18.1. Stack Height Above Grade: **32 feet**

18.2. Stack Exit Diameter: **2.33 feet**
(Provide Stack Dimensions If Rectangular Stack)

18.3. Is a Stack Cap Present? ☐ YES ☒ NO

18.4. Stack Configuration: ☒ Vertical ☐ Horizontal ☐ Downward-Venting
(check all that apply) ☐ Other (Specify):

18.5. Stack Exit Gas Temperature: **300 °F**

18.6. Stack Exit Gas Flow Rate: **5825 ACFM**

18.7. Distance to Nearest Property Line: **30 ft**

Stack Information

18.8. Describe Nearest Obstruction: **Building #2**

18.9. Height of Nearest Obstruction: **22 ft**

18.10. Distance to Nearest Obstruction: **40 ft**

18.11. Are Stack Sampling Ports Provided? ☐ YES ☒ NO

Monitoring Information

19. Will Emissions Data be Recorded by a Continuous Emission Monitoring System? ☐ YES ☒ NO

If Yes, Attach a Copy of the Continuous Emission Monitoring System Manufacturer's Specification Sheets

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.1. Pollutants Monitored: ☐ VOCs ☐ HAPs ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ NO_x ☐ SO_x ☐ Metals ☐ Other (Specify):

19.2. Describe the Continuous Emission Monitoring System: **NA**

19.3. Manufacturer: **NA**

19.4. Model: **NA**

19.5. Serial Number: **NA**

19.6. Will Multiple Emission Units Be Monitored at the Same Point? ☐ YES ☒ NO

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.7. Emission Units Monitored: **NA**

19.8. Will More Than One Emission Unit be Emitting From the Combined Point At Any Time? ☐ YES ☒ NO

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.9. Emission Units Emitting Simultaneously: **NA**

Visible Emissions Monitoring Information

For Primary Fuel

20. Proposed Technique Used to Monitor Visible Emissions:
☐ Opacity Monitor (COM)
☐ Manual (Method 9)
☐ Manual (Method 22)
☐ Other (Describe):

If an Opacity Monitor (COM) is used, complete the rest of Question 20. If not, proceed to Question 21.

20.1. Describe the Continuous Opacity Monitoring System: **NA**

20.2. Manufacturer: **NA**

20.3. Model: **NA**

Visible Emissions Monitoring Information

20.4. Serial Number: **NA**

21. Proposed Frequency of Opacity Monitoring: **NA**

For Secondary Fuel. If no Secondary Fuel is used, proceed to Question 24.

22. Proposed Technique Used to Monitor Visible Emissions:
- ☐ Opacity Monitor (COMs)
- ☐ Manual (Method 9)
- ☐ Manual (Method 22)
- ☐ Other (Describe):

If an Opacity Monitor (COMs) is used, complete the rest of Question 22. If not, proceed to Question 23.

22.1. Describe the Continuous Opacity Monitoring System: **NA**

22.2. Manufacturer: **NA**

22.3. Model: **NA**

22.4. Serial Number: **NA**

23. Proposed Frequency of Opacity Monitoring: **NA**

Voluntary Emission Limitation Request Information

24. Are You Requesting Any Voluntary Emission Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 24. If NO, proceed to Question 25.

24.1. Describe Any Proposed Emission Limitations:

Voluntary Operating Limitation Request Information

25. Are You Requesting Any Voluntary Operating Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 25. If NO, proceed to Question 26.

25.1. Describe Any Proposed Operating Limitations: **NA**

26. Do You Plan to Operate Differently During Ozone Season? ☒ YES ☐ NO

If YES, complete the rest of Question 26. If NO, proceed to Question 27.

26.1. Describe Any Differences In Operation During Ozone Season: **none**

Additional Information

27. Is There Any Additional Information Pertinent to this Application? ☒ YES ☐ NO

If YES, complete the rest of Question 27.

27.1. Describe: **See attached narrative and specification sheets from the boiler and burner manufacturer**

Emissions Information Application

If you are using this form electronically, press F1 at any time for help

Process Information

1.	Number of Individual Pieces of Process Equipment in Process: **1**
2.	Number of Individual Control Devices in Process: **0**

Emissions Information for First Emission Point/Stack

3.	Emission Point Name: **500 HP Boiler**
4.	Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack: **500 HP Boiler**
5.	Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 5.10 through 5.18)	CAS Number (Not required for 5.1 through 5.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
5.1.	Particulate Matter (PM)		**0.18 lbs/hour**	**0.18 lbs/hour**	**0.79** tons/year	**0.79** tons/year
5.2.	PM_{10}		**0.18 lbs/hour**	**0.18 lbs/hour**	**0.79** tons/year	**0.79** tons/year
5.3.	$PM_{2.5}$		**0.18 lbs/hour**	**0.18 lbs/hour**	**0.79** tons/year	**0.79** tons/year
5.4.	Sulfur Oxides (SO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.5.	Nitrogen Oxides (NO_X)		**1.25 lbs/hour**	**1.25 lbs/hour**	**5.49** tons/year	**5.49** tons/year
5.6.	Carbon Monoxide (CO)		**1.27 lbs/hour**	**1.27 lbs/hour**	**5.57** tons/year	**5.57** tons/year
5.7.	Total Volatile Organic Compounds (VOCs)		**0.13 lbs/hour**	**0.13 lbs/hour**	**0.57** tons/year	**0.57** tons/year
5.8.	Total Hazardous Air Pollutants (HAPs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year

Emissions Information for First Emission Point/Stack

5.9. CO_2		**2836 lbs/hour**	**2836 lbs/hour**	**12420** tons/year	**12420** tons/year
5.10. CO_{2e}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.11.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.12.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.13.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.14.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.15.		**lbs/hour**	**lbs/hour**	tons/year	tons/year

6. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Second Emission Point/Stack

7. Emission Point Name:

8. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:

9. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 9.10 through 9.18)	CAS Number (Not required for 9.1 through 9.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
9.1.	Particulate Matter (PM)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.2.	PM_{10}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.3.	$PM_{2.5}$		**lbs/hour**	**lbs/hour**	tons/year	tons/year

Emissions Information for Second Emission Point/Stack

9.4.	Sulfur Oxides (SO_x)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.5.	Nitrogen Oxides (NO_x)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.6.	Carbon Monoxide (CO)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.7.	Total Volatile Organic Compounds (VOCs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.8.	Total Hazardous Air Pollutants (HAPs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.9.	CO_2		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.10.	CO_{2e}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.11.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.13.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.14.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

10. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Third Emission Point/Stack

11. Emission Point Name:

12. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:

13. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

Emissions Information for Third Emission Point/Stack

	Pollutant Name (Specify VOCs and HAPs Individually in 13.10 through 13.18)	CAS Number (Not required for 13.1 through 13.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
13.1.	Particulate Matter (PM)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.2.	PM_{10}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.3.	$PM_{2.5}$		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.4.	Sulfur Oxides (SO_x)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.5.	Nitrogen Oxides (NO_x)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.6.	Carbon Monoxide (CO)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.7.	Total Volatile Organic Compounds (VOCs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.8.	Total Hazardous Air Pollutants (HAPs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.9.	CO_2		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.10.	CO_{2e}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.11.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.13.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.14.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

14. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Fourth Emission Point/Stack

15. Emission Point Name:

16. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:

17. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 17.10 through 17.18)	CAS Number (Not required for 17.1 through 17.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
17.1.	Particulate Matter (PM)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.2.	PM_{10}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.3.	$PM_{2.5}$		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.4.	Sulfur Oxides (SO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.5.	Nitrogen Oxides (NO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.6.	Carbon Monoxide (CO)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.7.	Volatile Organic Compounds (VOCs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.8.	Total Hazardous Air Pollutants (HAPs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.9.	CO_2		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.10.	CO_{2e}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.11.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.13.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.14.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

Emissions Information for Fourth Emission Point/Stack

18. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

If there are more than four Emission Points/Stacks, attach additional copies of this form as needed.

Overall Process Emissions

19. Pollutant Emissions

If more than 15 pollutants are emitted from this Process, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 19.10 through 19.18)	CAS Number (Not required for 19.1 through 19.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
19.1.	Particulate Matter (PM)		**0.18 lbs/hour**	**0.18 lbs/hour**	**0.79** tons/year	**0.79** tons/year
19.2.	PM_{10}		**0.18 lbs/hour**	**0.18 lbs/hour**	**0.79** tons/year	**0.79** tons/year
19.3.	$PM_{2.5}$		**0.18 lbs/hour**	**0.18 lbs/hour**	**0.79** tons/year	**0.79** tons/year
19.4.	Sulfur Oxides (SO_x)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.5.	Nitrogen Oxides (NO_x)		**1.25 lbs/hour**	**1.25 lbs/hour**	**5.49** tons/year	**5.49** tons/year
19.6.	Carbon Monoxide (CO)		**1.27 lbs/hour**	**1.27 lbs/hour**	**5.57** tons/year	**5.57** tons/year
19.7.	Total Volatile Organic Compounds (VOCs)		**0.13 lbs/hour**	**0.13 lbs/hour**	**0.57** tons/year	**0.57** tons/year
19.8.	Total Hazardous Air Pollutants (HAPs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.9.	CO_2		**2836 lbs/hour**	**2836 lbs/hour**	**12420** tons/year	**12420** tons/year
19.10.	CO_{2e}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

Overall Process Emissions

19.13.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.14.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.15.		**lbs/hour**	**lbs/hour**	tons/year	tons/year

20. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Minor New Source Review Information

21. Does the Process Have the Potential to Emit More Than Five Tons Per Year of Any Pollutant? ☒ YES ☐ NO

22. Is the Source New or Existing? ☒ NEW ☐ EXISTING
See Question 11 of AQM-1

If the Process has the Potential to Emit more than five tons per year of any pollutant, and is a New Source, a Control Technology Analysis pursuant to Regulation No. 1125 Section 4 must be conducted and attached to this application.

Major New Source Review Information

23. Does the Process Have the Potential to Emit More Than the Significance Level for Any Pollutant? *(Check All That Apply)*

- ☐ Greater Than 25 Tons Per Year of Particulate Matter (PM)
- ☐ Greater Than 15 Tons Per Year of PM_{10}
- ☐ Greater Than 10 Tons Per Year of $PM_{2.5}$
- ☐ Greater Than 40 Tons Per Year of Sulfur Dioxide(SO_2)
- ☐ Greater Than 25 Tons Per Year of Nitrogen Oxides (NO_X) in New Castle and Kent County
- ☐ Greater Than 100 Tons Per Year of Nitrogen Oxides (NO_X) in Sussex County
- ☐ Greater Than 100 Tons Per Year of Carbon Monoxide (CO)
- ☐ Greater Than 25 Tons Per Year of Total Volatile Organic Compounds (VOCs) in New Castle and Kent County
- ☐ Greater Than 50 Tons Per Year of Total Volatile Organic Compounds (VOCs) in Sussex County
- ☐ Greater Than 75,000 Tons Per Year of Equivalent Carbon Dioxide (CO_{2e})

If the Process has the Potential to Emit greater than any of the amounts listed above 7 DE Admin. Code 1125 Sections 2 and/or 3 apply. Contact the Department at (302) 323-4542 or (302) 739-9402 for additional information

Additional Information

24. Is There Any Additional Information Pertinent to this Application? ☒ YES ☐ NO

If YES, complete the rest of Question 24.

24.1. Describe: **See attached narrative, vendor data and calculations**

Permanent Boiler Construction Permit Application
Emissions Calculation Sheet

Emissions from New Boilers

	CFM exhaust	NOx (PPM)	CO (PPM)	MW (NO2)	MW(CO)
500 HP boiler	5825	30	50	46.005	28.01
200 HP boiler	2281	30	50		

PPM to Lb/SCF

PPM	X	MW / 385100000	=	Number	Lb / SCF							
500 HP	NOx / 30	*	1.1946E-07	=	3.58387E-06	lb/cuft						
3.58387E-06	lb/cuft	*	5825	cuft/min	=	0.020876068	lb/min	*	60	min/hr	=	1.25 lb/hr
	CO / 50	*	7.2734E-08	=	3.63672E-06	lb/cuft						
3.63672E-06	lb/cuft	*	5825	cuft/min	=	0.021183881	lb/min	*	60	min/hr	=	1.27 lb/hr
200 HP	NOx / 30	*	1.1946E-07	=	3.58387E-06	lb/cuft						
3.58387E-06	lb/cuft	*	2281	cuft/min	=	0.008174817	lb/min	*	60	min/hr	=	0.49 lb/hr
	CO / 50	*	7.2734E-08	=	3.63672E-06	lb/cuft						
3.63672E-06	lb/cuft	*	2281	cuft/min	=	0.008295353	lb/min	*	60	min/hr	=	0.50 lb/hr

500 HP	NOx (lb/hr)	CO (lb/hr)
	1.25	1.27
	Lb/Yr	Lb/Yr
8760 hr/yr	10972	11134
	TPY	TPY
2000 lb/ton	5.49	5.57

200 HP	NOx (lb/hr)	CO (lb/hr)
	0.49	0.50
	Lb/Yr	Lb/Yr
8760 hr/yr	4297	4360
	TPY	TPY
2000 lb/ton	2.15	2.18

Other Pollutants from Natural Gas Combustion

From AP42	lb/ 10^6 scf	500 HP 10^6 scf/yr*	200 HP 10^6 scf/yr*	500 HP emission (lb/hr)	200 HP emission (lb/hr)	500 HP emission (TPY)	200 HP emission (TPY)
CO2	120000	207.0	87.6	2836	1200	12420	5256
VOC	5.5			0.13	0.06	0.57	0.24
PM Total	7.6			0.18	0.08	0.79	0.33
PM Cond	5.7			0.13	0.06	0.59	0.25
PM Filt	1.9			0.04	0.02	0.20	0.08

Notes:
1. 500 HP (24.807 MMBtu/hr) (8760 hrs) (1 MMCF/1050 MMBtu) = 207 MMCF natural gas combusted annually
2. 200 HP (10.5 MMBtu/hr) (8760 hrs) (1 MMCF/1050 MMBtu) = 87.6 MMCF natural gas combusted annually
3. Data is based on the burner manufacturer's specification sheets.

Permanent Boiler Construction Permit Application
Minor New Source Review (MNSR)/
Best Available Control Technology (BACT)
Analysis for Nitrogen Oxides (NOx)

By

Rohm and Haas Electronic Materials CMP, LLC
Electronics & Imaging | DuPont Specialty Products
451 Bellevue Rd, Newark, DE 19713
June 8, 2021

PURPOSE

DNREC requires applicants to perform a Minor New Source Review (MNSR) / Best Available Control Technology (BACT) analysis whenever the potential to emit (PTE) exceeds 5 tons per year (TPY) for either Oxides of Nitrogen (NOx) or Volatile Organic Compounds (VOCs). The evaluation is used to demonstrate that the air contaminant source meets the criteria for the best technology to minimize applicable emissions. Rohm and Haas submitted a construction permit application to DNREC on March 8, 2021 for a Building 2 boiler replacement project. This evaluation covers a NOx BACT analysis for the 500 HP natural gas fired boiler since the PTE was calculated at 5.49 TPY. The VOC PTE for the 500 HP boiler was calculated at 0.57 TPY; therefore, a VOC BACT analysis was not performed.

The 500 HP boiler is equipped with a low NOx burner and Flue Gas Recirculation (FGR) and the analysis determined that this technology is sufficient to meet the MNSR/BACT requirements for minimizing NOx emissions.

BACKGROUND

The 500 HP boiler is only fired with natural gas. If the boiler is fired at 100% capacity for 8760 hours per year, the potential NOx emissions would just exceed the 5 TPY MNSR/BACT analysis threshold (5.49 TPY). From operational experience for the processes requiring steam in Building 2, it is projected that the boiler will not fire at 100% output and will experience full shutdown periods. Actual emissions are expected to be less than the 5 TPY threshold. Based on operational experience and the equipment that is being replaced, current NOx emissions are less than 2 TPY.

EMISSION BASIS FOR MNSR / BACT ANALYSIS

The NOx PTE was calculated using the rated maximum heat input of 24.8 MMBTU/hr. for the burner on the new 500 HP Burnham boiler (Model RS650/EV). The vendor guarantees a NOx emission rate of 30 ppm or less. The stack exhaust flow for this boiler is rated at 5825 cfm. This yields a NOx PTE of 5.49 TPY (reference calculation sheet attached to the permit application).

TECHNOLOGY CONSTRAINTS

For the MNSR/BACT evaluation, all reasonable available control technology was examined to determine that the proposed boiler meets the standards for BACT.

Summary of Control Technology Screening

Technology	Technical Feasibility	Reason
Flue Gas Recirculation	Feasible	Technology allows for flue gas to be recirculated into the combustion process to reduce Thermal NOx by controlling the flame temperature.
Low NOx Burner	Feasible	Low NOx burner technology controls the flame shape thus controlling the formation of Thermal NOx during the combustion process
Non-Selective Catalytic Reduction	Feasible	Catalytic combustion could provide effective destruction of the NOx
Selective Catalytic Reduction with Ammonia Injection	Feasible	Injection of ammonia into the air stream before a vanadium/titanium catalyst

TECHNICALLY FEASIBLE CONTROL ALTERNATIVE

Each of the technically feasible alternatives was evaluated paralleling EPA's OAQPS Control Cost Manual[1]. This evaluation of the overall control effectiveness included:

- Estimated emission reduction potential or estimated control efficiency of each option;
- Estimated emission after application of each control option;
- Technical feasibility with regards to the ease of implementation, timing, etc.; and
- An economic impact of each control option.

Comparisons are based on the annual NOx PTE of 5.49 TPY for the 500 HP Boiler.

1Economic Analysis of the BACT options was conducted per the methods of the EPA Air Pollution Control Cost Manual, Sixth Edition, EPA/452/B-02-001, January 2002

Flue Gas Recirculation

When natural gas is burned in the presence of air, the resulting mixture of flue gases includes nitric oxide (NO). The NO then reacts with the air to produce nitrogen dioxide (NO_2).

The flame temperature may be reduced – and so lessen oxides of nitrogen (NOx) production – by adding non-reactive gases such as carbon dioxide, nitrogen, steam or any other inert gas into the burner. A commonly used practice for a source like the new boiler is in the flue gases that will be inert and have a temperature substantially lower than the flame temperature. By adding about 10% of flue gas into the flame, the temperature will be reduced by about 7%. This is known as flue gas recirculation (FGR). Although it might be considered that reheating the hot flue gases may exacerbate the production of NOx, the relatively cool (compared with the combustion chamber) inert gas lowers the temperature of the flame, thereby reducing the production of NOx.

In a standard forced-draft burner, excess oxygen is present to ensure complete combustion whereas, with FGR, the excess oxygen is reduced and partly replaced by inert flue gases, which mix and absorb some of the flame energy and reduce the temperature. NOx formation increases exponentially as temperatures rise, so reducing the flame temperature can readily cut NOx levels by up to 50%. At higher rates of flue gas recirculation, the flame size can increase, which may cause impingement on heat transfer surfaces, so requiring a limitation on firing rate. The consequent reduction of the oxygen content limits the possibility of nitrogen reacting at later stages within the flame.

In terms of capital cost, the forced draft burners are more expensive, as they are specifically produced for the application. The ducted flue system and flue connections are relatively simple. According to advice from the manufacturer, typical additional cost – compared with that of a standard installation using FGR – is around 20% to 25% extra to the burner and flue costs, not to the overall project cost and the cost per kW reduces as the size of the boiler increases.

Low NOx Burner

Design improvements such as controlling gas and airflows as well as monitoring exhaust gases have been incorporated into contemporary burner designs, however, inefficient combustion can still result. Oftentimes, industries have turned to installing auxiliary oxygen supply systems in an effort to gain efficiency and reduce emissions. Auxiliary oxygen systems add to both production and maintenance costs while yielding only marginal emissions improvements.

Modern design incorporating vortex mixing technology improves the combustion process efficiency which significantly reduces NOx emissions and utilizes less fuel without the addition of auxiliary oxygen supply systems or exhaust monitoring equipment. A low velocity vortex generator internal to the burner is used to thoroughly mix the fuel gas and combustion air on ratio prior to ignition. In this arrangement, fuel gas is significantly better associated with oxygen rather than the surrounding nitrogen or products of combustion. The results are more efficient combustion and a significant reduction in NOx emissions.

Selective Non-Catalytic Reduction

In Selective Non-Catalytic Reduction (SNCR), aqueous ammonia or urea is injected into flue gases from the combustion process at temperatures between 1600°F and 2100°F (870°C to 1150°C) to reduce NOx to nitrogen gas (N2), carbon dioxide (CO2), and water (H2O). The basic chemical principle is that at a high temperature, ammonia or urea reacts with NOx from the combustion gases to yield nitrogen gas (N2) and water vapor (H2O). SNCR can be used to reduce NOx emissions by 30 – 70 %. With the low NOx burner and FGR, the overall NOx reduction is closer to 90%.

Selective Catalytic Reduction with Ammonia Injection

Selective Catalytic Reduction (SCR) is arguably the most widely-used technique for NOx reduction in large scale combustion streams. Selective catalytic reduction of NOx is classified as an after-treatment solution for emission control and commonly used in combustion turbines, natural gas engines, and diesel engines which generate pollutants like NOx and carbon particulates post-combustion.

In SCR, a reagent (usually 19% or 29% aqueous ammonia, anhydrous ammonia or urea) is injected into the exhaust stream of the combustion machine (turbine or engine) which is maintained at a specific temperature depending on the catalyst used. The heat vaporizes the ammonia.

Nitrogen gas and NOx present in the flue gas stream react with vaporized ammonia in the presence of a catalyst (which speeds up the reaction) to yield diatomic nitrogen (N2), water, and trace amounts of CO2 – harmless products which are expelled from the exhaust pipe. The reagent is optimized by maintaining a near-equal ratio with the NOx to be removed from the flue gas stream. Depending on the design, the removal efficiency can exceed 90%. For this analysis, we are assuming 90% for the calculations.

MNSR/BACT ECONOMIC ANALYSIS

Baseline: Nitrogen oxide (NOx) emissions from the combustion process for the 500 HP boiler prior to add on controls was calculated at 5.49 TPY, based on a 365-day operating year and 100% firing rate. The evaluation assumes utilizing FGR and a low NOx burner to reach these emissions. The NOx emissions would be at least 30-50% higher without utilizing these two control technologies. The MNSR/BACT analysis is to demonstrate the practicality of additional controls to reduce the emissions further.

Selective Non-Catalytic Reduction and Selective Catalytic Reduction with Ammonia Injection were evaluated for the economic analysis. The analysis is based on the following assumptions:

1. Cost for the selected technologies are based on the EPA Air Pollution Control Cost Manual (EPA/452/B-02-001). The cost includes design, installation and testing of the control device. This factor was applied to the capital cost to develop an installed cost.

2. The equipment costs were adjusted by a 33% inflation factor. The basis for this adjustment was the Bureau of Labor Statistics Producer Price Index from the end of 2008 to the end of 2016.

3. Electric and natural gas costs were based on $0.15 per kW hour and $9 per thousand cubic feet of gas.

4. A 15-year, 10% interest depreciation factor was used for the analysis.

ECONOMIC ANALYSIS FOR T-BACT OPTIONS

The capital costs to implement SNCR and SCR are $151,604 and $465,325, respectively. Based on review of the current data available, it is assumed there is a 14% increase in these costs in the time frame since the issuance of the 2016 data that was used in the evaluation. The operating costs for the SNCR and SCR options are included Table 1.

Table 1 – Selective Non-Catalytic Reduction and Selective Catalytic Reduction Costs

							SNCR	SCR
	Operator		4 hours per week		$20/hr		$4,160	$4,160
	Supervisor		15% of Operator				$624	$624
Maintenance								
	Labor		3 hours per week		$25/hr		$3,900	$3,900
	Materials							
Catalyst Replacement			4 CF		$650/ft3			$1,200
Utilities								
	Electricity	Ammonia Injection			$0.15/kWh		$0	$250
						Sum	**$8,684**	**$10,134**
	Indirect Costs							
	Overhead		60% of sum of operating,				$5,210	$6,080
			supervisor & maintenance labor &					
			maintenance materials					
	Admin		2% Installed Cost				$3,032	$9,307
	Property Taxes		1% Installed Cost				$1,516	$4,653
	Insurance		1% Installed Cost				$1,516	$4,653
	Capital Recovery		15%				$22,741	$69,799
TOTAL ANNUAL OPERATING COSTS							**$42,699**	**$104,626**

CONTROLS IMPLEMENTED/ RECOMMENDATIONS

SNCR or SCR technologies can provide further NO_X reduction with a removal efficiency of 70% and 90%, respectively. Therefore, applying either technology to the boiler system as an additional control would reduce the NOx emissions further by 3.84 TPY for SNCR and 4.94

TPY for SCR. An economic analysis was performed for the additional controls and is included in Table 2.

Table 2 – SNCR/SCR NOx Removal Technology Economic Analysis

Type	Overall Annualized Cost	Cost per Ton NOx Reduction	Reasonable Addition over Already Installed FGR & Low NOx Burner
SNCR	**$49,699**	**$11,120**	No
SCR	**$104,626**	**$21,179**	No

As part of the MNSR/BACT evaluation, a search of the RACT/BACT/LAER database was conducted to determine the technology and corresponding emission rates for boilers with similarly sized burners that combust natural gas (25 MMBTU/hr.). A summary of the search, filtered for NOx to make the table more concise, was provided as Attachment #1. The manufacturer of the burner for the proposed 500 HP boiler unit guarantees an emission limit of 30 ppm NOx, which is well within the parameters noted for a modern burner used in a typical package boiler like those referenced in Attachment #1. Additionally, the 0.05 lbs. NOx/MMBTU emission rate for the proposed boiler unit ((lbs. NOx/hr. permitted) / (Heat input rate)) is also within the emission range of several similar sized sources listed in the database.

Based on the DNREC required MNSR/BACT analysis, DuPont has specified a low NOx burner and flue gas recirculation as part of the new 500 HP boiler system for Building 2. Emissions of NOx from large combustion sources located at power generation facilities or refineries may be controlled using SNCR or SCR. However, review of the RACT/BACT/LAER database and the Removal Technology Economic Analysis referenced in Table 2 indicates the addition of post combustion NOx control like SNCR and SNR are not feasible for smaller combustion sources like the 500 HP package boiler. DuPont believes that the 500 HP boiler unit which includes both a low NOx burner and Flue Gas Recirculation to reduce NOx emissions represents Best Available Control Technology for this application and meets the DNREC minor new source review requirements without further NOx emission controls.

ATTACHMENT #1
RACT/BACT/LAER CLEARINGHOUSE DATABASE SEARCH
BOILERS AND HEATERS - LESS THAN 25 MMBTU/HR HEAT INPUT

RBLCID	FACILITY NAME	CORPORATE OR COMPANY NAME	FACILITY COUNTY	FACILITY STATE	FACILITY ZIP CODE	SIC CODE	NAICS CODE	PERMIT ISSUANCE DATE	PROCESS NAME	PROCCESS TYPE	PRIMARY_FUEL	THROUGHPUT	THROUGHPUT UNIT	PROCESS NOTES	POLLUTANT	POLLUTANT_GROUP(S)	CONTROL_METHOD_CODE	CONTROL METHOD DESCRIPTION	EMISSION_LIMIT_1	EMISSION_LIMIT_1_UNIT	EMISSION_LIMIT_2	EMISSION_LIMIT_2_UNIT	POLLUTANT_COMPLIANCE_NOTES
AL-0307	ALLOYS PLANT	CONSTELLIUM	COLBERT	AL	35661	3353	331315	10/09/2015 ACT	2 CALP LINE BOILERS	13.31	NATURAL GAS	24.59	MMBTU/H	2 IDENTICAL BOILERS	Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	P	LOW NOX BURNER FLUE GAS RECIRCULATION (FGR) GOOD COMBUSTION PRACTICES (GCP)	39	PPMVD	0.9	LB/H	
AR-0140	BIG RIVER STEEL LLC	BIG RIVER STEEL LLC	MISSISSIPPI	AR	72370	3312	331111	09/18/2013 ACT	BOILERS SN-26 AND 27, GALVANIZING LINE	13.31	NATURAL GAS	24.5	MMBTU/H		Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	B	LOW NOX BURNERS COMBUSTION OF CLEAN FUEL GOOD COMBUSTION PRACTICES	0.035	LB/MMBTU	0		
AR-0140	BIG RIVER STEEL LLC	BIG RIVER STEEL LLC	MISSISSIPPI	AR	72370	3312	331111	09/18/2013 ACT	BOILERS SN-26 AND 27, GALVANIZING LINE	13.31	NATURAL GAS	24.5	MMBTU/H		Nitrous Oxide (N2O)	(Greenhouse Gasses (GHG),InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	P	GOOD OPERATING PRACTICES MINIMUM BOILER EFFICIENCY 75%	0.0002	LB/MMBTU	0		
AR-0140	BIG RIVER STEEL LLC	BIG RIVER STEEL LLC	MISSISSIPPI	AR	72370	3312	331111	09/18/2013 ACT	FURNACES SN-40 AND SN-42, DECARBURIZING LINE	13.31	NATURAL GAS	22	MMBTU/H		Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	B	LOW NOX BURNERS SCR COMBUSTION OF CLEAN FUEL GOOD COMBUSTION PRACTICES	0.1	LB/MMBTU	0		
AR-0140	BIG RIVER STEEL LLC	BIG RIVER STEEL LLC	MISSISSIPPI	AR	72370	3312	331111	09/18/2013 ACT	FURNACES SN-40 AND SN-42, DECARBURIZING LINE	13.31	NATURAL GAS	22	MMBTU/H		Nitrous Oxide (N2O)	(Greenhouse Gasses (GHG),InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	P	GOOD OPERATING PRACTICES	0.0002	LB/MMBTU	0		
LA-0240	FLOPAM INC.	FLOPAM INC.	IBERVILLE PARISH	LA	70764	2899	325110	06/14/2010 ACT	Boilers	13.31	natural gas	25.1	MMBTU/H		Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	P	Ultra Low NOx Burners	0.38	LB/H	9	PPMV	also determined as BACT
LA-0244	LAKE CHARLES CHEMICAL COMPLEX - LAB UNIT	SASOL NORTH AMERICA, INC.	CALCASIEU	LA	70669	2869	325110	11/29/2010 ACT	EQT0028 - PACOL STARTUP HEATER H-202	13.31	natural gas	21	MMBTU/H		Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	P	low nox burners	2.71	LB/H	0	% OPACITY	BACT was determined in 1983
LA-0305	LAKE CHARLES METHANOL FACILITY	LAKE CHARLES METHANOL, LLC	CALCASIEU PARISH	LA	70669	2869	325199	06/30/2016 ACT	Gasifier Start-up Preheat Burners	13.31	Natural gas	23	MM BTU/hr (each)		Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	P	good engineering practices, good combustion technology, and use of clean fuels	0		0		
MI-0423	INDECK NILES, LLC	INDECK NILES, LLC	CASS	MI	49120	4911	221112	01/04/2017 ACT	FGFUELHTR (Two fuel boilers identified as EUFUELHTR1 & EUFUELHTR2)	13.31	Natural gas	27	MMBTU/H	Two natural gas fired dew point heaters for warming the natural gas fuel (EUFUELHTR1 & EUFUELHTR2 in flexible group FGFUELHTR). The total combined heat input during operation shall not exceed 27 MMBTU/H (each) as well. The CO2e limit is for both units combined; however the other limits are per unit.	Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	P	Good combustion practices.	2.65	LB/H	0		The emission limit of 2.65 lb/hr is for each unit. SCR and low NOx burners are each greater than $18,000/ton for NOx, factoring in the redundancy of the heaters (limited operation).
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	MONROE	OH	43931	4911	221112	11/07/2017 ACT	Auxiliary Boiler (B001)	13.31	Natural gas	26.8	MMBTU/H	26.8 MMBtu/hr natural gas-fired boiler with a low-NOx burner and flue gas recirculation	Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	A	Flue gas recirculation and low NOX burner	0.29	LB/H	0.74	T/YR	
TX-0635	CEDAR BAYOU PLANT, UNIT 1594	CHEVRON PHILLIPS CHEMICAL COMPANY, LP	HARRIS	TX	77521	2869	325199	01/17/2013 ACT	Vapor Destruction Unit	13.31	Natural Gas	28.8	MM BTU/H	Vapor Destruction Unit (VDU) (Combustion Unit). The VDU has a maximum design heat input rate of 28.8 MMBtu/hr. EPN# PK-00060	Nitrous Oxide (N2O)	(Greenhouse Gasses (GHG),InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	N		0.0046	T/YR	0		
TX-0656	GAS TO GASOLINE PLANT	NATGASOLINE	JEFFERSON	TX		2911	325199	05/16/2014 ACT	heaters (5)	13.31	natural gas	24.3	MMBTU/H		Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	P	ultra low NOx burners	0.036	LB/MMBTU	0		
WY-0075	CHEYENNE PRAIRIE GENERATING STATION	BLACK HILLS POWER, INC	LARAMIE	WY	82009	491	221122	07/16/2014 ACT	Auxiliary Boiler	13.31	natual gas	25.06	MMBtu/h		Nitrogen Oxides (NOx)	(InOrganic Compounds,Oxides of Nitrogen (NOx),Particulate Matter (PM))	A	Ultra low NOx burners and flue gas recirculation	0.0175	LB/MMBTU	0.4	LB/H	