Trinity Consultants
1580 Columbia Turnpike, Building 1, Suite 1; Castleton-On-Hudson, NY 12033 / P 518.460.8036 / **trinityconsultants.com**

Submitted via email only
Attention: kevin.balduzzi@dec.ny.gov dep.r7@dec.ny.gov

NON-CONFIDENTIAL VERSION

July 8, 2025

Mr. Kevin Balduzzi
Regional Permit Administrator
Division of Air Resources, Region 7
New York State Department of Environmental Conservation
5786 Widewaters Parkway, Syracuse, NY 13214-1867

RE: Micron New York Semiconductor Manufacturing, LLC, Clay, NY
PSD/NNSR Air Permit Application 2 for the Proposed Air Permit Project
Submission of Additional Information

Dear Mr. Balduzzi:

On March 10, 2025, Micron New York Semiconductor Manufacturing, LLC (Micron) submitted a PSD/NNSR and Title V air permit application for the construction and operation of the Proposed Air Permit Project in Clay, New York. On April 30, 2025, the New York State Department of Environmental Conservation (NYSDEC) sent Micron a Notice of Incomplete Application (NOIA) identifying additional information needed in support of the Title V application.

Micron submitted its responses to the NOIA on June 06, 2025. As indicated in our NOIA response letter, we are hereby submitting additional supplemental information. The following updated application sections and appendices are included in this submittal:

- Updated Section 6 – Limits Summary
- Use of Emission Reduction Credits (ERC) Form
- Updated Appendix A – Application Forms
- Updated Appendix B – List of Exempt Activities
- Updated Appendix E – Process Flow Diagrams
- Updated Appendix F – Emission Calculations
- Updated Appendix H – NOx BACT/LAER
- Updated Appendix J – CO BACT
- Updated Appendix K – PM/PM10/PM2.5 BACT
- Updated Appendix L – GHG BACT
- Updated Appendix M – VOC LAER
- Updated Appendix Q – Emission Unit Matrix

The Climate Leadership and Community Protection Act (CLCPA) analysis (Appendix O) was submitted under a separate cover to the Department on June 27, 2025. Upon the receipt of the Department's approval of the air dispersion modeling protocol (submitted on April 5, 2025), the final air dispersion modeling report will be submitted. Proposed Title V permit conditions, methods of compliance (Appendix C), updated operational flexibility protocol (Appendix D), and updated stack test plan (Appendix T) will be submitted to the Department by July 15, 2025.

We appreciate the expeditiousness and collaboration demonstrated by the NYSDEC team in reviewing our application and look forward to receiving the Notice of Complete Application and the draft Title V permit for review soon.

This submittal has been redacted to protect commercial information that is considered proprietary, confidential business information, and/or trade secret information to Micron ("confidential business information"). Micron requests that its confidential business information be protected from disclosure in accordance with Title 6 of the New York Codes, Rules and Regulations (6 NYCRR), Part 616, New York Public Officers Law Section 87(2)(d), and similar laws and regulations. The confidential information in this submittal would cause substantial injury to Micron's competitive position and place Micron at a significant competitive disadvantage if disclosed to a competitor.

If you have any questions regarding this application, please contact me at (724) 442-6809 or tmuscenti@trinityconsultants.com.

Sincerely,

Tom Muscenti, P.E.
Regional Director
Trinity Consultants

ecc cover letter only:

Mr. Robert Jacobs, NYSDEC
Mr. Andy LoFaro NYSDEC
Ms. Marissa Logan, NYSDEC
Mr. Patrick Foster, NYSDEC
Ms. Ashley Kunz, Micron
Ms. Brittany Sanders, Micron
Ms. Katie Birchenough, Micron
Ms. Jesse McMahon, Micron
Ms. Kailin Schwan, Micron
Mr. Jacob Bugiera, Trinity Consultants
Mr. Sundar Sadashivam, Trinity Consultants

6. CONTROL TECHNOLOGY LIMIT SUMMARY

Because the Proposed Air Permit Project is considered to be a major source under the PSD/NNSR programs, the emission sources proposed are subject to BACT- and/or LAER-based limits in accordance with 6 NYCRR 231-7.5 and 231-5.3(a). Micron has identified BACT and LAER limitations, including associated numerical limits, as detailed in Section 4 of this application and Appendices H through N.

This Section summarizes the proposed BACT and LAER requirements for each PSD/NNSR pollutant, broken down by emission source groups. The Emission Unit ID, Title V Process ID, and initial Emission Source/Control IDs are provided to clarify the emission sources and equipment to which each limit applies. The Emission Unit Matrix in Appendix Q provides additional details on each source. Only emission sources that emit the specific pollutant are included in each section.

6.1 Nitrogen Oxides

As described in Section 4.1.1 and 4.2.1, the Proposed Air Permit Project is subject to the requirements of both BACT and LAER for emissions of NO_X. The proposed BACT/LAER limitations are summarized in Table 6-1.

Table 6-1. Proposed NO_X Limitations

Source Description	Emission Unit	Title V Process	Emission Source/Control	NO_X BACT/LAER
Natural Gas-fired Boilers	1-CMBOP	BLR	BLR01 – BLR03	9 ppmvd at 3% O_2 Good Combustion and Maintenance Practices Limited to 6,000 hours per year for each boiler
	2-CMBOP	BLR	BLR04 – BLR06	
Natural Gas-fired Water Bath Vaporizers	1-CMBOP	WBV	WBV01 - WBV04	50 lb/MMscf Good Combustion and Maintenance Practices Limited to 8,000 hours per year for all water bath vaporizers combined
	2-CMBOP	WBV	WBV05 – WBV08	

Source Description	Emission Unit	Title V Process	Emission Source/Control	NO_x BACT/LAER
Diesel-fired Emergency Generators	1-CMBOP	EMD	DG001 – DG060	Procure engines that meet Tier 4 Final Emission Standards Good Combustion and Maintenance Practices Limited to 100 hours per year for each engine
	2-CMBOP	EMD	DG061 – DG118	
Diesel-fired Emergency Fire Pump	1-CMBOP	DFP	FP001	Procure engines that meet NSPS IIII/Tier 3 Emission Standards Good Combustion and Maintenance Practices Limited to 500 hours per year
Semiconductor Process Tools and PEECs	1-FABOP	FC1	TFD01	Good Combustion and Maintenance Practices Wet scrubbing of NO_2 with Fab CVD exhaust either: ▶ 13.1 lb/hr per Fab or; ▶ ≥90% efficiency if inlet NOx ≥46.1 ppmv.
	2-FABOP	FC2	TFD02	
	1-FABOP	FA1	PLE01	Good Combustion and Maintenance Practices
		FS1	PHO01	
			WET01	

Source Description	Emission Unit	Title V Process	Emission Source/Control	NO_X BACT/LAER
Semiconductor Process Tools and PEECs	2-FABOP	FA2	PLE02	Good Combustion and Maintenance Practices
		FS2	PHO02	
			WET02	

As required by 6 NYCRR 231-5.3(a) and 231-7.5(a), all sources of NO_X emissions at the Proposed Air Permit Project will be subject to a combined limit of 357.2 tons per year NO_X emissions, based on current emissions estimates. Proposed permit condition language, consistent with the above limits and practices, will be included in a forthcoming submission.

6.2 Carbon Monoxide

As described in Section 4.1.1, the Proposed Air Permit Project is subject to BACT for emissions of CO. The proposed CO BACT limitations are summarized in Table 6-2.

Table 6-2. Proposed CO Limitations

Source Description	Emission Unit	Title V Process	Emission Source/Control	CO BACT
Natural Gas-fired Boilers	1-CMBOP	BLR	BLR01 – BLR03	50 ppmvd at 3% O_2 Good Combustion and Maintenance Practices Limited to 6,000 hours per year for each boiler
	2-CMBOP	BLR	BLR04 – BLR06	
Natural Gas-fired Water Bath Vaporizers	1-CMBOP	WBV	WBV01 - WBV04	84 lb/MMscf Good Combustion and Maintenance Practices

Source Description	Emission Unit	Title V Process	Emission Source/Control	CO BACT
Natural Gas-fired Water Bath Vaporizers	2-CMBOP	WBV	WBV05 – WBV08	Limited to 8,000 hours per year for all water bath vaporizers combined
Diesel-fired Emergency Generators	1-CMBOP	EMD	DG001 – DG060	Procure engines that meet Tier 4 Final Emission Standards Good Combustion and Maintenance Practices Use of ULSD fuel Limited to 100 hours per year for each engine
	2-CMBOP	EMD	DG061 – DG118	
Diesel-fired Emergency Fire Pump	1-CMBOP	DFP	FP001	Procure engines that meet NSPS IIII/Tier 3 Emission Standards Good Combustion and Maintenance Practices Use of ULSD fuel Limited to 500 hours per year
Semiconductor Process Tools and PEECs	1-FABOP	FA1	PLE01	Good Combustion and Maintenance Practices Fab Acid exhaust either: ► 0.03 lb/hr per Fab or; ► 184.2 lbs/yr per Fab
	2-FABOP	FA2	PLE02	

As required by 6 NYCRR 231-7.5(a), all sources of CO emissions at the Proposed Air Permit Project will be subject to a combined limit of 1,410 tons per year CO emissions, based on current emissions estimates. Proposed permit condition language, consistent with the above limits and practices, will be included in a forthcoming submission.

6.3 Particulate Matter

As described in Section 4.1.1, the Proposed Air Permit Project is subject to BACT for emissions of PM. The proposed PM LAER limitations are summarized in Table 6-3.

Table 6-3. Proposed PM Limitations

Source Description	Emission Unit	Title V Process	Emission Source/Control	PM BACT
Natural Gas-fired Boilers	1-CMBOP	BLR	BLR01 – BLR03	7.6 lb/MMscf Good Combustion and Maintenance Practices Limited to 6,000 hours per year for each boiler
	2-CMBOP	BLR	BLR04 – BLR06	
Natural Gas-fired Water Bath Vaporizers	1-CMBOP	WBV	WBV01 - WBV04	7.6 lb/MMscf Good Combustion and Maintenance Practices Limited to 8,000 hours per year for all water bath vaporizers combined
	2-CMBOP	WBV	WBV05 – WBV08	
Diesel-fired Emergency Generators	1-CMBOP	EMD	DG001 – DG060	Procure engines that meet 0.008 g/kW-hr

Source Description	Emission Unit	Title V Process	Emission Source/Control	PM BACT
Diesel-fired Emergency Generators	2-CMBOP	EMD	DG061 – DG118	Good Combustion and Maintenance Practices Use of ULSD fuel Limited to 100 hours per year for each engine
Diesel-fired Emergency Fire Pump	1-CMBOP	DFP	FP001	Procure engines that meet NSPS IIII/Tier 3 Emission Standards Good Combustion and Maintenance Practices Use of ULSD fuel Limited to 500 hours per year
Semiconductor Process Tools and PEECs	1-FABOP	FC1	TFD01	Use of Ionizing Wet Scrubber for 82% (minimum inlet concentration of 0.22 ppmv) Total PM Reduction
		FA1	PLE01	Use of Mist Eliminators on Acid Scrubbers Good Combustion and Maintenance Practices
			IMP01	
			WET01	
		FB1	PHO01	Use of Mist Eliminators on Ammonia Scrubbers Good Combustion and Maintenance Practices
			CMP01	

Source Description	Emission Unit	Title V Process	Emission Source/Control	PM BACT
Semiconductor Process Tools and PEECs	1-FABOP	FS1	PHO01	Good Combustion and Maintenance Practices
	2-FABOP	FC2	TFD02	Use of Ionizing Wet Scrubber for 82% (minimum inlet concentration of 0.22 ppmv) Total PM Reduction
		FA2	PLE02	Use of Mist Eliminators on Acid Scrubbers Good Combustion and Maintenance Practices
			IMP02	
			WET02	
		FB2	PHO02	Use of Mist Eliminators on Ammonia Scrubbers Good Combustion and Maintenance Practices
			CMP02	
		FS2	PHO02	Good Combustion and Maintenance Practices
Cooling towers	1-HPMCU	CT1	CT001 – CT105	Drift/Mist eliminators certified to < 0.0005% drift rate Total Dissolved Solids < 1,200 mg/L
		CT1	CT106 – CT111	
	2-HPMCU	CT2	CT112 – CT216	

Source Description	Emission Unit	Title V Process	Emission Source/Control	PM BACT
Cooling towers	2-HPMCU	CT2	CT217 – CT222	
Bulk Material Storage Silos	1-WWBIO	SL1	SIL001 - SIL02	Fabric Filters certified to 0.005 gr/dscf Good Operating and Maintenance Practices.
	2-WWBIO	SL2	SIL03 – SIL04	
Vehicle Traffic Dust Emissions	1-FUGEM	RF1	RWY01	Surface Improvements (e.g., Paving) and implementation of Speed Limit(s) Periodic Surface Treatments (i.e., watering) where paving is not feasible.
	2-FUGEM	RF2	RWY02	
Wastewater Treatment Process	1-WWBIO	WS1	WWT01	Waste Minimization and Efficient Design
		BG1	BIO01	
	2-WWBIO	WS2	WWT02	
		BG2	BIO02	

As required by 6 NYCRR 231-7.5(a), all sources of particulate matter emissions at the Proposed Air Permit Project will be subject to the following PM limits, based on current emissions estimates. Proposed permit condition language, consistent with the above limits and practices, will be included in a forthcoming submission.

- PM: 77.6 tons per year
- PM_{10}: 68.7 tons per year
- $PM_{2.5}$: 55.9 tons per year

6.4 Volatile Organic Compounds

As described in Section 4.2.1, the Proposed Air Permit Project is subject to LAER for emissions of VOC. The proposed VOC LAER limitations are summarized in Table 6-4.

Table 6-3. Proposed VOC Emission Limits

Source Description	Emission Unit	Title V Process	Emission Source/Control	VOC LAER
Natural Gas-fired Boilers	1-CMBOP	BLR	BLR01 – BLR03	0.0017 lb/MMBtu Good Combustion and Maintenance Practices Limited to 6,000 hours per year for each boiler
	2-CMBOP	BLR	BLR04 – BLR06	
Natural Gas-fired Water Bath Vaporizers	1-CMBOP	WBV	WBV01 - WBV04	0.0054 lb/MMBtu Good Combustion and Maintenance Practices Limited to 8,000 hours per year for all water bath vaporizers combined
	2-CMBOP	WBV	WBV05 – WBV08	
Diesel-fired Emergency Generators	1-CMBOP	EMD	DG001 – DG060	Procure engines that meet Tier 4 Final Emission Standards Good Combustion and Maintenance Practices Use of ULSD fuel Limited to 100 hours per year for each engine
	2-CMBOP	EMD	DG061 – DG118	

Source Description	Emission Unit	Title V Process	Emission Source/Control	VOC LAER
Diesel-fired Emergency Fire Pump	1-CMBOP	DFP	FP001	Procure engines that meet NSPS IIII/Tier 3 Emission Standards Good Combustion and Maintenance Practices Use of ULSD fuel Limited to 500 hours per year
Semiconductor Process Tools, PEECs, and Cleaning Operations	1-FABOP	FA1	PLE01	Compliance with the following DREs and/or concentration-based limits: ► ≥98.5% destruction/recovery efficiency if inlet VOC ≥2,000 ppmv*; ► ≥97% efficiency if inlet VOC ≥200 to <2,000 ppmv*; ► ≥90% efficiency if inlet VOC <200 ppmv*; or ► ≤10 parts per ppmv* at outlet. *_ppmv measured as methane_.
			WET01	
		FC1	TFD01	
		FB1	PHO01	
			CMP01	
		FS1	PHO01	
			WET01	
		FG1	GN001 - GN040	
	2-FABOP	FA2	PLE02	
			WET02	
		FC2	TFD02	
		FB2	PHO02	
			CMP02	
		FS2	PHO02	
			WET02	
		FG2	GN041 - GN080	

Source Description	Emission Unit	Title V Process	Emission Source/Control	VOC LAER
Semiconductor Process Tools, PEECs, and Cleaning Operations	1-HPMCU	HS1	SOD01	
	1-HPMCU	HS2	SOD02	
	2-HPMCU	HS3	SOD03	
	2-HPMCU	HS4	SOD04	
Use of Heat Transfer Fluids	1-FABOP	FG1	GN001 – GN040	Good Design and Maintenance Practices, including regular evaluation of consumption records to confirm efficient usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas.
	2-FABOP	FG2	GN041 – GN080	
Lab Process	1-ADMPR	AA1	ALB01	Good Operating and Maintenance Practices
		AS1		
	2-ADMPR	AA2	ALB02	
		AS2		
	1-WWBIO	WA1	WLB01	
		WB1		
		WS1		
	2-WWBIO	WA2	WLB02	
		WB2		
		WS2		

Source Description	Emission Unit	Title V Process	Emission Source/Control	VOC LAER
Volatile Organic Liquid Storage Tanks	1-HPMCU	HB1	ST046 – ST049	Good Operating and Maintenance Practices Procurement of efficiently designed tanks. Equip tanks with submerged fill device and conservation vent; and apply light colored paint or locate tanks indoors. Achieve ≥95% overall reduction of VOC emissions. Ammonia Scrubber to control TMAH emissions (Process FB1, HB1, FB2, and HB2). RCTO for all other tanks
		HB2	ST050 – ST053	
		HS1	ST066 – ST069	
		HS2	ST070 – ST073	
	2-HPMCU	HB3	ST115 – ST118	
		HB4	ST119 – ST122	
		HS3	ST135 – ST138	
		HS4	ST139 – ST142	
Waste Volatile Organic Liquid Storage Tanks	1-FABOP	FS1	WS001 – WS030	Good Operating and Maintenance Practices Procurement of efficiently designed tanks Nitrogen blanketing, conservation vents, and adequately sized pressure relief valves for organic concentrations of at least 10 percent. Achieve ≥95% overall reduction of VOC emissions.
	2-FABOP	FS2	WS031 – WS030	
Wastewater Treatment Process	1-WWBIO	WS1	WWT01	Waste Minimization and Efficient Design
		WA1	WLB01	

Source Description	Emission Unit	Title V Process	Emission Source/Control	VOC LAER
Wastewater Treatment Process	1-WWBIO	BG1	BIO01	Waste Minimization and Efficient Design
	2-WWBIO	WS2	WWT02	
		WA2	WLB02	
		BG2	BIO02	

As required by 6 NYCRR 231-5.3(a), all sources of VOC emissions at the Proposed Air Permit Project will be subject to the combined limit of 205.7 tons per year VOC emissions, based on current emissions estimates. Proposed permit condition language, consistent with the above limits and practices, will be included in a forthcoming submission.

6.5 Greenhouse Gases

As described in Section 4.1.1, GHG emissions are subject to BACT requirements. The proposed GHG BACT limitations are summarized in Table 6-5.

Table 6-5. Proposed GHG Limitations

Source Description	Emission Unit	Title V Process	Emission Source/ Control	GHG BACT
Natural Gas-fired Boilers	1-CMBOP	BLR	BLR01 – BLR03	117 lb CO_2/MMBtu Efficient design and combustion practices Limited to 6,000 hours per year for each boiler
	2-CMBOP	BLR	BLR04 – BLR06	
Natural Gas-fired Water Bath Vaporizers	1-CMBOP	WBV	WBV01 - WBV04	117 lb CO_2/MMBtu Efficient design and combustion practices

Source Description	Emission Unit	Title V Process	Emission Source/ Control	GHG BACT
Natural Gas-fired Water Bath Vaporizers	2-CMBOP	WBV	WBV05 – WBV08	Limited to 8,000 hours per year for all water bath vaporizers combined
Diesel-fired Emergency Generators	1-CMBOP	EMD	DG001 – DG060	163 lb CO_2/MMBtu Efficient Design and Combustion Practices Limited to 100 hours per year for each engine
	2-CMBOP	EMD	DG061 – DG118	
Diesel-fired Emergency Fire Pump	1-CMBOP	DFP	FP001	163 lb CO_2/MMBtu Efficient Design and Combustion Practices Limited to 500 hours per year
Semiconductor Process Tools and PEECs	1-FABOP	FA1	PLE01	Use of thermal oxidation systems that are used to oxidize F-GHGs Meet the default DREs listed in the IPCC's 2019 Revision Table 6.17[1] plasma etch processes by executing the following work-practice standards:

[1] 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 6 – Electronics Industry Emissions.

Source Description	Emission Unit	Title V Process	Emission Source/ Control	GHG BACT
Semiconductor Process Tools and PEECs	1-FABOP	FA1	PLE01	► Obtain POU control device and RCS supplier DRE certification that states each can at a minimum meet default DREs or higher. ► Maintain a site maintenance plan that meets the POU control device and RCS supplier's installation, operation, and maintenance requirements. ► Track uptime of POU control devices and RCS when fab processes are running. DRE is assumed 0% (unless demonstrated otherwise) when POU control device is not running per site maintenance plan while process is running. ► Certify annually that each POU control device and RCS claiming default DRE followed the site maintenance plan.
			WET01	Good Combustion and Maintenance Practices Utilize GHG raw materials as efficiently as possible, including optimizing tool operating cycles and efficient utilization of process chemicals.
		FC1	TFD01	Good Combustion and Maintenance Practices Use of thermal oxidation systems that are used to oxidize F-GHGs. For cleaning CVD chambers between production cycles, NF_3 will replace the use of carbon-based F-GHGs.

Source Description	Emission Unit	Title V Process	Emission Source/ Control	GHG BACT
Semiconductor Process Tools and PEECs	1-FABOP			Utilize GHG raw materials as efficiently as possible, including optimizing tool operating cycles and efficient utilization of process chemicals.
		FB1	CMP01	Good Combustion and Maintenance Practices
		FS1	WET01	
			PHO01	
		FG1	GN001 – GN040	

Source Description	Emission Unit	Title V Process	Emission Source/ Control	GHG BACT
Semiconductor Process Tools and PEECs	2-FABOP	FA2	PLE02	Use of thermal oxidation systems that are used to oxidize F-GHGs Meet the default DREs listed in the IPCC's 2019 Revision Table 6.17[2] plasma etch processes by executing the following work-practice standards: ► Obtain POU control device and RCS supplier DRE certification that states each can at a minimum meet default DREs or higher. ► Maintain a site maintenance plan that meets the POU control device and RCS supplier's installation, operation, and maintenance requirements. ► Track uptime of POU control devices and RCS when fab processes are running. DRE is assumed 0% (unless demonstrated otherwise) when POU control device is not running per site maintenance plan while process is running. ► Certify annually that each POU control device and RCS claiming default DRE followed the site maintenance plan.
			WET02	Good Combustion and Maintenance Practices

[2] 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 6 – Electronics Industry Emissions.

<table>
<tr><th>Source Description</th><th>Emission Unit</th><th>Title V Process</th><th>Emission Source/ Control</th><th>GHG BACT</th></tr>
<tr><td rowspan="6">Semiconductor Process Tools and PEECs</td><td rowspan="6">2-FABOP</td><td></td><td>WET02</td><td>Utilize GHG raw materials as efficiently as possible, including optimizing tool operating cycles and efficient utilization of process chemicals.</td></tr>
<tr><td>FC2</td><td>TFD02</td><td>Good Combustion and Maintenance Practices

Use of thermal oxidation systems that are used to oxidize F-GHGs.

For cleaning CVD chambers between production cycles, NF_3 will replace the use of carbon-based F-GHGs.

Utilize GHG raw materials as efficiently as possible, including optimizing tool operating cycles and efficient utilization of process chemicals.</td></tr>
<tr><td>FB2</td><td>CMP02</td><td rowspan="4">Good Combustion and Maintenance Practices</td></tr>
<tr><td rowspan="2">FS2</td><td>WET02</td></tr>
<tr><td>PHO02</td></tr>
<tr><td>FG2</td><td>GN041 – GN080</td></tr>
<tr><td rowspan="2">Use of Heat Transfer Fluids</td><td>1-FABOP</td><td>FG1</td><td>GN001 – GN040</td><td rowspan="2">Good Design and Maintenance Practices, including regular evaluation of consumption records to confirm efficient usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas.</td></tr>
<tr><td>2-FABOP</td><td>FG2</td><td>GN041 – GN080</td></tr>
<tr><td>Circuit Breakers</td><td>--</td><td>--</td><td>--</td><td>Leak rate < 0.5%
Leak detection system</td></tr>
</table>

As required by 6 NYCRR 231-7.5(a), all sources of GHG emissions at the Proposed Air Permit Project will be subject to the combined limit of 1,090,018 tons per year of CO_2e (100-yr GWP), based on current emissions estimates. Proposed permit condition language, consistent with the above limits and practices, will be included in a forthcoming submission.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Air Resources, Bureau of Stationary Sources
625 Broadway, Albany, New York 12233-3254
P: (518) 402-8403 | F: (518) 402-9035
www.dec.ny.gov

USE OF EMISSION REDUCTION CREDITS (ERC) NA FORM*

Check the appropriate box | ☑ Facility using ERCs ☐ Facility purchasing‡ ERCs ☐ Broker purchasing‡ ERCs

Facility/Broker Name: Micron NY Semiconductor DEC ID#:

Address: 5171 NY-31, Clay, NY 13041

Proposed Project Description: Micron Clay Fabs 1 and 2

Contact Name: Scott Gatzemeier Phone #: (203) 363-4026

Name of Authorized Representative: Scott Gatzemeier

Signature of Authorized Representative: Scott Gatzemeier

Title: CVP, Front End US Expansion Date: 7/8/25

Check the appropriate box | ☐ Facility creating ERCs ☐ Facility transferring ERCs ☐ Broker transferring ERCs

Facility/Broker Name: DEC ID#:

Address:

ERC Emission Source ID#(s) / ERC tpy: / ; / ;
/ ; / ; / ; **or**

ERC Emission Unit ID#(s) / ERC tpy: / ; / ;
/ ; / ; /

Reduction Mechanism:

Name of Authorized Representative:

Signature of Authorized Representative:

Title: Date:

AMOUNT OF EMISSIONS REDUCTION CREDITS BEING USED / TRANSFERRED
(complete all that apply)

	offsets			netting	
NOx	411.0	tpy	NOx		tpy
VOC	237.0	tpy	VOC		tpy
PM-10		tpy	PM-10		tpy

***NOTE:** Any previous Use of ERC Forms associated with the ERCs being used or transferred with this transaction must be attached.

‡**NOTE:** For ERCs purchased without use, DEC requires acknowledgement that the purchaser understands that the terms and conditions for the use of ERCs is subject to change without notification.

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

New York State Department of Environmental Conservation
Air Permit Application Form

DEC ID												
0	-	0	0	0	0	-	0	0	0	0	0	

Section IV - Emission Unit Information

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements (continuation)									
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Clause	Subcl.
2-FABOP		FS2, FG2		40	CFR	63	BBBBB	7184	b				
1-HPMCU		HA1, HA2, HB1, HB2, HS1, HS2		40	CFR	63	BBBBB	7184	d				
2-HPMCU		HA3, HA4, HB3, HB4, HS3, HS4		40	CFR	63	BBBBB	7184	d				
1-WWBIO		WA1, WB1		40	CFR	63	BBBBB	7184	d				
1-WWBIO	1W008 - 1W010	WS1		40	CFR	63	BBBBB	7184	d				
2-WWBIO		WA2, WB2		40	CFR	63	BBBBB	7184	d				
2-WWBIO	2W008 - 2W010	WS2		40	CFR	63	BBBBB	7184	d				
1-HPMCU		HA1, HB1, HS1		40	CFR	63	BBBBB	7187					
1-HPMCU		HA1, HB1, HS1		40	CFR	63	BBBBB	7188					
1-HPMCU		HA1, HB1, HS1		40	CFR	63	BBBBB	7189					
1-HPMCU		HA1, HB1, HS1		40	CFR	63	BBBBB	7190					
2-HPMCU		HA2, HB2, HS2		40	CFR	63	BBBBB	7187					
2-HPMCU		HA2, HB2, HS2		40	CFR	63	BBBBB	7188					
2-HPMCU		HA2, HB2, HS2		40	CFR	63	BBBBB	7189					
2-HPMCU		HA2, HB2, HS2		40	CFR	63	BBBBB	7190					
1-WWBIO		WA1, WB1		40	CFR	63	BBBBB	7187					
1-WWBIO	1W008 - 1W010	WS1		40	CFR	63	BBBBB	7187					
1-WWBIO		WA1, WB1		40	CFR	63	BBBBB	7188					
1-WWBIO	1W008 - 1W010	WS1		40	CFR	63	BBBBB	7188					
1-WWBIO		WA1, WB1		40	CFR	63	BBBBB	7189					
1-WWBIO	1W008 - 1W010	WS1		40	CFR	63	BBBBB	7189					
1-WWBIO		WA1, WB1		40	CFR	63	BBBBB	7190					
1-WWBIO	1W008 - 1W010	WS1		40	CFR	63	BBBBB	7190					
2-WWBIO		WA2, WB2		40	CFR	63	BBBBB	7187					
2-WWBIO	2W008 - 2W010	WS2		40	CFR	63	BBBBB	7187					
2-WWBIO		WA2, WB2		40	CFR	63	BBBBB	7188					
2-WWBIO	2W008 - 2W010	WS2		40	CFR	63	BBBBB	7188					
2-WWBIO		WA2, WB2		40	CFR	63	BBBBB	7189					
2-WWBIO	2W008 - 2W010	WS2		40	CFR	63	BBBBB	7189					
2-WWBIO		WA2, WB2		40	CFR	63	BBBBB	7190					
2-WWBIO	2W008 - 2W010	WS2		40	CFR	63	BBBBB	7190					

Continuation Sheet 8-2 of 8-4

Version 1.2 - 11/20/2020

New York State Department of Environmental Conservation
Air Permit Application Form

DEC ID
0 - 0 0 0 0 - 0 0 0 0 0

Section IV - Emission Unit Information

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements (continuation)									
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Clause	Subcl.
1-CMBOP		EMD, DFP		6	NYCRR	225	1.2	d					
1-CMBOP				6	NYCRR	227	1.4						
1-CMBOP				6	NYCRR	227	2						
2-CMBOP		EMD		6	NYCRR	225	1.2	d					
2-CMBOP				6	NYCRR	227	1.4						
2-CMBOP				6	NYCRR	227	2						
1-FABOP			WS001-WS024	6	NYCRR	229	3	e	2	iv			
1-FABOP			WS025-WS030	6	NYCRR	229	3	e	2	v			
2-FABOP			WS031-WS054	6	NYCRR	229	3	e	2	iv			
2-FABOP			WS055-WS060	6	NYCRR	229	3	e	2	v			
1-HPMCU			ST066-ST073	6	NYCRR	229	3	e	2	iv			
1-HPMCU			ST054-ST065; ST074-ST077	6	NYCRR	229	3	e	2	v			
2-HPMCU			ST135-ST142	6	NYCRR	229	3	e	2	iv			
2-HPMCU			ST123-ST134 ST143-ST146	6	NYCRR	229	3	e	2	v			
1-WWBIO			ST080; ST163; ST164; ST182	6	NYCRR	229	3	e	2	v			
2-WWBIO			ST149; ST196; ST197; ST215	6	NYCRR	229	3	e	2	v			
ALL*				6	NYCRR	231	4.1	b	50				
ALL*				6	NYCRR	231	5.1	a	1				
ALL*				6	NYCRR	231	7.1	a	1				
1-FABOP		FA1, FC1, FS1,		6	NYCRR	212	1.4	a					
2-FABOP		FA2, FC2, FS2,		6	NYCRR	212	1.4	a					
1-HPMCU		HS1, HS2		6	NYCRR	212	1.4	a					
2-HPMCU		HS3, HS4		6	NYCRR	212	1.4	a					
1-WWBIO		BG1		6	NYCRR	212	1.4	a					
2-WWBIO		BG2		6	NYCRR	212	1.4	a					
1-FABOP		FA1, FC1, FB1, FG1		6	NYCRR	212	1.5	e	2				
2-FABOP		FA2, FC2, FB2, FG2		6	NYCRR	212	1.5	e	2				
1-HPMCU		HA1, HA2		6	NYCRR	212	1.5	e	2				
2-HPMCU		HA3, HA4		6	NYCRR	212	1.5	e	2				
1-WWBIO		WA1, WS1, BG1		6	NYCRR	212	1.5	e	2				
2-WWBIO		WA2, WS2, BG2		6	NYCRR	212	1.5	e	2				
1-FABOP		FA1, FC1, FB1, FC1, FG1		6	NYCRR	212	1.5	f					

Continuation Sheet 8-3 of 8-4

**These citations apply to all EUs that are part of the Proposed Air Permit Project, but do not necessarily apply to all future EUs at the facility.*

Version 1.2 - 11/20/2020

New York State Department of Environmental Conservation
Air Permit Application Form

DEC ID
0 - 0 0 0 0 - 0 0 0 0 0

Section IV - Emission Unit Information

Emission Unit	Emission Point	Process	Emission Source	Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Clause	Subcl.
				Emission Unit Applicable Federal Requirements (continuation)									
2-FABOP		FA2, FC2, FB2, FC2, FG2		6	NYCRR	212	1.5	f					
1-HPMCU		HS1, HS2		6	NYCRR	212	1.5	f					
2-HPMCU		HS3, HS4		6	NYCRR	212	1.5	f					
1-WWBIO		WS1, BG1		6	NYCRR	212	1.5	f					
2-WWBIO		WS2, BG2		6	NYCRR	212	1.5	f					
1-FABOP		FA1, FC1, FB1, FC1		6	NYCRR	212	1.5	g					
2-FABOP		FA2, FC2, FB2, FC2		6	NYCRR	212	1.5	g					
1-HPMCU		HS1, HS2		6	NYCRR	212	1.5	g					
2-HPMCU		HS3, HS4		6	NYCRR	212	1.5	g					
1-WWBIO		WS1, BG1		6	NYCRR	212	1.5	g					
2-WWBIO		WS2, BG2		6	NYCRR	212	1.5	g					
1-WWBIO		FU1		6	NYCRR	212	1.5	g					
2-WWBIO		FU2		6	NYCRR	212	1.5	g					
1-FABOP		FA1, FS1		6	NYCRR	212	2.3	a					
2-FABOP		FA2, FS2		6	NYCRR	212	2.3	a					
1-WWBIO		BG1		6	NYCRR	212	2.3	a					
2-WWBIO		BG2		6	NYCRR	212	2.3	a					
1-FABOP		FA1, FC1		6	NYCRR	212	2.3	b					
2-FABOP		FA2, FC2		6	NYCRR	212	2.3	b					
1-HPMCU		HA1, HA2		6	NYCRR	212	2.3	b					
2-HPMCU		HA3, HA4		6	NYCRR	212	2.3	b					
1-WWBIO		WA1		6	NYCRR	212	2.3	b					
2-WWBIO		WA2		6	NYCRR	212	2.3	b					
1-FABOP		FA1, FC1, FS1		6	NYCRR	212	2.4	b	1				
2-FABOP		FA2, FC2, FS2		6	NYCRR	212	2.4	b	1				
1-HPMCU		HS1, HS2		6	NYCRR	212	2.4	b	1				
2-HPMCU		HS3, HS4		6	NYCRR	212	2.4	b	1				
1-WWBIO		WA1		6	NYCRR	212	2.4	b	1				
2-WWBIO		WA2		6	NYCRR	212	2.4	b	1				
1-WWBIO		FU1		6	NYCRR	212	2.4	b	1				
2-WWBIO		FU2		6	NYCRR	212	2.4	b	1				

Continuation Sheet 8-4 of 8-4

**These citations apply to all EUs that are part of the Proposed Air Permit Project, but do not necessarily apply to all future EUs at the facility.*

Version 1.2 - 11/20/2020

New York State Department of Environmental Conservation
Air Permit Application Form

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID
0 - 0 0 0 0 - 0 0 0 0 0

Request for Emission Reduction Credits			☐ Continuation Sheet(s)
Emission Source			
Emission Reduction Description			
Contaminant Emission Reduction Data			
Baseline Period ____/ ____/ ______ to ____/ ____/ ______		Reduction	
		Date	Method
CAS Number	Contaminant Name	ERC (lbs/yr)	
		Netting	Offset
Facility to Use Future Reduction			
Name		Application ID - - /	
Location Address			
☐ City / ☐ Town/ ☐ Village	State	Zip	

Use of Emission Reduction Credits		☑ Continuation Sheet(s)
Emission Source		
Proposed Project Description		
See Continuation		
Contaminant Emissions Increase Data		
CAS Number	Contaminant Name	Project Emission Potential (lbs/yr)
Statement of Compliance		
☑ All facilities under the ownership of this "owner/firm" are operating <u>in compliance</u> with all applicable requirements and state regulations including any compliance certification requirements under Section 114(a)(3) of the Clean Air Act Amendments of 1990, or are meeting the schedule of a consent order.		
Source of Emission Reduction Credit-Facility		
Name		Permit ID - - /
Location Address		
☐ City / ☐ Town/ ☐ Village	State	Zip

Emission Source	CAS Number	Contaminant Name	ERC (lbs/yr)	
			Netting	Offset

Version 4-1/11/2021 10

New York State Department of Environmental Conservation
Air Permit Application Form

DEC ID
0 - 0 0 0 0 - 0 0 0 0 0

Section IV - Emission Unit Information

Use of Emission Reduction Credits (continuation)

Emission Source: ALL

Proposed Project Description

Proposed Air Permit Project - Fab 1 and Fab 2 with supporting equipment

Project Emission Potential = 357.2 tons per year Oxides of Nitrogen (NO_X)
Project Emission Potential = 205.7 tons per year Volatile Organic Compounds (VOC)

Source of Emission Reduction Credit - Facility

Name: Micron NY Semiconductor

Permit ID: - - /

Location Address: 5171 NY-31

☐ City/ ☑ Town/ ☐ Village: Clay State: NY Zip: 13041

Emission Source	CAS Number	Contaminant Name	ERC (lbs/yr)	
			Netting	Offset
ALL	0NY998-00-0	Total Volatile Organic Compounds (VOC)		474000
ALL	0NY210-00-0	Oxides of Nitrogen		822000

Continuation Sheet 1 of 1

Version 1.2 - 11/20/2020

Table A-1 - Section IV Pg. 5 Emission Point Information

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
1F001	AE_1	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.6504	4782.844	FAB1	1519
1F002	AE_2	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.6394	4782.8292	FAB1	1480
1F003	AE_3	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.633	4782.819	FAB1	1457
1F004	AE_4	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.6241	4782.8073	FAB1	1426
1F005	AE_5	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.6156	4782.7955	FAB1	1396
1F006	AE_6	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.5558	4782.7124	FAB1	1184
1F007	AE_7	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.543	4782.6944	FAB1	1138
1F008	AE_8	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.5386	4782.6886	FAB1	1122
1F009	AE_9	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.5298	4782.6767	FAB1	1091
1F010	AE_10	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.5174	4782.659	FAB1	1045
1F011	AE_11	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.7592	4782.7663	FAB1	1860
1F012	AE_12	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.7483	4782.7512	FAB1	1822
1F013	AE_13	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.741	4782.7414	FAB1	1796
1F014	AE_14	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.7326	4782.7299	FAB1	1766
1F015	AE_15	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.7241	4782.7176	FAB1	1736
1F016	AE_16	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.6641	4782.6345	FAB1	1519
1F017	AE_17	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.6515	4782.6166	FAB1	1474
1F018	AE_18	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.6473	4782.6108	FAB1	1459
1F019	AE_19	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.6385	4782.5987	FAB1	1427
1F020	AE_20	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.6257	4782.581	FAB1	1381
1F021	AE_21	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.8429	4783.112382	FAB1	2201
1F022	AE_22	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.829939	4783.095056	FAB1	2155
1F023	AE_23	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.8221	4783.0824	FAB1	2127
1F024	AE_24	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.8177	4783.0765	FAB1	2111
1F025	AE_25	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.8046	4783.059	FAB1	2065
1F026	AE_26	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.7458	4782.9755	FAB1	1856
1F027	AE_27	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.7411	4782.9697	FAB1	1826
1F028	AE_28	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.7283	4782.952	FAB1	1795
1F029	AE_29	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.7188	4782.9394	FAB1	1761
1F030	AE_30	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.7062	4782.9214	FAB1	1716
1F031	AE_31	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.9522	4783.0341	FAB1	2543
1F032	AE_32	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.9392	4783.0167	FAB1	2498
1F033	AE_33	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.9305	4783.0051	FAB1	2467
1F034	AE_34	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.9262	4782.9993	FAB1	2452
1F035	AE_35	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.9137	4782.9811	FAB1	2407
1F036	AE_36	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.8536	4782.898	FAB1	2195
1F037	AE_37	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.849	4782.8919	FAB1	2164
1F038	AE_38	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.836	4782.8745	FAB1	2133
1F039	AE_39	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.8272	4782.8613	FAB1	2101
1F040	AE_40	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.8143	4782.8435	FAB1	2056
1F041	CVD_1	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.5477	4782.7067	FAB1	1163
1F042	CVD_2	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.5465	4782.7053	FAB1	1146
1F043	CVD_3	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.522	4782.671	FAB1	1069
1F044	CVD_4	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.5209	4782.6695	FAB1	1054
1F045	CVD_5	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.6614	4782.6255	FAB1	1512
1F046	CVD_6	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.6603	4782.6238	FAB1	1496
1F047	CVD_7	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.6356	4782.5895	FAB1	1419
1F048	CVD_8	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.6346	4782.5878	FAB1	1404
1F049	CVD_9	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.733	4782.9642	FAB1	1831
1F050	CVD_10	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.7319	4782.9627	FAB1	1800
1F051	CVD_11	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.7107	4782.934	FAB1	1739
1F052	CVD_12	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.7096	4782.932	FAB1	1723
1F053	CVD_13	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.8464	4782.8826	FAB1	2186
1F054	CVD_14	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.8454	4782.8809	FAB1	2157
1F055	CVD_15	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.8247	4782.852	FAB1	2096
1F056	CVD_16	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.8236	4782.8507	FAB1	2080
1F057	AME_1	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.6445	4782.8407	FAB1	1499
1F058	AME_2	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.64	4782.8348	FAB1	1483
1F059	AME_3	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.6254	4782.8157	FAB1	1432

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
1F060	AME_4	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.617	4782.803	FAB1	1402
1F061	AME_5	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.7575	4782.7588	FAB1	1854
1F062	AME_6	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.7535	4782.7527	FAB1	1839
1F063	AME_7	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.7396	4782.7336	FAB1	1790
1F064	AME_8	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.7305	4782.721	FAB1	1758
1F065	AME_9	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.8361	4783.1081	FAB1	2177
1F066	AME_10	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.8321	4783.1027	FAB1	2163
1F067	AME_11	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.813	4783.0749	FAB1	2095
1F068	AME_12	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.8063	4783.066	FAB1	2072
1F069	AME_13	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.9499	4783.0264	FAB1	2535
1F070	AME_14	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.9459	4783.0209	FAB1	2521
1F071	AME_15	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.9263	4782.9941	FAB1	2451
1F072	AME_16	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	405.9198	4782.9849	FAB1	2428
1F073	SE_1	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.59	4782.7915	FAB1	1311
1F074	SEA_1	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.6008	4782.7759	FAB1	1345
1F075	SE_2	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.5853	4782.7851	FAB1	1295
1F076	SEA_2	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.5963	4782.7695	FAB1	1327
1F077	SE_3	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.5805	4782.7788	FAB1	1278
1F078	SEA_3	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.5917	4782.7631	FAB1	1311
1F079	SE_4	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.5758	4782.7724	FAB1	1261
1F080	SEA_4	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.587	4782.7565	FAB1	1294
1F081	SE_5	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.571	4782.7661	FAB1	1244
1F082	SEA_5	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.5824	4782.7502	FAB1	1279
1F083	SE_6	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.5667	4782.7592	FAB1	1229
1F084	SEA_6	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.5777	4782.7437	FAB1	1262
1F085	SE_7	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.5619	4782.7529	FAB1	1212
1F086	SEA_7	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.573	4782.7372	FAB1	1245
1F087	SE_8	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.5572	4782.7465	FAB1	1196
1F088	SEA_8	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.5685	4782.7308	FAB1	1228
1F089	SE_9	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.5525	4782.7402	FAB1	1179
1F090	SEA_9	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.5639	4782.7244	FAB1	1212
1F091	SE_10	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7291	4782.6911	FAB1	1746
1F092	SEA_10	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.71	4782.6975	FAB1	1686
1F093	SE_11	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7244	4782.6848	FAB1	1729
1F094	SEA_11	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7053	4782.6911	FAB1	1668
1F095	SE_12	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7196	4782.6784	FAB1	1711
1F096	SEA_12	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7007	4782.6846	FAB1	1651
1F097	SE_13	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7149	4782.6721	FAB1	1695
1F098	SEA_13	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.6959	4782.678	FAB1	1634
1F099	SE_14	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7101	4782.6658	FAB1	1678
1F100	SEA_14	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.6912	4782.6717	FAB1	1617
1F101	SE_15	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7054	4782.6594	FAB1	1661
1F102	SEA_15	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.6869	4782.6653	FAB1	1602
1F103	SE_16	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7006	4782.6531	FAB1	1643
1F104	SEA_16	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.6822	4782.6588	FAB1	1585
1F105	SE_17	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.6963	4782.6463	FAB1	1628
1F106	SEA_17	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.6776	4782.6524	FAB1	1568
1F107	SE_18	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.6921	4782.64	FAB1	1613
1F108	SEA_18	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.673	4782.646	FAB1	1551
1F109	SE_19	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7808	4783.0554	FAB1	1986
1F110	SEA_19	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7918	4783.0467	FAB1	2021
1F111	SE_20	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7761	4783.0491	FAB1	1970
1F112	SEA_20	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7872	4783.0403	FAB1	2005
1F113	SE_21	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7714	4783.0428	FAB1	1953
1F114	SEA_21	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7827	4783.034	FAB1	1988
1F115	SE_22	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7668	4783.0366	FAB1	1937
1F116	SEA_22	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7781	4783.0277	FAB1	1972
1F117	SE_23	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.762	4783.0303	FAB1	1920
1F118	SEA_23	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7735	4783.0212	FAB1	1955
1F119	SE_24	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7573	4783.024	FAB1	1903
1F120	SEA_24	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7689	4783.0148	FAB1	1939

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
1F121	SE_25	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7525	4783.0175	FAB1	1886
1F122	SEA_25	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7642	4783.0084	FAB1	1922
1F123	SE_26	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.7477	4783.0112	FAB1	1870
1F124	SEA_26	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.7596	4783.0018	FAB1	1905
1F125	SE_27	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.743	4783.0048	FAB1	1853
1F126	SEA_27	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.755	4782.9954	FAB1	1888
1F127	SE_28	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9182	4782.9568	FAB1	2418
1F128	SEA_28	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.9057	4782.9646	FAB1	2378
1F129	SE_29	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9135	4782.9505	FAB1	2401
1F130	SEA_29	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.901	4782.9584	FAB1	2362
1F131	SE_30	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9088	4782.9442	FAB1	2384
1F132	SEA_30	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.8963	4782.9521	FAB1	2345
1F133	SE_31	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9042	4782.938	FAB1	2368
1F134	SEA_31	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.892	4782.9458	FAB1	2331
1F135	SE_32	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.8998	4782.9311	FAB1	2352
1F136	SEA_32	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.8876	4782.9392	FAB1	2314
1F137	SE_33	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.8951	4782.9248	FAB1	2336
1F138	SEA_33	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.8829	4782.9329	FAB1	2297
1F139	SE_34	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.8903	4782.9183	FAB1	2319
1F140	SEA_34	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.8781	4782.9265	FAB1	2280
1F141	SE_35	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.8856	4782.912	FAB1	2302
1F142	SEA_35	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.8735	4782.92	FAB1	2265
1F143	SE_36	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.8808	4782.9056	FAB1	2285
1F144	SEA_36	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.869	4782.9134	FAB1	2248
1F145	GE_1	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6599	4782.846	FAB1	1550
1F146	GE_2	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6519	4782.8341	FAB1	1522
1F147	GE_3	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6422	4782.8212	FAB1	1488
1F148	GE_4	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6336	4782.8096	FAB1	1457
1F149	GE_5	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6247	4782.7975	FAB1	1426
1F150	GE_6	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6166	4782.7854	FAB1	1397
1F151	GE_7	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.5654	4782.7144	FAB1	1216
1F152	GE_8	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.5565	4782.702	FAB1	1184
1F153	GE_9	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.5397	4782.6785	FAB1	1124
1F154	GE_10	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.5311	4782.6667	FAB1	1092
1F155	GE_11	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7575	4782.7756	FAB1	1857
1F156	GE_12	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.749	4782.764	FAB1	1827
1F157	GE_13	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.74	4782.7509	FAB1	1795
1F158	GE_14	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7314	4782.7391	FAB1	1764
1F159	GE_15	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7226	4782.7269	FAB1	1733
1F160	GE_16	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7143	4782.715	FAB1	1703
1F161	GE_17	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6632	4782.644	FAB1	1519
1F162	GE_18	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6544	4782.6323	FAB1	1487
1F163	GE_19	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6374	4782.6081	FAB1	1426
1F164	GE_20	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.6291	4782.5966	FAB1	1396
1F165	GE_21	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.8396	4783.0964	FAB1	2187
1F166	GE_22	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.8313	4783.0843	FAB1	2157
1F167	GE_23	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.8141	4783.0607	FAB1	2098
1F168	GE_24	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.806	4783.0485	FAB1	2068
1F169	GE_25	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7459	4782.9649	FAB1	1855
1F170	GE_26	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7375	4782.9533	FAB1	1825
1F171	GE_27	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7278	4782.9407	FAB1	1791
1F172	GE_28	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7198	4782.9287	FAB1	1762
1F173	GE_29	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7151	4782.9224	FAB1	1746
1F174	GE_30	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.7093	4782.9147	FAB1	1725
1F175	GE_31	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.9379	4783.0257	FAB1	2495
1F176	GE_32	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.929	4783.0138	FAB1	2464
1F177	GE_33	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.912	4782.9903	FAB1	2404
1F178	GE_34	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.9031	4782.9785	FAB1	2372
1F179	GE_35	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.8435	4782.8947	FAB1	2161
1F180	GE_36	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.8357	4782.8833	FAB1	2133
1F181	GE_37	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.8254	4782.8709	FAB1	2097

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
1F182	GE_38	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.8172	4782.8585	FAB1	2068
1F183	GE_39	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.8127	4782.8525	FAB1	2052
1F184	GE_40	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.8069	4782.8448	FAB1	2032
2F001	AE_1	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1656	4782.4746	FAB2	2003
2F002	AE_2	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1544	4782.4597	FAB2	1942
2F003	AE_3	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1471	4782.449	FAB2	1900
2F004	AE_4	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1392	4782.4373	FAB2	1854
2F005	AE_5	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1304	4782.4258	FAB2	1806
2F006	AE_6	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.0709	4782.3425	FAB2	1470
2F007	AE_7	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.058	4782.325	FAB2	1399
2F008	AE_8	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.0535	4782.3188	FAB2	1374
2F009	AE_9	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.0452	4782.3064	FAB2	1325
2F010	AE_10	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.0322	4782.2887	FAB2	1253
2F011	AE_11	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.0576	4782.5525	FAB2	2017
2F012	AE_12	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.0461	4782.5371	FAB2	1955
2F013	AE_13	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.0391	4782.5268	FAB2	1914
2F014	AE_14	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.0307	4782.5154	FAB2	1868
2F015	AE_15	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.0221	4782.5033	FAB2	1820
2F016	AE_16	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.9623	4782.42	FAB2	1487
2F017	AE_17	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.9496	4782.403	FAB2	1419
2F018	AE_18	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.945	4782.3968	FAB2	1394
2F019	AE_19	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.937	4782.3846	FAB2	1346
2F020	AE_20	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	405.9236	4782.3668	FAB2	1275
2F021	AE_21	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.3583	4782.7422	FAB2	2872
2F022	AE_22	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.3453	4782.7248	FAB2	2943
2F023	AE_23	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.3366	4782.7132	FAB2	2967
2F024	AE_24	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.3327	4782.7069	FAB2	2942
2F025	AE_25	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.3202	4782.6889	FAB2	2870
2F026	AE_26	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2597	4782.6061	FAB2	2534
2F027	AE_27	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2555	4782.6001	FAB2	2486
2F028	AE_28	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2426	4782.5823	FAB2	2438
2F029	AE_29	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2337	4782.5692	FAB2	2386
2F030	AE_30	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2205	4782.5516	FAB2	2314
2F031	AE_31	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2493	4782.8202	FAB2	2935
2F032	AE_32	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2363	4782.8028	FAB2	3004
2F033	AE_33	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2277	4782.7913	FAB2	2975
2F034	AE_34	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2241	4782.7849	FAB2	2951
2F035	AE_35	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.2115	4782.7671	FAB2	2880
2F036	AE_36	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1522	4782.6836	FAB2	2545
2F037	AE_37	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1476	4782.6777	FAB2	2497
2F038	AE_38	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1346	4782.6601	FAB2	2449
2F039	AE_39	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1251	4782.6474	FAB2	2397
2F040	AE_40	400	154.0	6.2	4.2	50.0	72.0	N/A	97.8	80000	406.1125	4782.6295	FAB2	2326
2F041	CVD_1	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.0681	4782.3332	FAB2	1446
2F042	CVD_2	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.067	4782.3315	FAB2	1423
2F043	CVD_3	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.0424	4782.2978	FAB2	1301
2F044	CVD_4	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.0415	4782.2962	FAB2	1279
2F045	CVD_5	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.9543	4782.4145	FAB2	1468
2F046	CVD_6	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.9533	4782.4133	FAB2	1442
2F047	CVD_7	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.9288	4782.379	FAB2	1325
2F048	CVD_8	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	405.9275	4782.3775	FAB2	1300
2F049	CVD_9	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.2529	4782.5907	FAB2	2510
2F050	CVD_10	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.2521	4782.5892	FAB2	2462
2F051	CVD_11	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.2311	4782.5603	FAB2	2361
2F052	CVD_12	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.2301	4782.5589	FAB2	2338
2F053	CVD_13	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.139	4782.6725	FAB2	2521
2F054	CVD_14	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.1379	4782.6709	FAB2	2474
2F055	CVD_15	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.1168	4782.642	FAB2	2374
2F056	CVD_16	400	170.4	22.6	3.1	36.8	72.0	N/A	119.8	53000	406.1161	4782.6406	FAB2	2351
2F057	AME_1	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.1639	4782.467	FAB2	1980
2F058	AME_2	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.1595	4782.4612	FAB2	1956

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
2F059	AME_3	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.1459	4782.4415	FAB2	1878
2F060	AME_4	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.1373	4782.4293	FAB2	1829
2F061	AME_5	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.0502	4782.5485	FAB2	1994
2F062	AME_6	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.0457	4782.5428	FAB2	1971
2F063	AME_7	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.0322	4782.5235	FAB2	1894
2F064	AME_8	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.0231	4782.511	FAB2	1844
2F065	AME_9	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.3563	4782.7342	FAB2	2896
2F066	AME_10	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.352	4782.729	FAB2	2918
2F067	AME_11	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.3328	4782.7017	FAB2	2929
2F068	AME_12	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.3264	4782.6927	FAB2	2892
2F069	AME_13	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.2426	4782.8155	FAB2	2961
2F070	AME_14	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.2388	4782.8103	FAB2	2982
2F071	AME_15	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.2192	4782.7831	FAB2	2938
2F072	AME_16	400	154.0	6.2	3.0	36.0	72.0	N/A	94.3	40000	406.2127	4782.7746	FAB2	2903
2F073	SE_1	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1354	4782.3993	FAB2	1746
2F074	SEA_1	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1164	4782.4054	FAB2	1725
2F075	SE_2	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1307	4782.393	FAB2	1720
2F076	SEA_2	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1117	4782.399	FAB2	1700
2F077	SE_3	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1259	4782.3866	FAB2	1694
2F078	SEA_3	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1073	4782.3926	FAB2	1673
2F079	SE_4	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1212	4782.3803	FAB2	1668
2F080	SEA_4	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1025	4782.3861	FAB2	1646
2F081	SE_5	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1169	4782.3734	FAB2	1641
2F082	SEA_5	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.0978	4782.3796	FAB2	1620
2F083	SE_6	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1122	4782.3671	FAB2	1615
2F084	SEA_6	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.0932	4782.3728	FAB2	1594
2F085	SE_7	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1074	4782.3607	FAB2	1589
2F086	SEA_7	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.0886	4782.3668	FAB2	1568
2F087	SE_8	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1027	4782.3544	FAB2	1563
2F088	SEA_8	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.084	4782.3604	FAB2	1542
2F089	SE_9	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.0979	4782.348	FAB2	1537
2F090	SEA_9	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.0792	4782.3537	FAB2	1516
2F091	SE_10	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.996	4782.4996	FAB2	1770
2F092	SEA_10	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.0073	4782.4839	FAB2	1740
2F093	SE_11	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9913	4782.4932	FAB2	1745
2F094	SEA_11	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.0027	4782.4774	FAB2	1714
2F095	SE_12	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9865	4782.4869	FAB2	1719
2F096	SEA_12	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.9978	4782.4708	FAB2	1689
2F097	SE_13	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9818	4782.4805	FAB2	1694
2F098	SEA_13	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.9934	4782.4646	FAB2	1663
2F099	SE_14	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.977	4782.4742	FAB2	1668
2F100	SEA_14	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.9888	4782.4582	FAB2	1638
2F101	SE_15	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.973	4782.4672	FAB2	1642
2F102	SEA_15	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.984	4782.4518	FAB2	1612
2F103	SE_16	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9682	4782.4609	FAB2	1617
2F104	SEA_16	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.9796	4782.4451	FAB2	1586
2F105	SE_17	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9635	4782.4545	FAB2	1591
2F106	SEA_17	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.975	4782.4386	FAB2	1560
2F107	SE_18	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	405.9587	4782.4482	FAB2	1565
2F108	SEA_18	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	405.9703	4782.4323	FAB2	1535
2F109	SE_19	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.3247	4782.6646	FAB2	2815
2F110	SEA_19	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.3121	4782.6728	FAB2	2811
2F111	SE_20	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.32	4782.6584	FAB2	2789
2F112	SEA_20	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.3075	4782.6665	FAB2	2786
2F113	SE_21	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.3153	4782.652	FAB2	2763
2F114	SEA_21	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.3029	4782.6598	FAB2	2760
2F115	SE_22	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.3107	4782.6458	FAB2	2738
2F116	SEA_22	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.2983	4782.6536	FAB2	2734
2F117	SE_23	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.3065	4782.639	FAB2	2712
2F118	SEA_23	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.2938	4782.6474	FAB2	2708
2F119	SE_24	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.3018	4782.6327	FAB2	2686

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
2F120	SEA_24	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.2893	4782.641	FAB2	2683
2F121	SE_25	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.297	4782.6263	FAB2	2660
2F122	SEA_25	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.2845	4782.6344	FAB2	2656
2F123	SE_26	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.2922	4782.6199	FAB2	2634
2F124	SEA_26	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.2798	4782.6278	FAB2	2630
2F125	SE_27	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.2875	4782.6136	FAB2	2608
2F126	SEA_27	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.2751	4782.6214	FAB2	2604
2F127	SE_28	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.187	4782.7636	FAB2	2829
2F128	SEA_28	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1984	4782.7545	FAB2	2822
2F129	SE_29	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1823	4782.7573	FAB2	2804
2F130	SEA_29	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1937	4782.7482	FAB2	2796
2F131	SE_30	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1776	4782.7506	FAB2	2777
2F132	SEA_30	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1889	4782.7419	FAB2	2771
2F133	SE_31	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1733	4782.7443	FAB2	2752
2F134	SEA_31	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1845	4782.7354	FAB2	2745
2F135	SE_32	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1686	4782.738	FAB2	2726
2F136	SEA_32	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1798	4782.729	FAB2	2719
2F137	SE_33	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1639	4782.7317	FAB2	2701
2F138	SEA_33	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1751	4782.7228	FAB2	2694
2F139	SE_34	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1596	4782.7251	FAB2	2675
2F140	SEA_34	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1706	4782.7162	FAB2	2667
2F141	SE_35	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1548	4782.7187	FAB2	2649
2F142	SEA_35	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1659	4782.7096	FAB2	2641
2F143	SE_36	400	154.0	6.2	3.3	40.0	72.0	N/A	95.5	50000	406.1501	4782.7124	FAB2	2623
2F144	SEA_36	400	154.0	6.2	0.8	10.0	600.0	N/A	76.4	2500	406.1612	4782.7032	FAB2	2615
2F145	GE_1	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1642	4782.4837	FAB2	2025
2F146	GE_2	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1556	4782.4723	FAB2	1978
2F147	GE_3	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1468	4782.4587	FAB2	1925
2F148	GE_4	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1375	4782.4471	FAB2	1876
2F149	GE_5	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1289	4782.4352	FAB2	1828
2F150	GE_6	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.121	4782.423	FAB2	1780
2F151	GE_7	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.0699	4782.3516	FAB2	1492
2F152	GE_8	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.0611	4782.3397	FAB2	1444
2F153	GE_9	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.0438	4782.3165	FAB2	1346
2F154	GE_10	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.0348	4782.3045	FAB2	1300
2F155	GE_11	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.0663	4782.5536	FAB2	2035
2F156	GE_12	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.0578	4782.542	FAB2	1988
2F157	GE_13	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.048	4782.5292	FAB2	1935
2F158	GE_14	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.0396	4782.518	FAB2	1890
2F159	GE_15	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.0312	4782.5055	FAB2	1841
2F160	GE_16	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.0225	4782.4932	FAB2	1791
2F161	GE_17	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.9719	4782.4221	FAB2	1508
2F162	GE_18	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.9631	4782.4104	FAB2	1460
2F163	GE_19	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.9461	4782.3861	FAB2	1364
2F164	GE_20	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	405.9377	4782.3748	FAB2	1319
2F165	GE_21	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.3442	4782.7334	FAB2	2923
2F166	GE_22	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.3353	4782.7216	FAB2	2972
2F167	GE_23	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.3184	4782.6988	FAB2	2893
2F168	GE_24	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.3096	4782.6863	FAB2	2843
2F169	GE_25	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.2497	4782.6031	FAB2	2507
2F170	GE_26	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.2415	4782.591	FAB2	2459
2F171	GE_27	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.2323	4782.5783	FAB2	2407
2F172	GE_28	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.2235	4782.5669	FAB2	2360
2F173	GE_29	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.2187	4782.5605	FAB2	2334
2F174	GE_30	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.2138	4782.5526	FAB2	2303
2F175	GE_31	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.2458	4782.8039	FAB2	2979
2F176	GE_32	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.2378	4782.7923	FAB2	2995
2F177	GE_33	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.2205	4782.7691	FAB2	2900
2F178	GE_34	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.212	4782.7564	FAB2	2850
2F179	GE_35	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1517	4782.673	FAB2	2514
2F180	GE_36	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1437	4782.6614	FAB2	2468

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
2F181	GE_37	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1341	4782.6488	FAB2	2416
2F182	GE_38	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1261	4782.637	FAB2	2370
2F183	GE_39	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1212	4782.6304	FAB2	2343
2F184	GE_40	400	154.0	6.2	3.5	42.0	72.0	N/A	95.3	55000	406.1159	4782.6232	FAB2	2314
1U001	BEX1	400	71.0	2.0	2.0	24.0	400.0	N/A	119.4	22507	405.5478	4782.8401	CUB1	1183
1U002	BEX2	400	71.0	2.0	2.0	24.0	400.0	N/A	119.4	22507	405.5414	4782.8311	CUB1	1160
1U003	BEX3	400	71.0	2.0	2.0	24.0	400.0	N/A	119.4	22507	405.5364	4782.8242	CUB1	1140
1U004	WBV_1	400	17.0	N/A	3.2	38.0	750.0	N/A	47.6	22507	406.1291	4783.2778	N/A-Outside	2066
1U005	WBV_2	400	17.0	N/A	3.2	38.0	750.0	N/A	47.6	22507	406.1365	4783.2725	N/A-Outside	2084
1U006	WBV_3	400	17.0	N/A	3.2	38.0	750.0	N/A	47.6	22507	406.1759	4783.2442	N/A-Outside	2184
1U007	WBV_4	400	17.0	N/A	3.2	38.0	750.0	N/A	47.6	22507	406.1795	4783.2412	N/A-Outside	2195
1U008	GEN_1	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.509	4782.9512	CUB1	1080
1U009	GEN_2	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5079	4782.9498	CUB1	1072
1U010	GEN_3	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5069	4782.9483	CUB1	1058
1U011	GEN_4	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5025	4782.9423	CUB1	1048
1U012	GEN_5	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5015	4782.9409	CUB1	1034
1U013	GEN_6	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5005	4782.9395	CUB1	1026
1U014	GEN_7	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4897	4782.9245	CUB1	1012
1U015	GEN_8	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4886	4782.923	CUB1	1004
1U016	GEN_9	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4876	4782.9216	CUB1	988
1U017	GEN_10	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4789	4782.9096	CUB1	979
1U018	GEN_11	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4781	4782.9082	CUB1	965
1U019	GEN_12	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4769	4782.9068	CUB1	956
1U020	GEN_13	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4701	4782.8972	CUB1	944
1U021	GEN_14	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4692	4782.8957	CUB1	935
1U022	GEN_15	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4681	4782.8944	CUB1	921
1U023	GEN_16	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.4588	4782.8813	CUB1	912
1U024	GEN_17	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.4577	4782.88	CUB1	894
1U025	GEN_18	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.4501	4782.8695	CUB1	868
1U026	GEN_19	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.4492	4782.8681	CUB1	864
1U027	GEN_20	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.4438	4782.8606	CUB1	1444
1U028	GEN_21	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.4428	4782.8593	CUB1	1435
1U029	GEN_22	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4373	4782.8518	CUB1	1421
1U030	GEN_23	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4364	4782.8503	CUB1	1413
1U031	GEN_24	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.4355	4782.849	CUB1	1400
1U032	GEN_25	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.6266	4783.115	CUB1	1392
1U033	GEN_26	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.6256	4783.1136	CUB1	1376
1U034	GEN_27	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.6214	4783.1076	CUB1	1367
1U035	GEN_28	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.6204	4783.1063	CUB1	1353
1U036	GEN_29	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.6117	4783.0944	CUB1	1345
1U037	GEN_30	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.6107	4783.0929	CUB1	1331
1U038	GEN_31	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.6098	4783.0915	CUB1	1322
1U039	GEN_32	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.6014	4783.08	CUB1	1308
1U040	GEN_33	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.6005	4783.0785	CUB1	1299
1U041	GEN_34	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5994	4783.0771	CUB1	1284
1U042	GEN_35	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5925	4783.0676	CUB1	1276
1U043	GEN_36	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5915	4783.0662	CUB1	1262
1U044	GEN_37	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5905	4783.0648	CUB1	1253
1U045	GEN_38	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5821	4783.0532	CUB1	1238
1U046	GEN_39	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5811	4783.0519	CUB1	850
1U047	GEN_40	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5803	4783.0503	CUB1	841
1U048	GEN_41	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5733	4783.0408	CUB1	827
1U049	GEN_42	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5723	4783.0394	CUB1	818
1U050	GEN_43	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5713	4783.038	CUB1	805
1U051	GEN_44	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5627	4783.026	CUB1	1512
1U052	GEN_45	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5616	4783.0245	CUB1	1503
1U053	GEN_46	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	405.5606	4783.0231	CUB1	1489
1U054	GEN_47	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.5552	4783.0156	CUB1	1474
1U055	GEN_48	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	405.5542	4783.0142	CUB1	1449
1U056	GEN_49	400	27.5	N/A	1.7	20.0	973.3	N/A	150.2	19662	405.8506	4782.6906	N/A-Outside	2127
1U057	GEN_50	400	27.5	N/A	1.7	20.0	973.3	N/A	150.2	19662	405.8555	4782.687	N/A-Outside	2123

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
1U058	GEN_51	400	27.5	N/A	1.7	20.0	973.3	N/A	150.2	19662	405.9178	4782.7843	N/A-Outside	2383
1U059	GEN_52	400	27.5	N/A	1.7	20.0	973.3	N/A	150.2	19662	405.9228	4782.7811	N/A-Outside	2399
1U060	GEN_53	400	27.5	N/A	1.7	20.0	877.0	N/A	150.2	19662	405.4435	4783.688	N/A-Outside	539
1U061	GEN_54	400	11.3	N/A	0.7	8.0	873.0	N/A	331.8	6950	406.049	4783.1277	N/A-Outside	2543
1U062	GEN_55	400	11.3	N/A	0.7	8.0	873.0	N/A	331.8	6950	406.1066	4783.2109	N/A-Outside	2283
1U063	GEN_56	400	124.0	24.0	2.0	24.0	973.3	N/A	42.8	8065.3	405.643	4782.5324	PROBE1	1423
1U064	GEN_57	400	124.0	24.0	2.0	24.0	973.3	N/A	42.8	8065.3	405.6343	4782.5388	PROBE1	1400
1U065	GEN_58	400	124.0	24.0	2.0	24.0	973.3	N/A	42.8	8065.3	405.6254	4782.5452	PROBE1	1372
1U066	GEN_59	400	27.5	N/A	1.7	20.0	877.0	N/A	150.2	19662	405.5169	4783.7233	N/A-Outside	499
1U067	GEN_60	400	27.5	N/A	1.7	20.0	973.3	N/A	150.2	19662	405.5142	4783.7785	N/A-Outside	317
1FP01	FWP_01	400	26.0	10.0	0.7	8.0	865.0	N/A	56.6	1186	405.7561	4783.3377	MPH1	1803
2U001	BEX1	400	71.0	2.0	2.0	24.0	400.0	N/A	119.4	22507	406.1945	4782.3753	CUB2	1795
2U002	BEX2	400	71.0	2.0	2.0	24.0	400.0	N/A	119.4	22507	406.1881	4782.3663	CUB2	1758
2U003	BEX3	400	71.0	2.0	2.0	24.0	400.0	N/A	119.4	22507	406.183	4782.3594	CUB2	1729
2U004	WBV_1	400	17.0	N/A	3.2	38.0	750.0	N/A	47.6	22507	406.8117	4783.1144	N/A-Outside	1051
2U005	WBV_2	400	17.0	N/A	3.2	38.0	750.0	N/A	47.6	22507	406.8192	4783.1095	N/A-Outside	1059
2U006	WBV_3	400	17.0	N/A	3.2	38.0	750.0	N/A	47.6	22507	406.8583	4783.0811	N/A-Outside	1120
2U007	WBV_4	400	17.0	N/A	3.2	38.0	750.0	N/A	47.6	22507	406.862	4783.0781	N/A-Outside	1127
2U008	GEN_1	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3122	4782.3739	CUB2	2026
2U009	GEN_2	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3111	4782.3725	CUB2	2013
2U010	GEN_3	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3102	4782.3711	CUB2	1990
2U011	GEN_4	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3058	4782.365	CUB2	1977
2U012	GEN_5	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3048	4782.3637	CUB2	1954
2U013	GEN_6	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3038	4782.3623	CUB2	1941
2U014	GEN_7	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.293	4782.3472	CUB2	1918
2U015	GEN_8	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.292	4782.3458	CUB2	1904
2U016	GEN_9	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2909	4782.3444	CUB2	1881
2U017	GEN_10	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2823	4782.3325	CUB2	1866
2U018	GEN_11	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2813	4782.331	CUB2	1844
2U019	GEN_12	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2803	4782.3295	CUB2	1831
2U020	GEN_13	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2734	4782.32	CUB2	1808
2U021	GEN_14	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2723	4782.3186	CUB2	1795
2U022	GEN_15	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2714	4782.3172	CUB2	1772
2U023	GEN_16	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2621	4782.3042	CUB2	1758
2U024	GEN_17	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.261	4782.3028	CUB2	1731
2U025	GEN_18	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.26	4782.3013	CUB2	1706
2U026	GEN_19	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2496	4782.2868	CUB2	1666
2U027	GEN_20	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2486	4782.2854	CUB2	2604
2U028	GEN_21	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2475	4782.284	CUB2	2590
2U029	GEN_22	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2407	4782.2744	CUB2	2568
2U030	GEN_23	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2397	4782.2731	CUB2	2554
2U031	GEN_24	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.2386	4782.2717	CUB2	2534
2U032	GEN_25	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	406.4299	4782.5378	CUB2	2520
2U033	GEN_26	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	406.429	4782.5365	CUB2	2496
2U034	GEN_27	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	406.4214	4782.5259	CUB2	2482
2U035	GEN_28	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	406.4204	4782.5246	CUB2	2461
2U036	GEN_29	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	406.4164	4782.519	CUB2	2447
2U037	GEN_30	400	69.0	0.0	2.4	28.3	973.3	N/A	150.2	39324	406.4154	4782.5177	CUB2	2424
2U038	GEN_31	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.4086	4782.5081	CUB2	2411
2U039	GEN_32	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.4075	4782.5067	CUB2	2388
2U040	GEN_33	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.4065	4782.5054	CUB2	2374
2U041	GEN_34	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3982	4782.4937	CUB2	2350
2U042	GEN_35	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3972	4782.4924	CUB2	2336
2U043	GEN_36	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3963	4782.4908	CUB2	2314
2U044	GEN_37	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3894	4782.4813	CUB2	2300
2U045	GEN_38	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3883	4782.4799	CUB2	2279
2U046	GEN_39	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3874	4782.4785	CUB2	1660
2U047	GEN_40	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3791	4782.467	CUB2	1647
2U048	GEN_41	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3781	4782.4656	CUB2	1624
2U049	GEN_42	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.377	4782.4642	CUB2	1611
2U050	GEN_43	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3699	4782.4541	CUB2	1588

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
2U051	GEN_44	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3688	4782.4527	CUB2	2712
2U052	GEN_45	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3678	4782.4514	CUB2	2699
2U053	GEN_46	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3595	4782.4398	CUB2	2676
2U054	GEN_47	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3585	4782.4383	CUB2	2634
2U055	GEN_48	400	69.0	0.0	2.9	34.6	973.3	N/A	150.2	58986	406.3575	4782.437	CUB2	2628
2U056	GEN_49	400	27.5	N/A	1.7	20.0	973.3	N/A	150.2	19662	405.9561	4782.6145	N/A-Outside	2052
2U057	GEN_50	400	27.5	N/A	1.7	20.0	973.3	N/A	150.2	19662	405.9512	4782.6181	N/A-Outside	2056
2U058	GEN_51	400	27.5	N/A	1.7	20.0	973.3	N/A	150.2	19662	406.0237	4782.7082	N/A-Outside	2426
2U059	GEN_52	400	27.5	N/A	1.7	20.0	973.3	N/A	150.2	19662	406.0189	4782.7118	N/A-Outside	2429
2U060	GEN_53	400	27.5	N/A	1.7	20.0	877.0	N/A	150.2	19662	405.6741	4783.69	N/A-Outside	596
2U061	GEN_54	400	11.3	N/A	0.7	8.0	873.0	N/A	331.8	6950	406.7309	4782.9648	N/A-Outside	1604
2U062	GEN_55	400	11.3	N/A	0.7	8.0	873.0	N/A	331.8	6950	406.7893	4783.0474	N/A-Outside	1283
2U063	GEN_56	400	124.0	24.0	2.0	24.0	973.3	N/A	42.8	8065.3	405.8646	4782.3734	PROBE1	1209
2U064	GEN_57	400	124.0	24.0	2.0	24.0	973.3	N/A	42.8	8065.3	405.8733	4782.367	PROBE1	1204
2U065	GEN_58	400	124.0	24.0	2.0	24.0	973.3	N/A	42.8	8065.3	405.8819	4782.3604	PROBE1	1196
1H001	AE_41	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.7836	4782.672	HPM1-S	1920
1H002	AE_42	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.7808	4782.6682	HPM1-S	1910
1H003	AE_43	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.7777	4782.6642	HPM1-S	1898
1H004	AE_44	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.7749	4782.6604	HPM1-S	1888
1H005	AE_45	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.9225	4782.8657	HPM1-N	2414
1H006	AE_46	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.9199	4782.862	HPM1-N	2405
1H007	AE_47	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.9165	4782.8574	HPM1-N	2393
1H008	AE_48	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.9137	4782.8537	HPM1-N	2383
1C001	AE_49	400	81.0	12.0	1.7	20.0	75.0	N/A	91.7	12000	405.5658	4783.0224	CUB1	1279
1C002	AE_50	400	81.0	12.0	1.7	20.0	75.0	N/A	91.7	12000	405.562	4783.017	CUB1	1264
1C003	AE_57	400	81.0	12.0	1.7	20.0	75.0	N/A	91.7	12000	405.5343	4782.9784	CUB1	1163
1C004	AE_58	400	81.0	12.0	1.7	20.0	75.0	N/A	91.7	12000	405.5304	4782.9729	CUB1	1152
1H009	AME_17	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.7411	4782.6177	HPM1-S	1768
1H010	AME_18	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.7383	4782.6139	HPM1-S	1757
1H011	AME_19	400	101.3	45.3	2.5	30.0	72.0		61.1	18000	405.7355	4782.6101	HPM1-S	1747
1H012	AME_20	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.7328	4782.6063	HPM1-S	1733
1H013	AME_21	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.9601	4782.9229	HPM1-N	2548
1H014	AME_22	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.9575	4782.919	HPM1-N	2539
1H015	AME_23	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.9547	4782.9152	HPM1-N	2529
1H016	AME_24	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.9519	4782.9114	HPM1-N	2519
1H017	SE_37	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.8391	4782.6956	HPM1-S	2107
1H018	SEA_37	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.8092	4782.7081	HPM1-S	2013
1H019	SE_38	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.8378	4782.6933	HPM1-S	2102
1H020	SEA_38	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.8041	4782.7007	HPM1-S	1994
1H021	SE_39	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.8274	4782.68	HPM1-S	2065
1H022	SEA_39	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.7989	4782.6937	HPM1-S	1975
1H023	SE_40	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.8267	4782.6777	HPM1-S	2057
1H024	SEA_40	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.7937	4782.6864	HPM1-S	1955
1H025	SE_41	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.9221	4782.8114	HPM1-N	2403
1H026	SEA_41	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.9039	4782.8398	HPM1-N	2349
1H027	SE_42	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.9207	4782.8096	HPM1-N	2398
1H028	SEA_42	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.8987	4782.8325	HPM1-N	2330
1H029	SE_43	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.911	4782.7954	HPM1-N	2363
1H030	SEA_43	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.8935	4782.8252	HPM1-N	2312
1H031	SE_44	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.9097	4782.7936	HPM1-N	2359
1H032	SEA_44	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.8881	4782.8181	HPM1-N	2293
1D001	N/A	400	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A-Outside	TBD
1D002	N/A	400	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A-Outside	TBD
1D003	N/A	400	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A-Outside	TBD
1D004	N/A	400	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A-Outside	TBD
1C005	CT_1	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.4823	4782.8592	CUB1	971
1C006	CT_2	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.4876	4782.8663	CUB1	990
1C007	CT_3	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.4918	4782.8718	CUB1	1005
1C008	CT_4	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.496	4782.8775	CUB1	1020
1C009	CT_5	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5012	4782.8846	CUB1	1038
1C010	CT_6	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5055	4782.8901	CUB1	1053

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
1C011	CT_7	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5097	4782.8972	CUB1	1069
1C012	CT_8	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5274	4782.9212	CUB1	1131
1C013	CT_9	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5314	4782.9276	CUB1	1145
1C014	CT_10	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5356	4782.9332	CUB1	1160
1C015	CT_11	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5409	4782.9402	CUB1	1179
1C016	CT_12	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.545	4782.9459	CUB1	1194
1C017	CT_13	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5492	4782.9517	CUB1	1208
1C018	CT_14	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5529	4782.9597	CUB1	1221
1C019	CT_15	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5572	4782.9649	CUB1	1237
1C020	CT_16	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.4969	4782.8482	CUB1	1017
1C021	CT_17	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5022	4782.8552	CUB1	1036
1C022	CT_18	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5065	4782.8608	CUB1	1051
1C023	CT_19	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5107	4782.8663	CUB1	1066
1C024	CT_20	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5159	4782.8736	CUB1	1085
1C025	CT_21	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5201	4782.8792	CUB1	1099
1C026	CT_22	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5243	4782.8848	CUB1	1114
1C027	CT_23	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5219	4782.9142	CUB1	1111
1C028	CT_24	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5338	4782.8974	CUB1	1148
1C029	CT_25	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.538	4782.9032	CUB1	1162
1C030	CT_26	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5418	4782.9111	CUB1	1176
1C031	CT_27	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.546	4782.9168	CUB1	1191
1C032	CT_28	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5502	4782.9222	CUB1	1206
1C033	CT_29	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5547	4782.9295	CUB1	1222
1C034	CT_30	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5597	4782.935	CUB1	1239
1C035	CT_31	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5638	4782.9407	CUB1	1254
1C036	CT_32	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5675	4782.9486	CUB1	1268
1C037	CT_33	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5717	4782.9545	CUB1	1282
1C038	CT_34	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5116	4782.8372	CUB1	1063
1C039	CT_35	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5169	4782.8443	CUB1	1082
1C040	CT_36	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.521	4782.8502	CUB1	1097
1C041	CT_37	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5253	4782.8555	CUB1	1111
1C042	CT_38	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5306	4782.8625	CUB1	1130
1C043	CT_39	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5348	4782.8682	CUB1	1145
1C044	CT_40	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.539	4782.8736	CUB1	1160
1C045	CT_41	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5178	4782.9081	CUB1	1097
1C046	CT_42	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5484	4782.8866	CUB1	1193
1C047	CT_43	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5526	4782.8922	CUB1	1208
1C048	CT_44	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5564	4782.9001	CUB1	1222
1C049	CT_45	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5606	4782.9058	CUB1	1237
1C050	CT_46	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5648	4782.9113	CUB1	1251
1C051	CT_47	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5701	4782.9185	CUB1	1270
1C052	CT_48	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5743	4782.924	CUB1	1285
1C053	CT_49	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5785	4782.9297	CUB1	1300
1C054	CT_50	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5822	4782.9377	CUB1	1313
1C055	CT_51	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5864	4782.9432	CUB1	1328
1C056	CT_52	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5613	4782.9708	CUB1	1251
1C057	CT_53	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5665	4782.9781	CUB1	1270
1C058	CT_54	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5709	4782.9833	CUB1	1285
1C059	CT_55	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.575	4782.9891	CUB1	1300
1C060	CT_56	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5941	4783.014	CUB1	1367
1C061	CT_57	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5983	4783.0196	CUB1	1382
1C062	CT_58	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6024	4783.0257	CUB1	1397
1C063	CT_59	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6077	4783.0327	CUB1	1415
1C064	CT_60	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6118	4783.0385	CUB1	1430
1C065	CT_61	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.616	4783.0442	CUB1	1444
1C066	CT_62	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6214	4783.0507	CUB1	1464
1C067	CT_63	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6256	4783.0565	CUB1	1478
1C068	CT_64	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6297	4783.0623	CUB1	1493
1C069	CT_65	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.635	4783.0693	CUB1	1511
1C070	CT_66	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6392	4783.075	CUB1	1526
1C071	CT_67	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6434	4783.0805	CUB1	1541

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
1C072	CT_68	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5759	4782.96	CUB1	1297
1C073	CT_69	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5813	4782.9669	CUB1	1316
1C074	CT_70	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5854	4782.9728	CUB1	1331
1C075	CT_71	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5895	4782.9785	CUB1	1346
1C076	CT_72	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5949	4782.9853	CUB1	1364
1C077	CT_73	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5991	4782.991	CUB1	1379
1C078	CT_74	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5809	4782.9952	CUB1	1320
1C079	CT_75	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6085	4783.0037	CUB1	1412
1C080	CT_76	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6129	4783.0089	CUB1	1427
1C081	CT_77	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.617	4783.0147	CUB1	1442
1C082	CT_78	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6222	4783.022	CUB1	1460
1C083	CT_79	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6265	4783.0276	CUB1	1476
1C084	CT_80	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6306	4783.0332	CUB1	1490
1C085	CT_81	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.636	4783.0401	CUB1	1509
1C086	CT_82	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6402	4783.0456	CUB1	1524
1C087	CT_83	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6444	4783.0512	CUB1	1539
1C088	CT_84	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6496	4783.0586	CUB1	1557
1C089	CT_85	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6539	4783.0637	CUB1	1572
1C090	CT_86	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.658	4783.0697	CUB1	1587
1C091	CT_87	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5906	4782.9488	CUB1	1343
1C092	CT_88	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5975	4782.9558	CUB1	1367
1C093	CT_89	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6001	4782.9615	CUB1	1376
1C094	CT_90	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6041	4782.9678	CUB1	1391
1C095	CT_91	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6096	4782.974	CUB1	1410
1C096	CT_92	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6137	4782.9801	CUB1	1425
1C097	CT_93	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.5848	4783.0008	CUB1	1334
1C098	CT_94	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6231	4782.9933	CUB1	1458
1C099	CT_95	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6275	4782.9979	CUB1	1473
1C100	CT_96	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6316	4783.0039	CUB1	1488
1C101	CT_97	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6369	4783.0109	CUB1	1506
1C102	CT_98	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6411	4783.0165	CUB1	1521
1C103	CT_99	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6454	4783.022	CUB1	1536
1C104	CT_100	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6507	4783.029	CUB1	1555
1C105	CT_101	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6548	4783.0347	CUB1	1570
1C106	CT_102	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.659	4783.0403	CUB1	1584
1C107	CT_103	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6643	4783.0474	CUB1	1603
1C108	CT_104	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6684	4783.0531	CUB1	1618
1C109	CT_105	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	405.6726	4783.0588	CUB1	1633
1G001	CT_106	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.1256	4783.2562	N/A-Outside	2136
1G002	CT_107	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.1179	4783.2461	N/A-Outside	2168
1G003	CT_108	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.1102	4783.236	N/A-Outside	2199
1G004	CT_109	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.0694	4783.1809	N/A-Outside	2373
1G005	CT_110	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.0617	4783.1708	N/A-Outside	2404
1G006	CT_111	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.0555	4783.1607	N/A-Outside	2437
2H001	AE_41	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.9603	4782.5448	HPM2-S	1853
2H002	AE_42	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.9575	4782.5411	HPM2-S	1838
2H003	AE_43	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.9544	4782.537	HPM2-S	1821
2H004	AE_44	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	405.9516	4782.5332	HPM2-S	1806
2H005	AE_45	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	406.0991	4782.7386	HPM2-N	2624
2H006	AE_46	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	406.0963	4782.7349	HPM2-N	2609
2H007	AE_47	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	406.0933	4782.7307	HPM2-N	2592
2H008	AE_48	400	101.3	45.3	3.5	42.0	72.0	N/A	63.2	36500	406.0904	4782.727	HPM2-N	2577
2C001	AE_49	400	81.0	12.0	1.7	20.0	75.0	N/A	91.7	12000	406.3601	4782.4488	CUB2	2316
2C002	AE_50	400	81.0	12.0	1.7	20.0	75.0	N/A	91.7	12000	406.3562	4782.4435	CUB2	2296
2C003	AE_57	400	81.0	12.0	1.7	20.0	75.0	N/A	91.7	12000	406.3285	4782.4048	CUB2	2138
2C004	AE_58	400	81.0	12.0	1.7	20.0	75.0	N/A	91.7	12000	406.3247	4782.3996	CUB2	2120
2H009	AME_17	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.9223	4782.4875	HPM2-S	1629
2H010	AME_18	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.9195	4782.4837	HPM2-S	1614
2H011	AME_19	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.9166	4782.4799	HPM2-S	1598
2H012	AME_20	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	405.914	4782.4761	HPM2-S	1583
2H013	AME_21	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	406.1412	4782.7925	HPM2-N	2843

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
2H014	AME_22	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	406.1385	4782.7888	HPM2-N	2828
2H015	AME_23	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	406.1357	4782.785	HPM2-N	2813
2H016	AME_24	400	101.3	45.3	2.5	30.0	72.0	N/A	61.1	18000	406.1329	4782.7812	HPM2-N	2798
2H017	SE_37	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.964	4782.6058	HPM2-S	2038
2H018	SEA_37	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.9857	4782.5813	HPM2-S	1996
2H019	SE_38	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.9632	4782.6041	HPM2-S	2032
2H020	SEA_38	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.9804	4782.5741	HPM2-S	1967
2H021	SE_39	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.9534	4782.5897	HPM2-S	1975
2H022	SEA_39	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.9752	4782.5669	HPM2-S	1938
2H023	SE_40	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	405.952	4782.5878	HPM2-S	1968
2H024	SEA_40	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	405.97	4782.5597	HPM2-S	1910
2H025	SE_41	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	406.0478	4782.7211	HPM2-N	2498
2H026	SEA_41	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	406.0803	4782.713	HPM2-N	2520
2H027	SE_42	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	406.0464	4782.7193	HPM2-N	2491
2H028	SEA_42	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	406.0751	4782.7058	HPM2-N	2491
2H029	SE_43	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	406.0361	4782.7055	HPM2-N	2436
2H030	SEA_43	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	406.0699	4782.6986	HPM2-N	2463
2H031	SE_44	400	101.3	45.3	2.8	34.0	72.0	N/A	60.8	23000	406.0347	4782.7037	HPM2-N	2428
2H032	SEA_44	400	101.3	45.3	0.5	6.0	600.0	N/A	97.6	1150	406.0647	4782.6913	HPM2-N	2434
2D001	N/A	400	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A-Outside	TBD
2D002	N/A	400	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A-Outside	TBD
2D003	N/A	400	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A-Outside	TBD
2D004	N/A	400	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A-Outside	TBD
2C005	CT_1	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2331	4782.3191	CUB2	1721
2C006	CT_2	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2384	4782.3262	CUB2	1750
2C007	CT_3	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2425	4782.3318	CUB2	1773
2C008	CT_4	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2469	4782.3374	CUB2	1796
2C009	CT_5	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2519	4782.3445	CUB2	1825
2C010	CT_6	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2561	4782.3501	CUB2	1848
2C011	CT_7	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2604	4782.3557	CUB2	1871
2C012	CT_8	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2785	4782.3809	CUB2	1972
2C013	CT_9	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2825	4782.3879	CUB2	1999
2C014	CT_10	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2869	4782.3935	CUB2	2022
2C015	CT_11	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2921	4782.4006	CUB2	2051
2C016	CT_12	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2962	4782.4062	CUB2	2074
2C017	CT_13	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3002	4782.4118	CUB2	2096
2C018	CT_14	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3059	4782.4189	CUB2	2126
2C019	CT_15	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3099	4782.4245	CUB2	2149
2C020	CT_16	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2186	4782.3301	CUB2	1722
2C021	CT_17	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2237	4782.3371	CUB2	1750
2C022	CT_18	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2278	4782.3427	CUB2	1773
2C023	CT_19	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.232	4782.3484	CUB2	1796
2C024	CT_20	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2374	4782.3554	CUB2	1825
2C025	CT_21	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2415	4782.3611	CUB2	1848
2C026	CT_22	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2459	4782.3667	CUB2	1872
2C027	CT_23	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2735	4782.3736	CUB2	1943
2C028	CT_24	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2554	4782.3794	CUB2	1924
2C029	CT_25	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2594	4782.385	CUB2	1946
2C030	CT_26	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2639	4782.3932	CUB2	1977
2C031	CT_27	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2679	4782.3988	CUB2	1999
2C032	CT_28	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2722	4782.4044	CUB2	2023
2C033	CT_29	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2776	4782.4115	CUB2	2052
2C034	CT_30	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2818	4782.4171	CUB2	2075
2C035	CT_31	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2858	4782.4228	CUB2	2098
2C036	CT_32	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.291	4782.4298	CUB2	2126
2C037	CT_33	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2954	4782.4354	CUB2	2150
2C038	CT_34	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2039	4782.341	CUB2	1723
2C039	CT_35	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2089	4782.3481	CUB2	1751
2C040	CT_36	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2132	4782.3537	CUB2	1774
2C041	CT_37	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2177	4782.3593	CUB2	1798
2C042	CT_38	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2228	4782.3664	CUB2	1827

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
2C043	CT_39	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2268	4782.372	CUB2	1849
2C044	CT_40	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2312	4782.3776	CUB2	1873
2C045	CT_41	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2696	4782.3679	CUB2	1921
2C046	CT_42	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2404	4782.3903	CUB2	1924
2C047	CT_43	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2448	4782.3959	CUB2	1947
2C048	CT_44	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.249	4782.4042	CUB2	1977
2C049	CT_45	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2532	4782.4098	CUB2	2000
2C050	CT_46	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2577	4782.4154	CUB2	2024
2C051	CT_47	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2627	4782.4225	CUB2	2052
2C052	CT_48	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.267	4782.4281	CUB2	2076
2C053	CT_49	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2713	4782.4337	CUB2	2099
2C054	CT_50	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2765	4782.4408	CUB2	2128
2C055	CT_51	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2807	4782.4464	CUB2	2151
2C056	CT_52	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3142	4782.4301	CUB2	2172
2C057	CT_53	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3182	4782.4377	CUB2	2200
2C058	CT_54	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3222	4782.4433	CUB2	2222
2C059	CT_55	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3265	4782.4489	CUB2	2246
2C060	CT_56	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3453	4782.4743	CUB2	2349
2C061	CT_57	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3495	4782.4799	CUB2	2372
2C062	CT_58	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3539	4782.4855	CUB2	2396
2C063	CT_59	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3582	4782.4934	CUB2	2425
2C064	CT_60	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3628	4782.499	CUB2	2449
2C065	CT_61	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.367	4782.5046	CUB2	2471
2C066	CT_62	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.372	4782.5117	CUB2	2500
2C067	CT_63	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3764	4782.5173	CUB2	2523
2C068	CT_64	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3806	4782.5229	CUB2	2546
2C069	CT_65	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3858	4782.5299	CUB2	2575
2C070	CT_66	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3901	4782.5355	CUB2	2598
2C071	CT_67	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3942	4782.5412	CUB2	2621
2C072	CT_68	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2994	4782.4411	CUB2	2172
2C073	CT_69	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3035	4782.4486	CUB2	2200
2C074	CT_70	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3078	4782.4542	CUB2	2223
2C075	CT_71	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3116	4782.4598	CUB2	2246
2C076	CT_72	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.317	4782.4669	CUB2	2275
2C077	CT_73	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3214	4782.4725	CUB2	2298
2C078	CT_74	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3319	4782.4552	CUB2	2273
2C079	CT_75	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3309	4782.4852	CUB2	2350
2C080	CT_76	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3345	4782.4908	CUB2	2372
2C081	CT_77	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3393	4782.4964	CUB2	2396
2C082	CT_78	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3439	4782.5043	CUB2	2426
2C083	CT_79	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.348	4782.5099	CUB2	2449
2C084	CT_80	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3523	4782.5155	CUB2	2472
2C085	CT_81	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3576	4782.5226	CUB2	2501
2C086	CT_82	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3616	4782.5282	CUB2	2524
2C087	CT_83	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3658	4782.5338	CUB2	2547
2C088	CT_84	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3711	4782.5409	CUB2	2576
2C089	CT_85	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3752	4782.5465	CUB2	2598
2C090	CT_86	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3795	4782.5521	CUB2	2622
2C091	CT_87	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2849	4782.452	CUB2	2173
2C092	CT_88	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.289	4782.4595	CUB2	2201
2C093	CT_89	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2929	4782.4652	CUB2	2224
2C094	CT_90	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.2973	4782.4708	CUB2	2247
2C095	CT_91	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3025	4782.4779	CUB2	2276
2C096	CT_92	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3069	4782.4835	CUB2	2299
2C097	CT_93	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3357	4782.4607	CUB2	2295
2C098	CT_94	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3161	4782.4962	CUB2	2351
2C099	CT_95	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3196	4782.5016	CUB2	2372
2C100	CT_96	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.324	4782.5082	CUB2	2398
2C101	CT_97	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3293	4782.5153	CUB2	2427
2C102	CT_98	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3333	4782.5209	CUB2	2450
2C103	CT_99	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3376	4782.5265	CUB2	2473

Emission Point	Plot Plan ID	Ground Elevation	Height	Height Above Structure	Inside Diameter	Inside Diameter	Exit Temp	Cross Section	Exit Velocity	Exit Flow	UTM X Coordinate	UTM Y Coordinate	Building	Distance to Property Line
		(ft)	(ft)	(ft)	(ft)	(in)	(F)	(in)	(FPS)	(ACFM)	(km)	(km)		(ft)
2C104	CT_100	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3429	4782.5336	CUB2	2502
2C105	CT_101	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3471	4782.5392	CUB2	2525
2C106	CT_102	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3513	4782.5448	CUB2	2548
2C107	CT_103	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3565	4782.5518	CUB2	2576
2C108	CT_104	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3608	4782.5574	CUB2	2600
2C109	CT_105	400	100.9	31.9	19.2	230.0	Ambient	N/A	33.8	585800	406.3649	4782.5631	CUB2	2623
2G001	CT_106	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.8079	4783.0926	N/A-Outside	1123
2G002	CT_107	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.8001	4783.0825	N/A-Outside	1162
2G003	CT_108	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.7924	4783.0723	N/A-Outside	1202
2G004	CT_109	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.7516	4783.0174	N/A-Outside	1418
2G005	CT_110	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.7439	4783.0073	N/A-Outside	1458
2G006	CT_111	400	42.0	N/A	24.0	288.0	Ambient	N/A	27.6	750000	406.7362	4782.9971	N/A-Outside	1499
1W001	AE_51	400	144.0	10.0	2.2	26.0	70.0	N/A	67.8	15000	405.3736	4783.0698	WWT1	656
1W002	AE_52	400	144.0	10.0	2.2	26.0	70.0	N/A	67.8	15000	405.3777	4783.067	WWT1	669
1W003	AE_53	400	144.0	10.0	2.2	26.0	70.0	N/A	67.8	15000	405.3869	4783.0603	WWT1	697
1W004	AE_54	400	144.0	10.0	2.2	26.0	70.0	N/A	67.8	15000	405.3913	4783.0572	WWT1	713
1W005	AME_25	400	144.0	10.0	0.8	10.0	70.0	N/A	76.4	2500	405.3558	4783.0833	WWT1	599
1W006	AME_26	400	144.0	10.0	0.8	10.0	70.0	N/A	76.4	2500	405.3607	4783.0798	WWT1	616
1W007	AME_27	400	144.0	10.0	0.8	10.0	70.0	N/A	76.4	2500	405.3661	4783.0759	WWT1	634
1W008	SE_45	400	144.0	10.0	0.5	6.0	70.0	N/A	169.8	2000	405.339	4783.0956	WWT1	550
1W009	SE_46	400	144.0	10.0	0.5	6.0	70.0	N/A	169.8	2000	405.3437	4783.0923	WWT1	565
1W010	SE_47	400	144.0	10.0	0.5	6.0	70.0	N/A	169.8	2000	405.3483	4783.0891	WWT1	577
1W011	SILO1	400	46.0	N/A	75.5	905.5	N/A	N/A	N/A	N/A	405.4379	4782.946	N/A-Outside	843
1W012	SILO2	400	46.0	N/A	75.5	905.5	N/A	N/A	N/A	N/A	406.2251	4783.1254	N/A-Outside	2458
1B001	GE_59	400	70.6	9.8	4.3	52.0	80.0	N/A	74.9	66234	405.4082	4783.683	BIO1	436
1B002	GE_60	400	70.6	9.8	4.3	52.0	80.0	N/A	74.9	66234	405.3977	4783.6822	BIO1	404
2W001	AE_51	400	144.0	10.0	2.2	26.0	70.0	N/A	67.8	15000	406.2942	4783.009	WWT2	2439
2W002	AE_52	400	144.0	10.0	2.2	26.0	70.0	N/A	67.8	15000	406.2902	4783.0118	WWT2	2445
2W003	AE_53	400	144.0	10.0	2.2	26.0	70.0	N/A	67.8	15000	406.2807	4783.0185	WWT2	2459
2W004	AE_54	400	144.0	10.0	2.2	26.0	70.0	N/A	67.8	15000	406.2763	4783.0216	WWT2	2466
2W005	AME_25	400	144.0	10.0	0.8	10.0	70.0	N/A	76.4	2500	406.3124	4782.9963	WWT2	2413
2W006	AME_26	400	144.0	10.0	0.8	10.0	70.0	N/A	76.4	2500	406.3074	4782.9998	WWT2	2419
2W007	AME_27	400	144.0	10.0	0.8	10.0	70.0	N/A	76.4	2500	406.302	4783.0037	WWT2	2427
2W008	SE_45	400	144.0	10.0	0.5	6.0	70.0	N/A	169.8	2000	406.3294	4782.9843	WWT2	2391
2W009	SE_46	400	144.0	10.0	0.5	6.0	70.0	N/A	169.8	2000	406.3248	4782.9874	WWT2	2396
2W010	SE_47	400	144.0	10.0	0.5	6.0	70.0	N/A	169.8	2000	406.3203	4782.9907	WWT2	2402
2W011	SILO3	400	46.0	N/A	75.5	905.5	N/A	N/A	N/A	N/A	407.045	4782.5367	N/A-Outside	1548
2W012	SILO4	400	46.0	N/A	75.5	905.5	N/A	N/A	N/A	N/A	407.0824	4782.5099	N/A-Outside	1430
2B001	GE_59	400	70.6	9.8	4.3	52.0	80.0	N/A	74.9	66234	405.7099	4783.6894	BIO2	603
2B002	GE_60	400	70.6	9.8	4.3	52.0	80.0	N/A	74.9	66234	405.7203	4783.69	BIO2	604
1A001	AE_55	400	114.0	14.0	1.7	20.0	70.0	N/A	76.4	10000	405.5218	4782.5898	PROBE1	1043
1A002	AE_56	400	114.0	14.0	1.7	20.0	70.0	N/A	76.4	10000	405.5192	4782.5863	PROBE1	1034
1A003	SE_48	400	114.0	14.0	1.0	12.0	70.0	N/A	84.9	4000	405.5151	4782.5814	PROBE1	1019
1A004	SE_49	400	114.0	14.0	1.0	12.0	70.0	N/A	84.9	4000	405.5137	4782.5795	PROBE1	1014
2A001	AE_55	400	114.0	14.0	1.7	20.0	70.0	N/A	76.4	10000	405.9577	4782.2767	PROBE2	1077
2A002	AE_56	400	114.0	14.0	1.7	20.0	70.0	N/A	76.4	10000	405.9551	4782.2732	PROBE2	1063
2A003	SE_48	400	114.0	14.0	1.0	12.0	70.0	N/A	84.9	4000	405.9517	4782.268	PROBE2	1042
2A004	SE_49	400	114.0	14.0	1.0	12.0	70.0	N/A	84.9	4000	405.9502	4782.2661	PROBE2	1034

Table A-3 - Section IV Pg. 6 Process Description

Emission Unit	Process	Description	Source Classification Code (SCC)	Operating Schedule		Building	Emission Point Identifiers	Emission Source/Control Identifiers
				Hours/Day	Days/Year			
1-FABOP	FA1	Fab 1 semiconductor manufacturing processes exhausting to centralized acid gas scrubbers, including Ion Implant, Plasma Etch, and Wet Etch/Wet Clean processes, as well as associated safety and support equipment and control devices, including point-of-use (POU) control devices and regenerative catalytic systems (RCS).	31306599	24	365	FAB1	1F001 - 1F040	AS001 - AS040 PLE01 POU01 RCS01 - RCS10 IMP01 WET01
1-FABOP	FC1	Fab 1 semiconductor manufacturing processes exhausting to centralized ionizing wet scrubbers capable of scrubbing NO2, including Thin Films/Diffusion Deposition processes as well as associated safety and support equipment.	31306599	24	365	FAB1	1F041 - 1F056	CS001 - CS016 TFD01
1-FABOP	FB1	Fab 1 semiconductor manufacturing processes exhausting to centralized caustic gas scrubbers, including Photolithography, Wet Etch/Wet Clean, and Chemical-Mechanical Planarization processes, as well as associated safety and support equipment.	31306599	24	365	FAB1	1F057 - 1F072	BS001 - BS016 PHO01 WET01 CMP01 ST001 - ST006
1-FABOP	FS1	Fab 1 semiconductor manufacturing processes exhausting to centralized rotor-concentrator thermal oxidizers, including Photolithography and Wet Etch/Wet Clean processes, solvent waste storage, as well as associated safety and support equipment.	31306599	24	365	FAB1	1F073 - 1F144	TO001 - TO036 PHO01 WET01 WS001 - WS030
1-FABOP	FG1	General ventilation for Fab 1 including the cleanroom, which may include emissions of air contaminants not collected by other semiconductor manufacturing process exhaust systems.	31306599	24	365	FAB1	1F145 - 1F184	GN001 - GN040
2-FABOP	FA2	Fab 2 semiconductor manufacturing processes exhausting to centralized acid gas scrubbers, including Ion Implant, Plasma Etch, and Wet Etch/Wet Clean processes, as well as associated safety and support equipment and control devices, including point-of-use (POU) control devices and regenrative catalytic systems (RCS).	31306599	24	365	FAB2	2F001 - 2F040	AS041 - AS080 PLE02 POU02 RCS11 - RCS20 IMP02 WET02
2-FABOP	FC2	Fab 2 semiconductor manufacturing processes exhausting to centralized ionizing wet scrubbers capable of scrubbing NO2, including Thin Films/Diffusion Deposition processes as well as associated safety and support equipment.	31306599	24	365	FAB2	2F041 - 2F056	CS017 - CS032 TFD02
2-FABOP	FB2	Fab 2 semiconductor manufacturing processes exhausting to centralized caustic gas scrubbers, including Photolithography, Wet Etch/Wet Clean, and Chemical-Mechanical Planarization processes, as well as associated safety and support equipment.	31306599	24	365	FAB2	2F057 - 2F072	BS017 - BS032 PHO02 WET02 CMP02 ST007 - ST012
2-FABOP	FS2	Fab 2 semiconductor manufacturing processes exhausting to centralized rotor-concentrator thermal oxidizers, including Photolithography and Wet Etch/Wet Clean processes, solvent waste storage, as well as associated safety and support equipment.	31306599	24	365	FAB2	2F073 - 2F144	TO037 - TO072 PHO02 WET02 WS031-WS060
2-FABOP	FG2	General ventilation for Fab 1 including the cleanroom, which may include emissions of air contaminants not collected by other semiconductor manufacturing process exhaust systems.	31306599	24	365	FAB2	2F145 - 2F184	GN041 - GN080
1-CMBOP	BLR	Natural-gas fired boilers.	10200602	24	250	CUB1	1U001 - 1U003	BLR01 - BLR03
1-CMBOP	WBV	Water bath vaporizers fired by natural gas as a backup measure to vaporize liquid nitrogen.	10200602	24	83.3	N/A	1U004 - 1U007	WBV01 - WBV04
1-CMBOP	EMD	Diesel-fired emergency generators.	20100102	Variable	Variable	CUB1	1U008 - 1U067	DG001 - DG060
1-CMBOP	DFP	Diesel-fired backup fire pump engine.	20200102	0.5	52	N/A	1FP01	FP001
2-CMBOP	BLR	Natural-gas fired boilers.	10200602	24	250	CUB2	2U001 - 2U003	BLR04 - BLR06
2-CMBOP	WBV	Water bath vaporizers fired by natural gas as a backup measure to vaporize liquid nitrogen.	10200602	24	83.3	N/A	2U004 - 2U007	WBV05 - WBV08
2-CMBOP	EMD	Diesel-fired emergency generators.	20100102	Variable	Variable	CUB2	2U008 - 2U065	DG061 - DG118
1-HPMCU	HA1	Storage of acidic raw materials and waste materials exhausting to acid gas scrubbers in the HPM1-S building supporting Fab 1.	2520010000	24	365	HPM1-S	1H001 - 1H004	AS081 - AS084 ST013 - ST018 ST025 - ST028 ST033 - ST034 ST037 - ST038 ST041 - ST042

Emission Unit	Process	Description	Source Classification Code (SCC)	Operating Schedule		Building	Emission Point Identifiers	Emission Source/Control Identifiers
				Hours/Day	Days/Year			
								WS061 - WS063
1-HPMCU	HA2	Storage of acidic raw materials and waste materials exhausting to acid gas scrubbers in the HPM1-N building supporting Fab 1.	2520010000	24	365	HPM1-N	1H005 - 1H008	AS085 - AS088 ST019 - ST024 ST029 - ST032 ST035 - ST036 ST039 - ST040 ST043 - ST044 WS064 - WS066

Emission Unit	Process	Description	Source Classification Code (SCC)	Operating Schedule		Building	Emission Point Identifiers	Emission Source/Control Identifiers
				Hours/Day	Days/Year			
1-HPMCU	CA1	Storage of acidic raw materials exhausting to acid gas scrubbers in the CUB building supporting Fab 1.	2520010000	24	365	CUB1	1C001 - 1C004	AS089 - AS092 ST045
1-HPMCU	HB1	Storage of basic raw materials exhausting to caustic gas scrubbers in the HPM1-S building supporting Fab 1.	2520010000	24	365	HPM1-S	1H009 - 1H012	BS033 - BS036 ST046 - ST049 ST054 - ST055 ST058 - ST059 ST062 - ST063
1-HPMCU	HB2	Storage of basic raw materials exhausting to caustic gas scrubbers in the HPM1-N building supporting Fab 1.	2520010000	24	365	HPM1-N	1H013 - 1H016	BS037 - BS040 ST050 - ST053 ST056 - ST057 ST060 - ST061 ST064 - ST065
1-HPMCU	HS1	Storage of solvents in the HPM1-S building supporting Fab 1.	40714697	24	365	HPM1-S	1H017 - 1H024	TO073 - TO076 ST066 - ST069 ST074 - ST075 SOD01
1-HPMCU	HS2	Storage of solvents in the HPM1-N building supporting Fab 1.	40714697	24	365	HPM1-N	1H025 - 1H032	TO077 - TO080 ST070 - ST073 ST076 - ST077 SOD02
1-HPMCU	DT1	Storage of diesel fuel to support Fab 1 engines.	2501010090; 2501995090	24	365	N/A	1D001 - 1D004	DT001 - DT004
1-HPMCU	FU1	Fugitive emissions related to Fab 1.	31306599	24	365	CUB1	-	ST078 - ST081
1-HPMCU	CT1	Cooling towers supporting Fab 1.	38500110	24	365	CUB1	1C005 - 1C109 1G001 - 1G006	CT001 - CT105 CT106 - CT111
2-HPMCU	HA3	Storage of acidic raw materials and waste materials exhausting to acid gas scrubbers in the HPM2-S building supporting Fab 2.	2520010000	24	365	HPM2-S	2H001 - 2H004	AS093 - AS096 ST082 - ST087 ST094 - ST097 ST102 - ST103 ST106 - ST107 ST110 - ST111 WS067 - WS069
2-HPMCU	HA4	Storage of acidic raw materials and waste materials exhausting to acid gas scrubbers in the HPM2-N building supporting Fab 2.	2520010000	24	365	HPM2-N	2H005 - 2H008	AS097 - AS100 ST088 - ST093 ST098 - ST101 ST104 - ST105 ST108 - ST109 ST112 - ST113 WS070 - WS072
2-HPMCU	CA2	Storage of acidic raw materials exhausting to acid gas scrubbers in the CUB building supporting Fab 2.	2520010000	24	365	CUB2	2C001 - 2C004	AS101 - AS104 ST114
2-HPMCU	HB3	Storage of basic raw materials exhausting to caustic gas scrubbers in the HPM2-S building supporting Fab 2.	2520010000	24	365	HPM2-S	2H009 - 2H012	BS041 - BS044 ST115 - ST118 ST123 - ST124 ST127 - ST128 ST131 - ST132
2-HPMCU	HB4	Storage of basic raw materials exhausting to caustic gas scrubbers in the HPM2-N building supporting Fab 2.	2520010000	24	365	HPM2-N	2H013 - 2H016	BS045 - BS048 ST119 - ST122 ST125 - ST126 ST129 - ST130

Emission Unit	Process	Description	Source Classification Code (SCC)	Operating Schedule		Building	Emission Point Identifiers	Emission Source/Control Identifiers
				Hours/Day	Days/Year			
								ST133 - ST134
2-HPMCU	HS3	Storage of solvents in the HPM2-S building supporting Fab 2.	40714697	24	365	HPM2-S	2H017 - 2H024	TO081 - TO084 ST135 - ST138 ST143 - ST144 SOD03
2-HPMCU	HS4	Storage of solvents in the HPM2-N building supporting Fab 2.	40714697	24	365	HPM2-N	2H025 - 2H032	TO085 - TO088 ST139 - ST142 ST145 - ST146 SOD04
2-HPMCU	DT2	Storage of diesel fuel to support Fab 2 engines.	2501010090; 2501995090	24	365	N/A	2D001 - 2D004	DT005 - DT008
2-HPMCU	FU2	Fugitive emissions related to Fab 2.	31306599	24	365	CUB2	-	ST147 - ST150
2-HPMCU	CT2	Cooling towers supporting Fab 2.	38500110	24	365	CUB2	2C005 - 2C109 2G001 - 2G006	CT112 - CT216 CT217 - CT222
1-WWBIO	WA1	Wastewater treatment operations and storage of acidic raw materials and waste materials exhausting to acid gas scrubbers in the WWT building supporting Fab 1.	2520010000	24	365	WWT1	1W001 - 1W004	AS105 - AS108 WWT01 ST151 - ST168 WS073 - WS092 WLB01
1-WWBIO	WB1	Wastewater treatment operations and storage of basic raw materials exhausting to caustic gas scrubbers in the WWT building supporting Fab 1.	2520010000	24	365	WWT1	1W005 - 1W007	BS049 - BS051 WWT01 ST169 - ST175 WLB01
1-WWBIO	WS1	Wastewater treatment operations and storage of solvents exhausting to rotor-concentrator thermal oxidizers in the WWT building supporting Fab 1.	2630010000	24	365	WWT1	1W008 - 1W010	TO089 - TO091 WWT01 WLB01
1-WWBIO	SL1	Solid material storage silos supporting Fab 1.	30501613	24	365	N/A	1W011, 1W012	SIL01 - SIL02
1-WWBIO	BG1	Bilological treatment processes and storage of raw materials supporting Fab 1.	2630010000	24	365	BIO1	1B001 - 1B002	OS001 - OS002 BIO01 ST176 - ST178 BLB01
1-WWBIO	FU1	Fugitive emissions related to Fab 1.	31306599	24	365	BIO1	-	ST179 - ST183
2-WWBIO	WA2	Wastewater treatment operations and storage of acidic raw materials and waste materials exhausting to acid gas scrubbers in the WWT building supporting Fab 2.	2520010000	24	365	WWT2	2W001 - 2W004	AS109 - AS112 WWT02 ST184 - ST201 WS093 - WS0112 WLB02

Emission Unit	Process	Description	Source Classification Code (SCC)	Operating Schedule		Building	Emission Point Identifiers	Emission Source/Control Identifiers
				Hours/Day	Days/Year			
2-WWBIO	WB2	Wastewater treatment operations and storage of basic raw materials exhausting to caustic gas scrubbers in the WWT building supporting Fab 2.	2520010000	24	365	WWT2	2W005 - 2W007	BS052 - BS054
								WWT02
								ST202 - ST208
								WLB02
2-WWBIO	WS2	Wastewater treatment operations and storage of solvents exhausting to rotor-concentrator thermal oxidizers in the WWT building supporting Fab 2.	2630010000	24	365	WWT2	2W008 - 2W010	TO092 - TO094
								WWT02
								WLB02
2-WWBIO	SL2	Solid material storage silos supporting Fab 2.	30501613	24	365	N/A	2W011, 2W012	SIL03 - SIL04
2-WWBIO	BG2	Bilological treatment processes and storage of raw materials supporting Fab 2.	2630010000	24	365	BIO2	2B001 - 2B002	OS003 - OS004
								BIO02
								ST209 - ST211
								BLB02
2-WWBIO	FU2	Fugitive emissions related to Fab 2.	31306599	24	365	BIO2	-	ST212 - ST216
1-ADMPR	AA1	Laboratory operations exhausting to acid gas scrubbers in the Admin/Probe buildings supporting Fab 1.	31306599	24	365	PROBE1	1A001 - 1A002	AS113 - AS114
								ALB01
1-ADMPR	AS1	Laboratory operations exhausting solvent gases in the Admin/Probe buildings supporting Fab 1.	31306599	24	365	PROBE1	1A003 - 1A004	TO095 - TO096
								ALB01
2-ADMPR	AA2	Laboratory operations exhausting to acid gas scrubbers in the Admin/Probe buildings supporting Fab 2.	31306599	24	365	PROBE2	2A001 - 2A002	AS115 - AS116
								ALB02
2-ADMPR	AS2	Laboratory operations exhausting solvent gases in the Admin/Probe buildings supporting Fab 2.	31306599	24	365	PROBE2	2A003 - 2A004	TO097 - TO098
								ALB02

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID
- -

Date of Form
July 2025

List of Exempt Activities

Instructions

Applicants for Title V facility permits must provide a listing of each exempt activity, as described in 6 NYCRR Part 201-3.2(c), that is currently operated at the facility. This form must be provided with each application for a new Title V facility permit and Title V facility permit renewal, or whenever changes are necessary. In order to complete this form, enter the number and building location of each exempt activity conducted. Building IDs used on this form should match those used in the Title V permit application. Provide all additional information where requested. If a listed activity is not operated at the facility, leave the corresponding information blank.

Rule Citation 201-3.2(c)	Description	Number of Activities	Building Location
	Combustion		
(1)	Stationary or portable combustion installations where the furnace has a maximum rated heat input capacity less than 10 MMBtu/hr burning liquid or gaseous fuels; or a maximum heat input capacity of less than 1 MMBtu/hr burning solid fuels. This activity does not include combustion installations burning any material classified as solid waste, as defined in 6 NYCRR Part 360, hazardous waste, as defined in 6 NYCRR Part 371, or waste oil, as defined in 6 NYCRR Subpart 225-2. **For each activity listed, attach documentation indicating the date of construction, heat input (MMBtu/hr), and the type of fuel combusted.**		
(2)	Space heaters burning waste oil at eligible facilities, as defined in 6 NYCRR Subpart 225-2, generated on-site or at a facility under common control, alone or in conjunction with used oil generated by a do-it-yourself oil changer as described in 6 NYCRR Subpart 374-2.		
(3)(i)	Stationary or portable internal combustion engines that are liquid or gaseous fuel powered and located within the New York City metropolitan area or the Orange County towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick, or Woodbury, and have a maximum mechanical power rating of less than 200 brake horsepower. **For each activity listed, attach documentation indicating the date of construction, engine model year, engine rating (hp), displacement (L/cylinder), type of fuel combusted, and EPA issued certificate of conformity.**		

DEC ID												
	-					-						

Date of Form
July 2025

Rule Citation 201-3.2(c)	Description	Number of Activities	Building Location
(3)(ii)	Stationary or portable internal combustion engines that are liquid or gaseous fuel powered and located outside of the New York City metropolitan area or the Orange County towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick, or Woodbury, and have a maximum mechanical power rating of less than 400 brake horsepower. **For each activity listed, attach documentation indicating the date of construction, engine model year, engine rating (hp), displacement (L/cylinder), type of fuel combusted, and EPA issued certificate of conformity.**		
(3)(iii)	Stationary or portable internal combustion engines that are gasoline powered and have a maximum mechanical power rating of less than 50 brake horsepower.		
(4)	Reserved.		
(5)	Gas turbines with a heat input at peak load less then 10 MMBtu/hour		
(6)	Emergency power generating stationary internal combustion engines, as defined in 6 NYCRR Part 200.1(cq). Stationary internal combustion engines used for peak shaving and/or demand response programs are not exempt. **For each activity listed, attach documentation indicating the date of construction, engine model year, engine rating (hp), displacement (L/cylinder), type of fuel combusted, and EPA issued certificate of conformity.**		
Combustion Related			
(7)	Non-contact water cooling towers and water treatment systems for process cooling water and other water containers designed to cool, store or otherwise handle water that has not been in direct contact with gaseous or liquid process streams.	222	CUB 1, CUB 2
Agricultural			
(8)	Feed and grain milling, cleaning, conveying, drying and storage operations including grain storage silos, where such silos exhaust to an appropriate emissions control device, excluding grain terminal elevators with permanent storage capacities over 2.5 million U.S. bushels, and grain storage elevators with capacities above one million bushels.		

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- -

Date of Form
July 2025

Rule Citation 201-3.2(c)	Description	Number of Activities	Building Location
(9)	Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating equipment.		
Commercial - Food Service Industries			
(10)	Flour silos at bakeries, provided all such silos are exhausted through an appropriate emission control device.		
(11)	Emissions from flavorings added to a food product where such flavors are manually added to the product.		
Commercial - Graphic Arts			
(12)	Screen printing inks/coatings or adhesives which are applied by a hand-held squeegee. A hand-held squeegee is one that is not propelled though the use of mechanical conveyance and is not an integral part of the screen printing process.		
(13)	Graphic arts processes at facilities located outside the New York City metropolitan area or the Orange County towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick, or Woodbury whose facility-wide total emissions of volatile organic compounds from inks, coatings, adhesives, fountain solutions and cleaning solutions are less than three tons during any 12-month period.		
(14)	Graphic label and/or box labeling operations where the inks are applied by stamping or rolling.		
(15)	Graphic arts processes which are specifically exempted from regulation under 6 NYCRR Part 234, with respect to emissions of volatile organic compounds which are not given an A rating as described in 6 NYCRR Part 212.		
Commercial - Other			
(16)	Gasoline dispensing sites registered with the department pursuant to 6 NYCRR Part 613.		

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID
- -

Date of Form
July 2025

Rule Citation 201-3.2(c)	Description	Number of Activities	Building Location
(17)	Surface coating and related activities at facilities which use less than 25 gallons per month of total coating materials, or with actual volatile organic compound emissions of 1,000 pounds or less from coating materials in any 12-month period. Coating materials include all paints and paint components, other materials mixed with paints prior to application, and cleaning solvents, combined. This exemption is subject to the following: (i) The facility is located outside of the New York City metropolitan area or the Orange County towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick, or Woodbury; and (ii) All abrasive cleaning and surface coating operations are performed in an enclosed building where such operations are exhausted into appropriate emission control devices.		
(18)	Abrasive cleaning operations which exhaust to an appropriate emission control device.		
(19)	Ultraviolet curing operations.		
Municipal/Public Health Related			
(20)	Landfill gas ventilating systems at landfills with design capacities less than 2.5 million megagrams (3.3 million tons) and 2.5 million cubic meters (2.75 million cubic yards), where the systems are vented directly to the atmosphere, and the ventilating system has been required by, and is operating under, the conditions of a valid 6 NYCRR Part 360 permit, or order on consent.		
Storage Vessels			
(21)	Distillate fuel oil, residual fuel oil, and biodiesel storage tanks with storage capacities below 300,000 barrels.	8	N/A
(22)	Pressurized fixed roof tanks which are capable of maintaining a working pressure at all times to prevent emissions of volatile organic compounds to the outdoor atmosphere.		
(23)	External floating roof tanks which are of welded construction and are equipped with a metallic-type shoe primary seal and a secondary seal from the top of the shoe seal to the tank wall.		

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID
- -

Date of Form
July 2025

Rule Citation 201-3.2(c)	Description	Number of Activities	Building Location
(24)	External floating roof tanks which are used for the storage of a petroleum or volatile organic liquid with a true vapor pressure less than 4.0 psi (27.6 kPa), are of welded construction and are equipped with one of the following: (i) a metallic-type shoe seal; (ii) a liquid-mounted foam seal; (iii) a liquid-mounted liquid-filled type seal; or (iv) equivalent control equipment or device.		
(25)	Storage tanks, including petroleum liquid storage tanks as defined in 6 NYCRR Part 229, and liquid asphalt storage tanks with capacities less than 10,000 gallons, except those subject to 6 NYCRR Part 229 or Part 233.	76	Various
(26)	Horizontal petroleum or volatile organic liquid storage tanks.		
(27)	Storage of solid materials, provided all such storage is exhausted through an appropriate emission control device. This exemption does not include raw material, clinker, or finished product storage at Portland cement plants.	4	N/A
Industrial			
(28)	Processing equipment at existing sand and gravel and stone crushing plants which were installed or constructed before August 31, 1983, where water is used for operations such as wet conveying, separating, and washing. This exemption does not include processing equipment at existing sand and gravel and stone crushing plants where water is used for dust suppression.		
(29)(i)	Sand and gravel, crushed stone, concrete, or recycled asphalt processing lines at non-metallic mineral processing facilities that are a permanent or fixed installation with a maximum rated processing capacity of 25 tons of minerals per hour or less.		
(29)(ii)	Sand and gravel, crushed stone, concrete, or recycled asphalt processing lines at non-metallic mineral processing facilities that are a portable emission source with a maximum rated processing capacity of 150 tons of minerals per hour or less.		

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID
- -

Date of Form
July 2025

Rule Citation 201-3.2(c)	Description	Number of Activities	Building Location
(29)(iii)	Sand and gravel, crushed stone, concrete, or recycled asphalt processing lines at non-metallic mineral processing facilities that are used exclusively to screen minerals at a facility where no crushing or grinding takes place.		
(30)	Reserved.		
(31)	Surface coating operations which are specifically exempted from regulation under 6 NYCRR Subparts 228-1 and 228-2, with respect to emissions of volatile organic compounds which are not given an A rating pursuant to 6 NYCRR Part 212.		
(32)	Pharmaceutical tablet branding operations.		
(33)	Thermal packaging operations, including, but not limited to, therimage labeling, blister packing, shrink wrapping, shrink banding, and carton gluing.		
(34)	Powder coating operations.		
(35)	All tumblers used for the cleaning and/or deburring of metal products without abrasive blasting.		
(36)	Presses used exclusively for molding or extruding plastics except where halogenated polymers are used or where halogenated carbon compounds or hydrocarbon solvents are used as foaming agents.		
(37)	Concrete batch plants where the cement weigh hopper and all bulk storage silos are exhausted through fabric filters, and the batch drop point is controlled by a shroud or other emission control device.		
(38)	Cement storage operations not located at Portland cement plants where materials are transported by screw or bucket conveyors.		
(39)(i)	Cold cleaning degreasers with an open surface area of 11 square feet or less and an internal volume of 93 gallons or less or, having an organic solvent loss of 3 gallons per day or less.		
39(ii)	Conveyorized degreasers with an air/vapor interface smaller than 22 square feet (2 square meters), unless subject to the requirements of 40 CFR 63 Subpart T.		
(39)(iii)	Open-top vapor degreasers with an open-top area smaller than 11 square feet (1.0 square meter), unless subject to the requirements in 40 CFR 63, Subpart T.		
Miscellaneous			
(40)	Ventilating and exhaust systems for laboratory operations. This exemption does not include laboratory operations used to produce products for sale except in a de minimis manner.	8	WWT1, WWT2 Probe1, Probe2

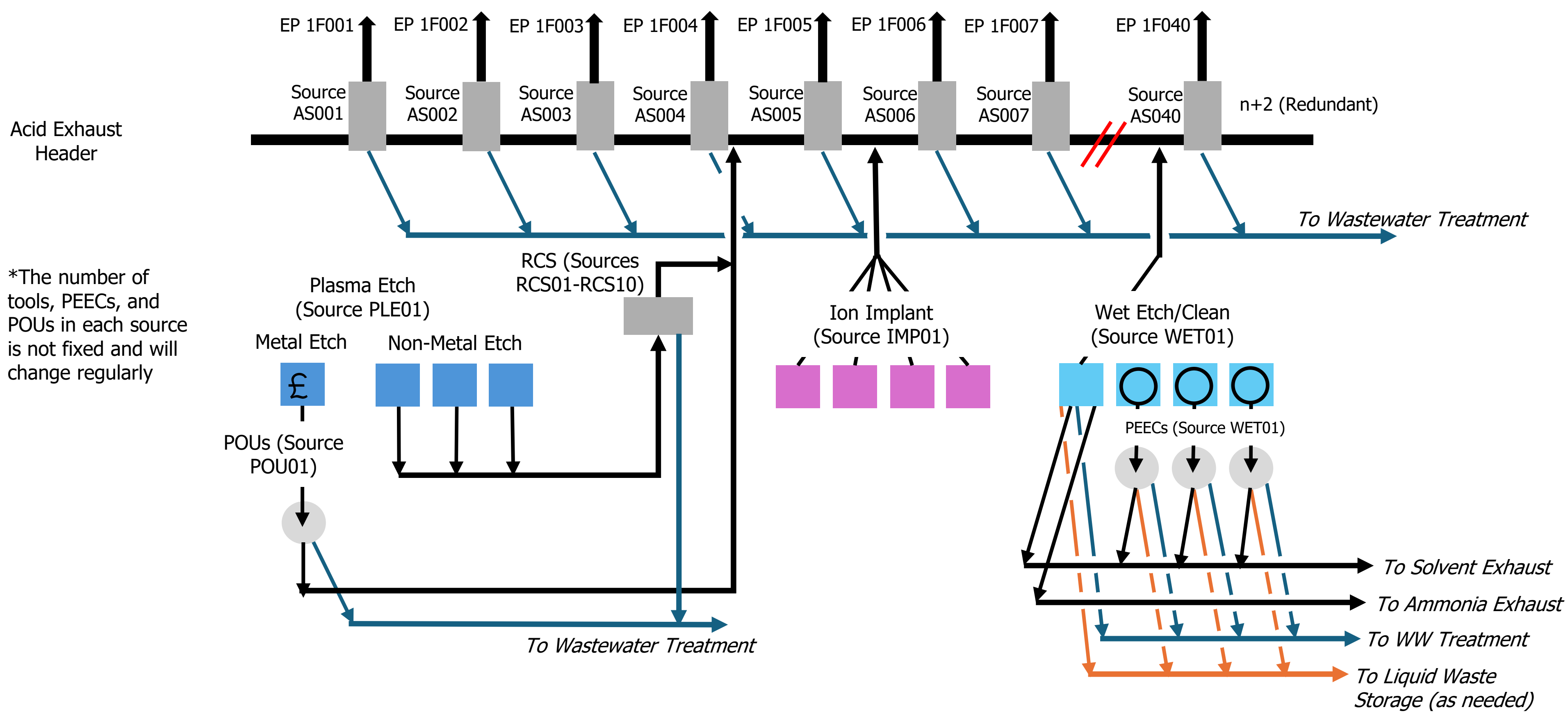
NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID
- -

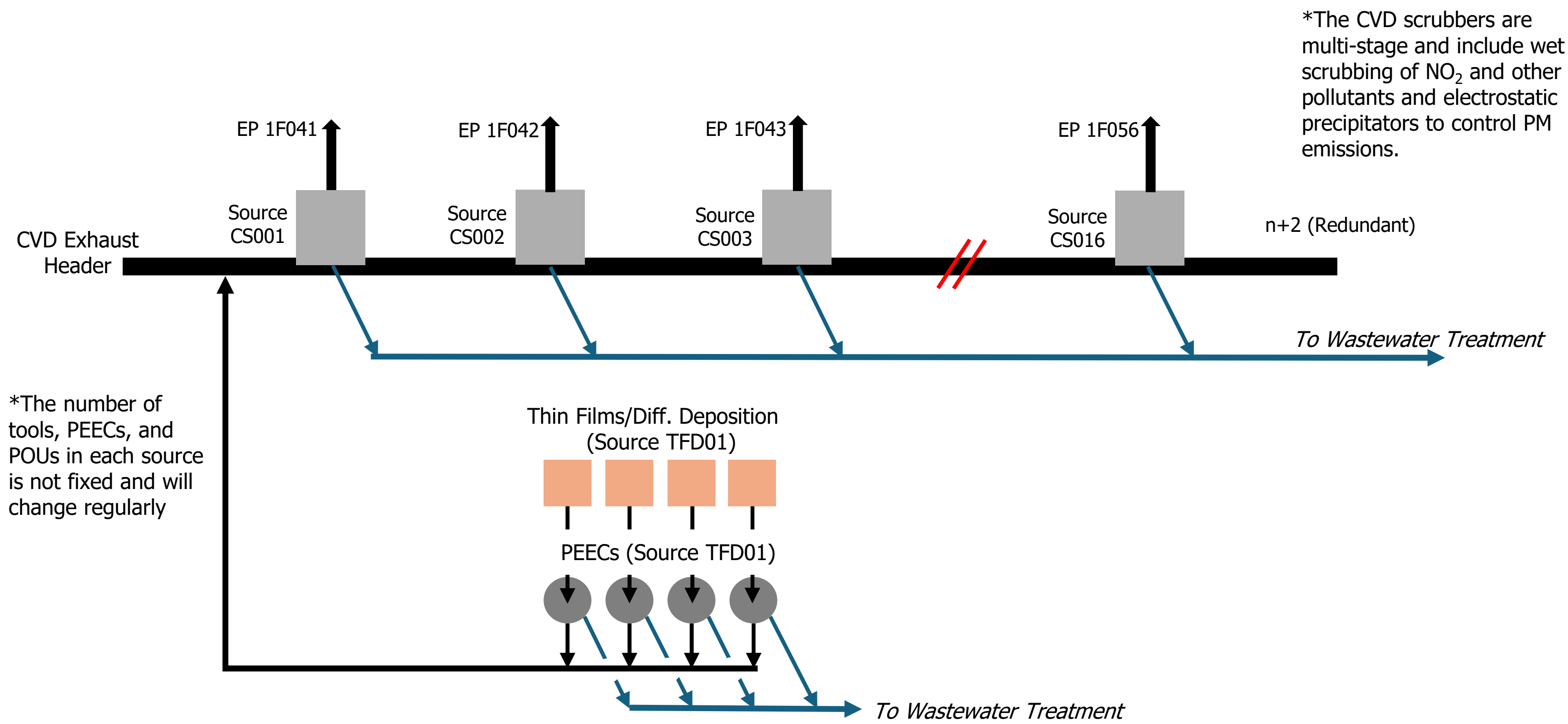
Date of Form
July 2025

Rule Citation 201-3.2(c)	Description	Number of Activities	Building Location
(41)	Exhaust or ventilating systems for the melting of gold, silver, platinum and other precious metals.		
(42)	Exhaust systems for paint mixing, transfer, filling or sampling and/or paint storage rooms or cabinets, provided the paints stored within these locations are stored in closed containers when not in use.		
(43)	Exhaust systems for solvent transfer, filling or sampling, and/or solvent storage rooms provided the solvents are stored in closed containers when not in use.		
(44)	Reserved		
(45)	The application of odor counteractants and/or neutralizers.		
(46)	Hydrogen, natural gas, and methane fuel cells.		
(47)	Dry cleaning equipment that uses only water-based cleaning processes or those using liquid carbon dioxide.		
(48)	Manure spreading, handling and storage at farms and agricultural facilities.		
(49)	Covered manure storage at farms that exhausts to a flare or other appropriate emission control device. This activity does not include anaerobic digestion processes operating with or without stationary or portable combustion installations.		
(50)	Coffee roasting processes which have a maximum operating capacity of 3 kilograms or less of green coffee beans per batch and no greater than 25 tons of green coffee beans per year, that are vented through an unobstructed, vertical stack that ensures proper dispersion of air contaminants.		
(51)	Process emission sources at breweries with total combined beer and/or malt liquor production of 60,000 barrels per year or less.		
(52)	Process emission sources at wineries with total combined wine and/or brandy production of 700,000 gallons per year or less.		
(53)	Process emission sources at distilleries with 10,000 distiller's bushels of grain input per year or less.		
(54)	Process emission sources at wood and lumber drying kilns with an annual throughput of untreated wood of 275,000 board feet or less.		

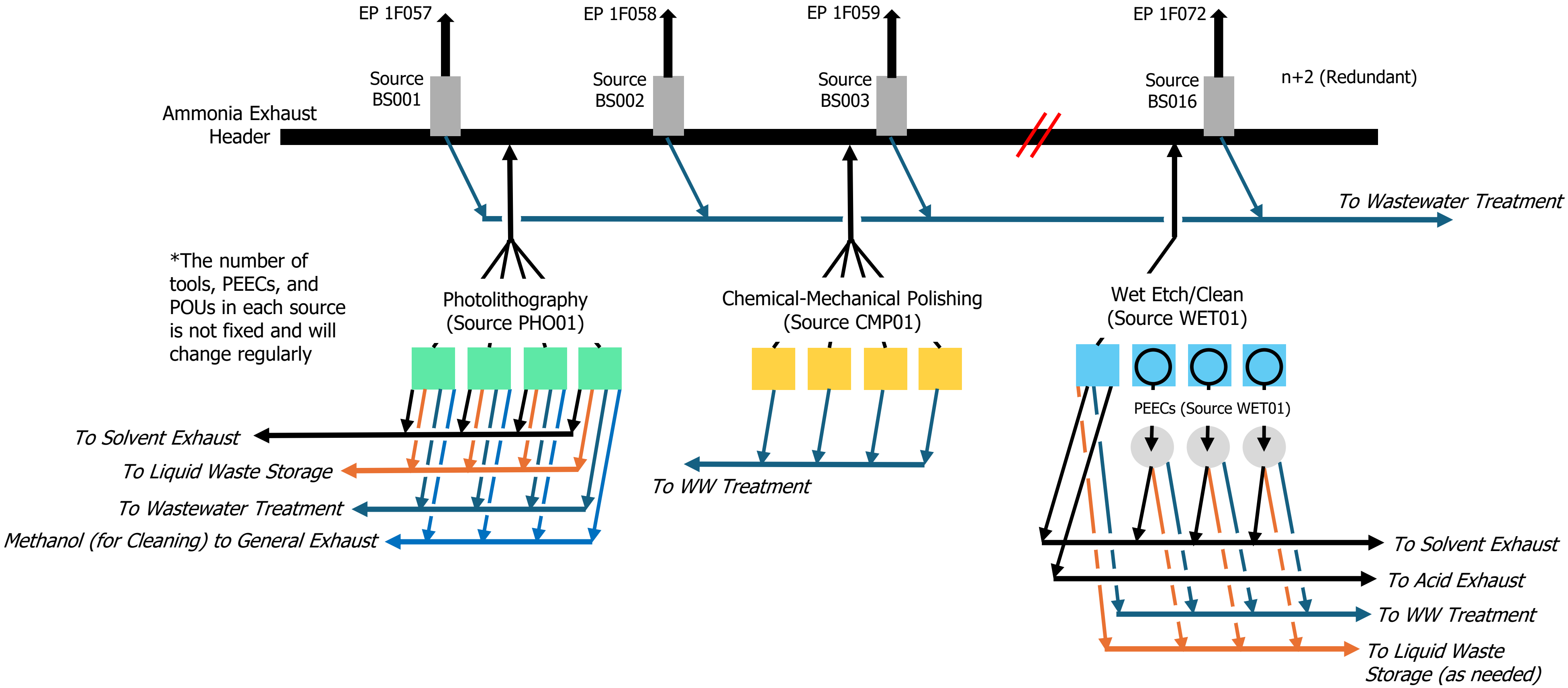
Example Acid Exhaust Configuration Serving One Half of Each Fab
Title V codes align with Fab 1 (1-FABOP), Process FA1



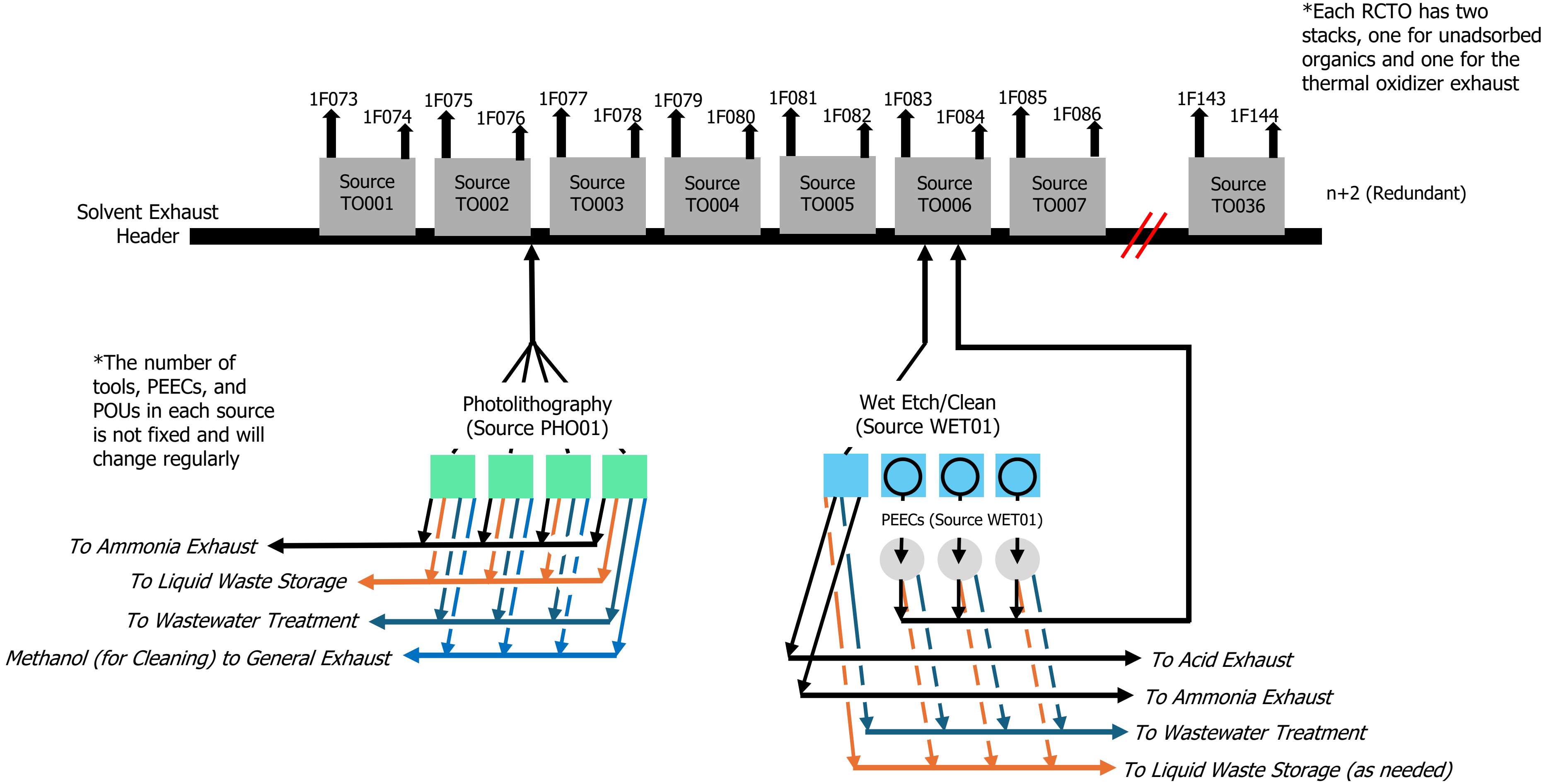
Example CVD Exhaust Configuration Serving One Half of Each Fab
Title V codes align with Fab 1 (1-FABOP), Process FC1



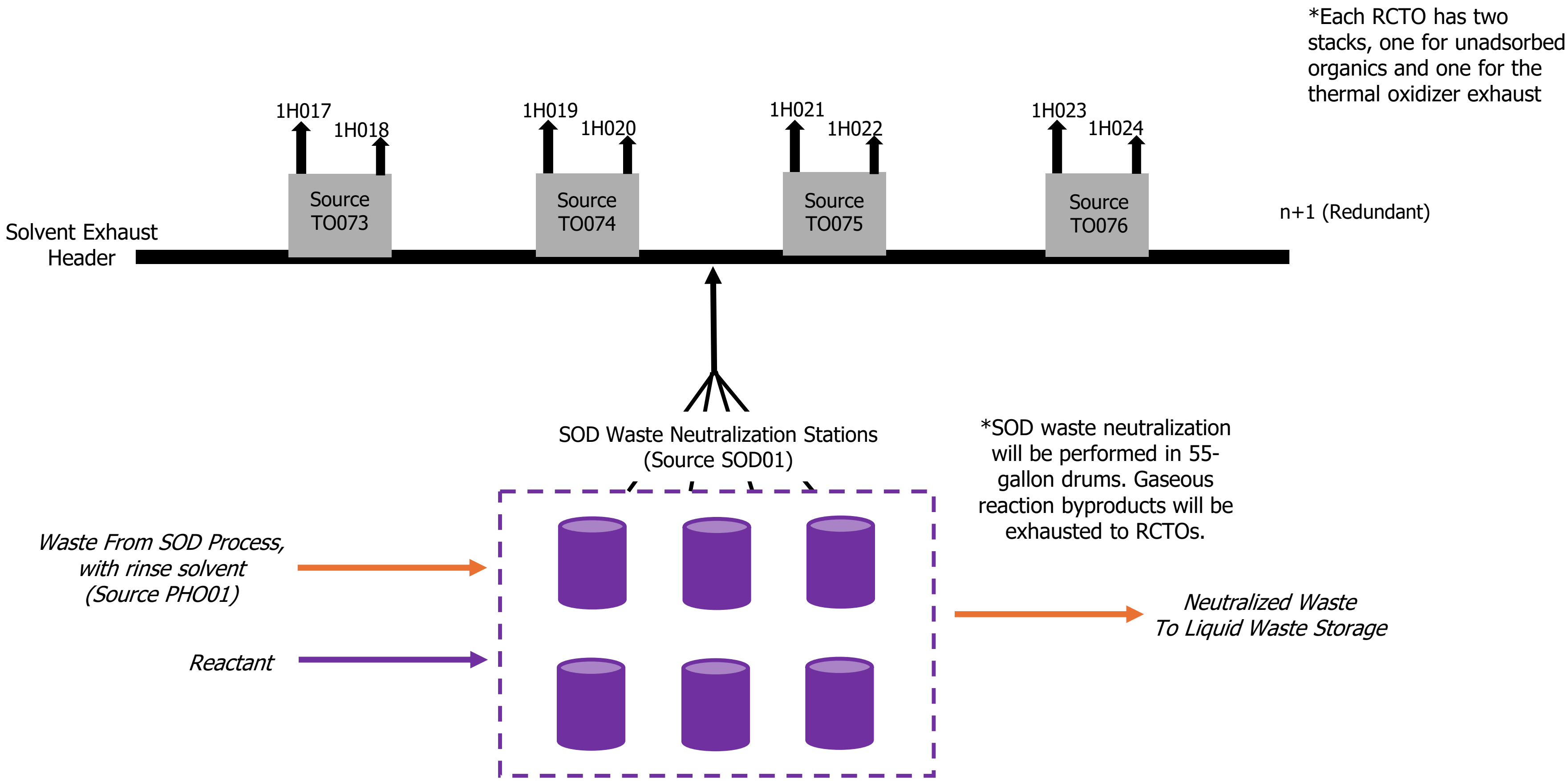
Example Ammonia Exhaust Configuration Serving One Half of Each Fab
Title V codes align with Fab 1 (1-FABOP), Process FB1



Example Solvent Exhaust Configuration Serving One Half of Each Fab
Title V codes align with Fab 1 (1-FABOP), Process FS1



Example Spin-on Dielectric (SOD) Waste Neutralization
Title V codes align with Fab 1 (1-HPMCU), Process HS1



Micron - Clay, NY Fabs 1 & 2
Total Emissions Summary

Table 1-1: Criteria Pollutant Annual Potential Emissions - By Source Type

CAS#	Chemical Name	Semiconductor Process Tools	Heat Transfer Fluids	IPA Cleaning	Wastewater Treatment	Tool-Level Thermal Oxidation Systems	RCTO Combustion	Water Bath Vaporizers	Boilers	Emergency Generators	Cooling Towers	Storage Tanks & Silos	Roadway	SF_6 Leaks	Lab Operations	SOD Waste Processing	RCS Combustion	Fire Pump Engine	Total PTE
		(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)
0NY075-00-0	PM	34.2	--	--	0.01	4.04	9.92	1.28	4.39	0.27	15.5	0.08	6.49	--	--	0.97	0.39	0.02	77.6
0NY075-00-5	PM_{10}	34.2	--	--	0.01	4.04	9.92	1.28	4.39	0.26	11.8	0.08	1.30	--	--	0.97	0.39	0.02	68.7
0NY750-02-5	$PM_{2.5}$	34.2	--	--	0.01	4.04	9.92	1.28	4.39	0.26	0.04	0.08	0.32	--	--	0.97	0.39	0.02	55.9
0NY998-00-0	VOC	131.3	1.74	11.7	32.0	8.11	7.18	0.92	1.00	6.17	--	0.80	--	--	0.29	3.87	0.28	0.41	205.7
0NY100-00-0	Total HAP	13.8	--	--	2.31E-05	2.79	2.47	0.32	1.09	0.08	--	2.06E-03	--	--	0.31	2.79	0.10	6.16E-04	23.7
0NY750-00-0	GHG (CO_2e 100-yr)	485,957	110,084	--	22,430	177,955	157,495	40,399	69,382	8,233	--	--	--	11,762	--	79.3	6,217	26.0	1,090,018
0NY210-00-0	NO_X	138.9	--	--	--	44.0	130.5	8.40	6.56	21.8	--	--	--	--	--	1.48	5.15	0.41	357.2
007446-09-5	SO_X	19.2	--	--	--	0.89	0.78	0.10	0.35	0.24	--	--	--	--	--	--	0.03	0.13	21.7
N/A	Fluorides	2.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.48
630-08-0	CO	4.07	--	--	--	619.5	548.3	14.1	88.3	113.7	--	--	--	--	--	--	21.6	0.36	1,410
7439-92-1	Lead	--	--	--	--	7.38E-04	6.53E-04	8.40E-05	2.89E-04	--	--	--	--	--	--	--	2.58E-05	--	1.79E-03
N/A	Direct GHG (CO_2e 20-yr)	378,913	111,272	--	61,545	178,142	157,660	40,442	69,456	8,251	--	--	--	8,759	--	79.3	6,223	26.1	1,020,768
N/A	Upstream GHG (CO_2e 20-yr)	--	--	--	--	135,583	119,994	30,885	53,044	2,612	--	--	--	--	--	--	4,737	8.26	346,863
10028-15-6	Ozone	0.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.50
7664-93-9	Sulfuric Acid	2.96	--	--	--	--	--	--	--	--	0.40	9.15E-07	--	--	--	--	--	--	3.36

Table 1-2: Criteria Pollutant Annual Potential Emissions - By Emission Unit

CAS#	Chemical Name	1-FABOP	2-FABOP	1-CMBOP	2-CMBOP	1-HPMCU	2-HPMCU	1-WWBIO	2-WWBIO	1-ADMPR	2-ADMPR	1-FUGEM	2-FUGEM
		(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)
0NY075-00-0	PM	24.3	24.3	2.99	2.96	8.26	8.26	0.01	0.01	0.00	0.00	3.24	3.24
0NY075-00-5	PM_{10}	24.3	24.3	2.98	2.96	6.43	6.43	0.01	0.01	0.00	0.00	0.65	0.65
0NY750-02-5	$PM_{2.5}$	24.3	24.3	2.98	2.96	0.54	0.54	0.01	0.01	0.00	0.00	0.16	0.16
0NY998-00-0	VOC	80.4	80.4	4.51	4.00	2.08	2.08	16.0	16.0	0.09	0.09	0.00	0.00
0NY100-00-0	Total HAP	9.56	9.56	0.74	0.74	1.39	1.39	0.05	0.05	0.11	0.11	0.00	0.00
0NY750-00-0	GHG (CO_2e 100-yr)	468,854	468,854	59,102	58,937	39.7	39.7	11,215	11,215	0.00	0.00	5,881	5,881
0NY210-00-0	NO_X	159.3	159.3	19.0	18.2	0.74	0.74	0.00	0.00	0.00	0.00	0.00	0.00
007446-09-5	SO_X	10.5	10.5	0.47	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N/A	Fluorides	1.24	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
630-08-0	CO	596.7	596.7	109.4	107.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7439-92-1	Lead	7.08E-04	7.08E-04	1.86E-04	1.86E-04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N/A	Direct GHG (CO_2e 20-yr)	416,105	416,105	59,170	59,005	39.7	39.7	30,773	30,773	0.00	0.00	4,379	4,379
N/A	Upstream GHG (CO_2e 20-yr)	130,157	130,157	43,301	43,248	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10028-15-6	Ozone	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7664-93-9	Sulfuric Acid	1.48	1.48	0.00	0.40	4.57E-07	4.57E-07	0.00	0.00	0.00	0.00	0.00	0.00

Table 1-3: 6 NYCRR Part 212 Applicability and Compliance - Individual Contaminants

CAS#	Chemical Name	PTE from Process Operations	VOC	HAP	HTAC	PM	Env. Rating[1,2,3,4]	SGC	AGC	ERP (lb/hr)												Applicable Citation	Compliance Requirement
		(lb/yr)						(ug/m^3)	(ug/m^3)	Fab Acid	Fab CVD	Fab Ammonia	Fab Solvent	Fab General	HPM Acid	HPM Solvent	WWT Acid	WWT Ammonia	WWT Solvent	Bio General	Indiv. Tank		
288-88-0	1,2,4-Triazole	7,299	X				INT-B	-	0.48	-	-	3.10E-02	-	-	-	-	-	-	0.37	0.55	-	212-1.5(f)	Comply w/ VOC LAER
95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	710.6	X				B	-	60.0	-	-	-	0.19	-	-	3.90	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
1436-34-6	1,2-Epoxyhexane	0.12	X				INT-B	-	-	-	-	-	1.40E-04	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
[redacted]			X				INT-B	[redacted]															
123-91-1	1,4-Dioxane	0.19	X	X			B	3,000	0.20	-	-	-	2.22E-04	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
[redacted]			X				INT-B	[redacted]															
			X			X	INT-B																
107-98-2	1-Methoxy-2-propanol	214.9	X				B	36,850	2,000	-	-	-	0.26	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
872-50-4	1-Methyl-2-pyrrolidone	5,017	X				B	-	100	-	-	-	3.95	-	-	-	-	-	0.10	0.14	-	212-1.5(f)	Comply w/ VOC LAER
929-06-6	2-(2-aminoethoxy)ethanol	65.1	X				INT-B	1,500	18.0	-	-	-	0.08	-	-	-	-	-	7.87E-11	3.40E-10	-	N/A - Part of Analog Group	
[redacted]			X				INT-B	[redacted]															
			X				B*																
			X				INT-B																
			X				INT-B*																
			X			X	INT-B																
108-65-6	2-Methoxy-1-methylethyl acetate	87,410	X				B	36,850	2,000	-	-	-	103.9	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
[redacted]			X				INT-B	[redacted]															
			X				INT-B																
			X				INT-A																
75-65-0	2-Methylpropan-2-ol	8.33E-03	X				B*	-	720	-	-	-	9.91E-06	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
[redacted]			X				INT-B	[redacted]															
123-42-2	4-Hydroxy-4-methylpentan-2-one	2.36E-02	X				B	-	570	-	-	-	2.81E-05	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
[redacted]			X				B*	[redacted]															
108-11-2	4-Methylpentan-2-ol	788.0	X				B*	17,000	250	-	-	-	0.94	-	-	-	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
[redacted]			X				INT-B	[redacted]															
			X				INT-B																
			X			X	INT-B																
64-19-7	Acetic acid	419.4	X				B*	3,700	60.0	1.50E-02	-	-	-	-	-	-	-	-	1.59E-08	6.63E-08	-	N/A - Part of Analog Group	
74-86-2	Acetylene	375.2	X				INT-C	2,400	500	-	1.34E-02	-	-	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
[redacted]			X				INT-B	[redacted]															
1344-28-1	Aluminum oxide	420.6				X	B*	-	2.40	9.64E-03	2.98E-02	-	-	-	-	-	-	-	-	-	-	212-2.4(b)(1)	PM Grain Standard
7664-41-7	Ammonia	109,231					C	2,400	500	0.47	0.72	41.0	-	-	-	0.78	-	376.5	-	-	-	N/A - Part of Analog Group	
7784-42-1	Arsine	4.15		X	X		A	0.20	0.05	1.48E-04	-	-	-	-	-	-	-	-	-	-	-	212-1.5(e)(2)	MEL - 10 lb/yr
1303-86-2	Boron trioxide	1,134				X	B*	-	24.0	3.73E-02	1.76E-02	-	-	-	-	-	-	-	-	-	-	212-2.4(b)(1)	PM Grain Standard
7726-95-6	Bromine	26,103					B	130	1.60	1.86	-	-	-	-	-	-	-	-	-	-	-	212-2.3(b)	Dispersion Modeling
124-38-9	Carbon dioxide	69,261,376					D	-	21,000	153.9	18.0	-	2,088	-	-	113.2	-	-	-	819.9	-	212-1.4(a)	None
463-58-1	Carbonyl sulfide	14.4	X	X			B	250	28.0	0.05	-	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
7782-50-5	Chlorine	791.8		X			B	116	0.20	2.82	-	-	-	-	-	-	-	-	-	-	-	212-1.5(e)(2)	Comply w/ NESHAP
77-92-9	Citric acid	166.5	X				INT-B	2,100	20.0	5.94E-03	-	-	-	-	-	-	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER

Table 1-3: 6 NYCRR Part 212 Applicability and Compliance - Individual Contaminants

CAS#	Chemical Name	PTE from Process Operations	VOC	HAP	HTAC	PM	Env. Rating[1,2,3,4]	SGC	AGC	ERP (lb/hr)												Applicable Citation	Compliance Requirement
		(lb/yr)						(ug/m³)	(ug/m³)	Fab Acid	Fab CVD	Fab Ammonia	Fab Solvent	Fab General	HPM Acid	HPM Solvent	WWT Acid	WWT Ammonia	WWT Solvent	Bio General	Indiv. Tank		
[redacted]			X				INT-B	[redacted]		[redacted]													
[redacted]			X				INT-B	[redacted]		[redacted]													
108-94-1	Cyclohexanone	1,565	X				B	20,000	190	-	-	-	1.86	-	-	-	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
[redacted]			X				B	[redacted]		[redacted]													
120-92-3	Cyclopentanone	0.98	X				INT-B	4,000	30.0	-	-	-	1.17E-03	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
19287-45-7	Diborane	1.97					B*	-	0.26	-	7.01E-05	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
142-96-1	Dibutyl ether	630.8	X				INT-C	15,000	2,887	-	-	-	0.17	-	-	3.46	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
109-89-7	Diethylamine	227.2	X				B*	4,500	36.0	-	8.10E-03	-	-	-	-	-	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
[redacted]			X				B	[redacted]		[redacted]													
75-10-5	Difluoromethane	86.4	X				INT-C	-	50,600	0.31	-	-	-	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
124-40-3	Dimethylamine	78.5	X				B*	2,800	22.0	-	2.80E-03	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
[redacted]			X				INT-B	[redacted]		[redacted]													
74-84-0	Ethane	186.9					N/A	N/A	N/A	-	6.67E-03	-	-	-	-	-	-	-	-	-	-	212-1.4(a)	None
107-21-1	Ethanediol	173.5	X	X			B*	1,000	400	-	-	6.19E-03	-	-	-	-	-	-	2.73E-08	1.42E-07	-	N/A - Part of Analog Group	
64-17-5	Ethanol	1,691	X				C	-	45,000	-	1.97E-02	-	-	-	-	8.13	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
[redacted]			X				B	[redacted]		[redacted]													
687-47-8	ethyl (S)-2-hydroxypropionate	215.7	X				INT-B	-	71.0	-	-	-	0.26	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
97-64-3	Ethyl lactate	190.9	X				INT-B	370	71.0	-	-	-	0.23	-	-	-	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
7782-41-4	Fluorine	3,488					B	5.30	0.07	-	0.12	-	-	-	-	-	-	-	-	-	-	212-2.3(b)	Dispersion Modeling
593-53-3	Fluoromethane	65.5	X				INT-C	-	50,600	0.23	-	-	-	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
50-00-0	Formaldehyde	14.8	X	X	X		A	30.0	6.0E-02	-	5.27E-04	-	-	-	-	-	-	-	-	-	-	212-1.5(e)(2)	MEL - 100 lb/yr
96-48-0	Gamma-butyrolactone	82.6	X				B	-	3.60	-	-	-	0.10	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
1310-53-8	Germanium dioxide	34.1				X	INT-B	-	12.9	-	6.75E-03	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
[redacted]			X				INT-C	[redacted]		[redacted]													
[redacted]						X	INT-B	[redacted]		[redacted]													
110-43-0	Heptan-2-one	14.2	X				B*	-	550	-	-	-	1.69E-02	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
685-63-2	Hexafluorobutadiene	49.4	X				INT-A	7.50	0.10	0.09	-	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
76-16-4	Hexafluoroethane	796.2					INT-C*	-	16,799	1.42	-	-	-	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
999-97-3	Hexamethyldisilazane	1,318	X				INT-B	-	36.0	-	-	-	1.57	-	-	-	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
10035-10-6	Hydrogen bromide	528.4					C	680	-	1.88	-	-	-	-	-	-	-	-	-	-	-	212-2.3(b)	Dispersion Modeling
7647-01-0	Hydrogen chloride	1,462		X			B	2,100	20.0	0.24	0.08	-	-	-	-	-	1.21	-	-	-	-	212-1.5(e)(2)	Comply w/ NESHAP
7664-39-3	Hydrogen fluoride	24,423		X			B	5.60	0.07	24.7	0.27	-	-	-	4.72E-03	-	1.50E-03	-	-	-	-	212-1.5(e)(2)	Comply w/ NESHAP
7722-84-1	Hydrogen peroxide	17,121					B*	-	3.30	0.61	-	-	-	-	0.08	-	8.45E-04	-	-	-	-	212-2.3(b)	Dispersion Modeling
[redacted]			X			X	INT-B	[redacted]		[redacted]													
13966-94-4	Indium iodide	8.74E-03				X	INT-A	100	0.24	3.12E-07	-	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
67-63-0	Isopropanol	218,425	X				B	98,000	7,000	0.33	3.65E-02	0.06	166.0	0.84	-	-	-	-	5.11	2.70	-	212-1.5(f)	Comply w/ VOC LAER
[redacted]						X	INT-B	[redacted]		[redacted]													
[redacted]						X	INT-B	[redacted]		[redacted]													
[redacted]			X				INT-B	[redacted]		[redacted]													
[redacted]			X			X	INT-B	[redacted]		[redacted]													
79-41-4	Methacrylic Acid	134.2	X				B*	-	170.0	-	-	-	0.16	-	-	-	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
74-82-8	Methane	1,410,078					N/A	N/A	N/A	0.12	1.89E-03	-	-	-	-	-	-	-	-	199.3	-	212-1.4(a)	None
67-56-1	Methanol	575.9	X	X			B	33,000	4,000	-	1.46E-02	-	-	5.99E-03	-	-	-	-	4.21E-06	2.20E-06	-	212-1.5(e)(2) 212-1.5(f)	Comply w/ NESHAP VOC LAER (WWT)
2110-78-3	Methyl 2-hydroxy-2-methylpropionate	37.0	X				INT-B	-	71.0	-	-	-	4.40E-02	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
1319-77-3	Mixed cresols	0.19	X	X			B	-	180	-	-	-	2.22E-04	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
[redacted]			X				INT-B	[redacted]		[redacted]													
91-20-3	Naphthalene	191.3	X	X			B	7,900	3.00	-	-	-	0.10	-	-	0.78	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
123-86-4	n-Butyl acetate	10,682	X				C	71,300	565	-	-	-	12.7	-	-	-	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
7697-37-2	Nitric acid	26,902					B	86.0	12.3	1.60	-	-	-	-	-	-	-	-	-	-	-	212-2.3(b)	Dispersion Modeling
7783-54-2	Nitrogen trifluoride	3,048					B*	6.60	0.08	1.52	3.27E-02	-	-	-	-	-	-	-	-	-	-	212-2.3(b)	Dispersion Modeling
10024-97-2	Nitrous oxide	327,782					B*	-	210	0.19	11.8	-	0.62	-	-	-	-	-	3.45E-02	-	-	212-2.3(b)	Demonstrate T-BACT
115-25-3	Octafluorocyclobutane	90.1					INT-C*	-	16,799	0.16	-	-	-	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
[redacted]			X			X	B	[redacted]		[redacted]													
10028-15-6	Ozone	1,000					INT-A	N/A	N/A	3.21E-02	3.55E-03	-	-	-	-	-	-	-	-	-	-	N/A - See Section 3 of App	
7803-51-2	Phosphine	8.12		X			B	21.0	0.30	2.47E-04	4.24E-05	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
7664-38-2	Phosphoric acid	458.9				X	B	300	10.0	1.64E-02	-	-	-	-	-	-	1.58E-04	-	-	-	1.67E-03	212-2.4(b)(1)	PM Grain Standard
1314-56-3	Phosphorus pentoxide	2,028				X	INT-B	300	4.80	0.07	8.85E-03	-	-	-	-	-	-	-	-	-	-	212-2.4(b)(1)	PM Grain Standard
1310-58-3	Potassium hydroxide	11.9				X	B*	200	-	4.24E-04	-	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
74-98-6	Propane	2.32	X				N/A	N/A	N/A	-	8.26E-05	-	-	-	-	-	-	-	-	-	-	NOIA Cmt. #58	None
52125-53-8	Propanol, 1(or 2)-ethoxy-	111.7	X				INT-B	36,850	2,000	-	-	-	0.13	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
115-07-1	Propylene	70.2	X				B*	-	3,000	-	2.50E-03	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
110-86-1	Pyridine	2.27	X				C	-	74.0	-	-	-	2.71E-03	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
[redacted]			X			X	INT-C	[redacted]		[redacted]													
7631-86-9	Silicon dioxide	52,185				X	INT-B	-	2.00	2.92E-02	3.31	-	1.17	-	-	1.38	-	-	-	-	-	212-2.4(b)(1)	PM Grain Standard
64742-94-5	Solvent naphtha (petroleum), heavy arom.	7,106	X				B	-	100	-	-	-	1.95	-	-	39.0	-	-	-	-	-	212-1.5(f)	Comply w/ VOC LAER
7446-09-5	Sulfur dioxide	38,415					B*	196	80.0	1.37	-	-	7.66E-04	-	-	-	-	-	-	-	-	212-2.3(a)	Dispersion Modeling
2551-62-4	Sulfur hexafluoride	59.7					B*	6.80	0.09	0.05	-	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
7664-93-9	Sulfuric acid	6,719				X	B	120	1.00	0.84	-	-	-	-	6.91E-06	-	1.27E-06	-	-	-	-	N/A - Part of Analog Group	
75-73-0	Tetrafluoromethane	114,405					INT-B	-	330	9.70	3.01	-	-	-	-	-	-	-	-	-	-	212-2.3(b)	Dispersion Modeling
[redacted]			X					[redacted]		[redacted]													
97-99-4	Tetrahydrofurfuryl Alcohol	21.4	X				INT-B	N/A	N/A	-	-	-	2.55E-02	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
[redacted]			X			X	INT-B	[redacted]		[redacted]													
[redacted]			X			X	INT-B	[redacted]		[redacted]													
75-59-2	Tetramethylammonium hydroxide	963.8	X			X	INT-B	3,600	29.0	-	-	3.33E-02	-	-	-	-	-	-	9.40E-05	4.09E-03	-	212-1.5(f) 212-2.4(b)(1)	Comply w/ VOC LAER PM Grain Standard
13463-67-7	Titanium dioxide	2,318				X	B*	-	24.0	1.26E-03	0.45	-	-	-	-	-	-	-	-	-	-	212-2.4(b)(1)	PM Grain Standard
[redacted]			X			X	INT-C	[redacted]		[redacted]													
121-44-8	Triethylamine	9.82	X	X			B*	2,800	7.00	3.50E-04	-	-	-	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
75-46-7	Trifluoromethane	503.4					INT-C	-	50,600	0.90	-	-	-	-	-	-	-	-	-	-	-	N/A - Part of Analog Group	
1314-35-8	Tungsten trioxide	838.2				X	INT-B	-	7.10	-	0.17	-	-	-	-	-	-	-	-	-	-	212-2.4(b)(1)	PM Grain Standard
1314-23-4	Zirconium oxide	783.8				X	INT-B	380	12.0	-	0.16	-	-	-	-	-	-	-	-	-	-	212-2.4(b)(1)	PM Grain Standard
7783-06-4	Hydrogen sulfide	186.4					B	14	2.00	-	-	-	-	-	-	-	-	-	-	2.66	-	212-2.3(a)	Dispersion Modeling

Table 1-3: 6 NYCRR Part 212 Applicability and Compliance - Individual Contaminants

CAS#	Chemical Name	PTE from Process Operations	VOC	HAP	HTAC	PM	Env. Rating[1,2,3,4]	SGC	AGC	ERP (lb/hr)												Applicable Citation	Compliance Requirement
		(lb/yr)						(ug/m^3)	(ug/m^3)	Fab Acid	Fab CVD	Fab Ammonia	Fab Solvent	Fab General	HPM Acid	HPM Solvent	WWT Acid	WWT Ammonia	WWT Solvent	Bio General	Indiv. Tank		
1310-73-2	Sodium hydroxide	5.10					B*	200	-	-	-	-	-	-	-	-	-	-	-	-	-	212-1.5(g)	Actuals < 100 lb/yr
7681-52-9	Sodium hypochlorite	26.1					INT-B	116	0.20	-	-	-	-	-	-	-	-	-	-	-	4.58E-02	212-1.5(g)	Actuals < 100 lb/yr

1. B* indicates that a compound is listed in DAR-1 with no toxicity rating assigned.
2. INT - (X) indicates an environmental rating was assigned by NYSDEC for chemicals not listed in DAR-1.
3. INT - (X*) indicates an environmental rating assigned pending review by NYSDEC for chemicals not listed in DAR-1.
4. Table 1-3 only includes chemicals with a non-zero PTE from process operations.
5. Table 1-3 does not address emissions of NO_X and CO. These pollutants are addressed individually in the regulatory analysis in Section 3 of the application.

Table 1-4: 6 NYCRR Part 212 Applicability and Compliance - Analog Groups

Analog CAS#	Analog Chemical Name and Group Title	Emission Chemical CAS#	Emission Chemical Name	Analog Group PTE	VOC	HAP	HTAC	PM	Env. Rating[1,2,3]	SGC	AGC	ERP (lb/hr)												Applicable Part 212 Citation	Compliance Requirement
				(lb/yr)						(ug/m^3)	(ug/m^3)	Fab Acid	Fab CVD	Fab Ammonia	Fab Solvent	Fab General	HPM Acid	HPM Solvent	WWT Acid	WWT Ammonia	WWT Solvent	BIO General	Indiv. Tank		
[redacted]					X			X	INT-B			[redacted]													
					X			X	INT-B	[redacted]															
107-98-2	1-Methoxy-2-propanol Group	107-98-2	1-Methoxy-2-propanol	[redacted]	X				B	36,850	2,000	[redacted]													
		[redacted]			X				INT-B	[redacted]															
		108-65-6	2-Methoxy-1-methylethyl acetate		X				B	36,850	2,000														
		[redacted]			X				INT-B	[redacted]															
					X				B																
		52125-53-8	Propanol, 1(or 2)-ethoxy-		X				INT-B	36,850	2,000														
64-19-7	Acetic Acid Group	64-19-7	Acetic acid	[redacted]	X				B*			[redacted]													
		[redacted]			X			X	INT-B	[redacted]															
7664-41-7	Ammonia Group	7664-41-7	Ammonia						C	2,400	500														
		74-86-2	Acetylene		X				INT-C	2,400	500														
		[redacted]			X			X	INT-C	[redacted]															
[redacted]		687-47-8	Ethyl (S)-2-Hydroxypropionate		X				INT-B	-	71.0														
		2110-78-3	Methyl 2-Hydroxy-2-Methylpropionate		X				INT-B	-	71.0														
		[redacted]			X			X	INT-B	[redacted]															
75-10-5	Difluoromethane Group	75-10-5	Difluoromethane	655.3	X				INT-C	-	50,600	1.44	-	-	-	-	-	-	-	-	-	-	-	212-2.3(b)	Dispersion Modeling
		593-53-3	Fluoromethane		X				INT-C	-	50,600														
		75-46-7	Trifluoromethane						INT-C	-	50,600														
[redacted]		107-21-1	Ethanediol	[redacted]	X	X			B*	1,000	400	[redacted]													
		[redacted]			X				INT-B	[redacted]															
					X				B																
		929-06-6	2-(2-Aminoethoxy)ethanol		X				INT-B	1,500	18.0														
		[redacted]			X				INT-C	[redacted]															
					X			X	INT-B																
76-16-4	Hexafluoroethane Group	76-16-4	Hexafluoroethane	886.2					INT-C*	-	16,799	1.58	-	-	-	-	-	-	-	-	-	-	-	212-2.3(b)	Dispersion Modeling
		115-25-3	Octafluorocyclobutane						INT-C*	-	16,799														
[redacted]					X			X	B	[redacted]															
					X			X	INT-B																
7664-93-9	Sulfuric Acid Group	7664-93-9	Sulfuric acid	6,719				X	B	120	1.00	0.84	-	-	-	-	6.91E-06	-	1.27E-06	-	-	-	-	212-2.4(b)(1)	PM Grain Standard
		3144-16-9	2-Oxobornane-10-Sulphonic Acid		X			X	INT-B	120	1.00														
7803-62-5	Silane Group	[redacted]							B	[redacted]															
					X				INT-B																
		1590-87-0	Disilane						INT-B	-	16.0														
121-44-8	Triethylamine Group	121-44-8	Triethylamine	[redacted]	X	X			B*	2,800	7.00	[redacted]													
		[redacted]			X				INT-B	[redacted]															

1. B* indicates that a B rating has been assumed for chemicals listed on DAR-1, but not assigned a toxicity therein.
2. INT-(X) indicates an environmental rating was assigned by NYSDEC for chemicals, but it is not yet listed in DAR-1.
3. INT - (X*) indicates an environmental rating assigned pending review by NYSDEC for chemicals not listed in DAR-1.
4. [redacted] and 2-Oxoborane-10-Sulphonic acid are no longer planned to be used as part of the Proposed Air Permit Project. Their projected PTE from process operations is 0.0 lbs/yr.
5. The Silane Group PTE from process operations is 0 lb/yr because these compounds are extremely reactive and are expected to react completely into byproducts before being emitted.

Table 1-5: 6 NYCRR Part 212 Compliance - Particulate Matter

Exhaust Type	Number of Operational Stacks	Exhaust Rate (ACFM)	PM PTE from Process Operations (lb/yr)	Applicable Part 212 Grain Standard (gr/dscf)	Potential Exhaust PM Concentration (gr/dscf)
Fab Acid	72	80,000	17,826	0.05	0.003
Fab CVD	24	26,500	21,331	0.05	0.011
Fab Ammonia	24	40,000	2,308	0.05	0.001
Fab Solvent	64	52,500	32,967	0.05	0.008
HPM Solvent	12	24,150	2,004	0.05	0.001
WWT Solvent	4	2,000	0.7	0.05	4.39E-06
BIO General	2	66,234	28.6	0.05	5.76E-06

1. PM emitted from the Fab Solvent exhaust will be created in and emitted from the RCTO burner, not the zeolite rotor exhaust. However, the combined exhaust rate from the RCTO burners and zeolite rotor is considered the total "exhaust gas" from the "process emission source" for purposes of compliance with 6 NYCRR 212-2.4(b)(1).

2. PM concentration estimates assume dry standard conditions in each stack

Table 1-6: NESHAP Subpart BBBBB Compliance

Stack Type	Process Category	Pollutant	CAS	Organic or Inorganic HAP?	Molecular Weight (lb/lb-mol)	Number of Operational Stacks	Exhaust Rate (scfm)	Annual Emissions per Stack Type (lb/yr)	Annual Emissions per Stack (lb/yr/stack)	Applicable NESHAP Subpart BBBBB Outlet Conc. Standard (ppmv)	Average Outlet Conc. per Stack (ppmv)
Fab Acid	All	Hydrogen fluoride	7664-39-3	Inorganic	20.01	72	80,000	21,372	296.84	0.42	0.14
Fab Acid	All	Arsine	7784-42-1	Inorganic	77.95	72	80,000	4.1	0.06	0.42	6.77E-06
Fab Acid	All	Hydrogen chloride	7647-01-0	Inorganic	36.46	72	80,000	612	8.50	0.42	2.14E-03
Fab Acid	All	Carbonyl sulfide	463-58-1	Organic	60	72	80,000	14.42	0.20	20	3.05E-05
Fab Acid	All	Chlorine	7782-50-5	Inorganic	70.91	72	80,000	791.83	11.00	0.42	1.42E-03
Fab Acid	All	Phosphine	7803-51-2	Inorganic	33.998	72	80,000	7	0.10	0.42	0.00
Fab Acid	All	Triethylamine	121-44-8	Organic	101.19	72	80,000	10	0.14	20	0.00
Fab CVD	All	Methanol	67-56-1	Organic	32.04	24	26,500	408	17.00	20	0.01
Fab CVD	All	Hydrogen chloride	7647-01-0	Inorganic	36.46	24	26,500	846.04	35.25	0.42	2.67E-02
Fab CVD	All	Hydrogen fluoride	7664-39-3	Inorganic	20.01	24	26,500	3,051	127.12	0.42	1.76E-01
Fab CVD	All	Phosphine	7803-51-2	Inorganic	34	24	26,500	1	0.05	0.42	4.03E-05
Fab CVD	All	Formaldehyde	50-00-0	Organic	30.03	24	26,500	14.77	0.62	20	5.67E-04
Fab Ammonia	All	Ethanediol	107-21-1	Organic	62.07	24	40,000	173.54	7.23	20	2.14E-03
Fab Solvent	All	1,4-Dioxane	123-91-1	Organic	88.11	64	52,500	0	0.00	20	4.62E-07
Fab Solvent	All	Mixed cresols	1319-77-3	Organic	108.14	64	52,500	0	0.00	20	3.77E-07
Fab Solvent	All	Naphthalene	91-20-3	Organic	128.17	64	52,500	8.20E+01	1.28E+00	20	1.40E-04
Fab General	All	Methanol	67-56-1	Organic	32.04	70	55,000	1.68E+02	2.40E+00	20	9.97E-04
HPM Acid	HPM Storage Tanks	Hydrogen fluoride	7664-39-3	Inorganic	20.01	12	36,500	5.57E-02	4.64E-03	0.42	4.66E-06
HPM Ammonia	HPM Storage Tanks	Hydrogen fluoride	7664-39-3	Inorganic	20.01	12	18,000	Trace	Trace	0.42	Trace
HPM Solvent	HPM Storage Tanks	Hydrogen fluoride	7664-39-3	Inorganic	20.01	12	24,150	Trace	Trace	0.42	Trace
WWT Acid	WWT Storage Tanks	Hydrogen chloride	7647-01-0	Inorganic	36.46	6	15,000	4.00	6.67E-01	0.42	8.94E-04
WWT Ammonia	WWT Storage Tanks	Hydrogen chloride	7647-01-0	Inorganic	36.46	4	2,000	Trace	Trace	0.42	Trace
WWT Solvent	WWT Storage Tanks	Hydrogen chloride	7647-01-0	Inorganic	36.46	4	2,000	Trace	Trace	0.42	Trace
WWT Acid	WWT Storage Tanks	Hydrogen fluoride	7664-39-3	Inorganic	20.01	6	15,000	6.55E-02	1.09E-02	0.42	2.67E-05
WWT Ammonia	WWT Storage Tanks	Hydrogen fluoride	7664-39-3	Inorganic	20.01	4	2,000	Trace	Trace	0.42	Trace
WWT Solvent	WWT Storage Tanks	Hydrogen fluoride	7664-39-3	Inorganic	20.01	4	2000	Trace	Trace	0.42	Trace

Conversions

1 year =	525600 minutes
1 lb-mole of gas (@ 20C)	385.3 Cubic feet

Micron - Clay, NY Fabs 1 & 2
Emission Reduction Credit Summary by Phase

Table 2-1: NOx ERC Summary

Source	Proposed Air Permit Project Potential Emissions (tpy)	ERC Multiplier	ERCs Required
Semiconductor Process Tools	138.9	1.15	159.8
Heat Transfer Fluids	--	1.15	0.00
IPA Cleaning	--	1.15	0.00
Wastewater Treatment	--	1.15	0.00
Tool-Level Thermal Oxidation Systems	44.0	1.15	50.6
RCTO Combustion	130.5	1.15	150.1
Water Bath Vaporizers	8.40	1.15	9.66
Boilers	6.56	1.15	7.55
Emergency Generators	21.8	1.15	25.0
Cooling Towers	--	1.15	0.00
Storage Tanks & Silos	--	1.15	0.00
Roadway	--	1.15	0.00
SF6 Leaks	--	1.15	0.00
Lab Operations	--	1.15	0.00
SOD Waste Processing	1.48	1.15	1.71
RCS Combustion	5.15	1.15	5.93
Fire Pump Engine	0.41	1.15	0.47
Total	357.2	--	411.0

Table 2-2: VOC ERC Summary

Source	Proposed Air Permit Project Potential Emissions (tpy)	ERC Multiplier	ERCs Required
Semiconductor Process Tools	131.3	1.15	150.9
Heat Transfer Fluids	1.74	1.15	2.01
IPA Cleaning	11.7	1.15	13.5
Wastewater Treatment	32.0	1.15	36.8
Tool-Level Thermal Oxidation Systems	8.11	1.15	9.33
RCTO Combustion	7.18	1.15	8.26
Water Bath Vaporizers	0.92	1.15	1.06
Boilers	1.00	1.15	1.15
Emergency Generators	6.17	1.15	7.10
Cooling Towers	--	1.15	0.00
Storage Tanks & Silos	0.80	1.15	0.92
Roadway	--	1.15	0.00
SF6 Leaks	--	1.15	0.00
Lab Operations	0.29	1.15	0.33
SOD Waste Processing	3.87	1.15	4.45
RCS Combustion	0.28	1.15	0.33
Fire Pump Engine	0.41	1.15	0.47
Total	205.7	--	237.0

Micron - Clay, NY Fabs 1 & 2
1-FABOP and 2-FABOP
Destruction and Removal Efficiency (DRE) and PEEC Management Values

Table 5-1: Process Equipment Exhaust Conditioner (PEEC) Management

Category/Chemical Controlled[1]	Chemical Names(s)	CAS #	Fleet Average Fraction Managed	Source
Flammable	Includes pyrophorics	Multiple	0.99	Engineering Estimate
Reactive	Cl2, etc	Multiple	0.99	Engineering Estimate
Acid Gas	HCl and HF	Multiple	0.99	Engineering Estimate
PM	SiO2, metal oxides, etc	Multiple	0.00	Engineering Estimate
F_2	Fluorine	7782-41-4	0.995	Engineering Estimate
NH3	Ammonia	7664-41-7	0.95	Engineering Estimate
CF4	Tetrafluoromethane	75-73-0	0.89	IPCC Table 6.17
N2O	Nitrous Oxide-Other	10024-97-2	0.60	IPCC Table 6.17
N2O	Nitrous Oxide-CVD	10024-97-2	0.60	IPCC Table 6.17
NF3	Nitrogen Trifluoride-In Situ	7783-54-2	0.95	IPCC Table 6.17
NF3	Nitrogen Trifluoride-Remote	7783-54-2	0.95	IPCC Table 6.17

1. CF_4 generated in a PEEC as a result of management of F_2 is not itself managed in the PEEC

Table 5-2: Point-of-Use Control Device DRE Values

Category/Chemical Controlled	Chemical Names(s)	CAS #	Fleet Average DRE Value	Source
Flammable	Includes pyrophorics	Multiple	0.99	Engineering Estimate
Br2	Bromine	7726-95-6	0.50	Engineering Estimate
Acid Gas	HCl, HF, and HBr	Multiple	0.99	Engineering Estimate
PM	SiO2, metal oxides, etc	Multiple	0.00	Engineering Estimate
CO2, NO2, SO2	Carbon Dioxide, Nitrogen Dioxide, Sulfur Dioxide	Multiple	0.00	Engineering Estimate
CH2F2	Difluoromethane	75-10-5	0.99	IPCC Table 6.17
CH3F	Fluoromethane	593-53-3	0.99	IPCC Table 6.17
CF4	Tetrafluoromethane	75-73-0	0.89	IPCC Table 6.17
C2F6	Hexafluoroethane	76-16-4	0.98	IPCC Table 6.17
CHF3	Trifluoromethane	75-46-7	0.98	IPCC Table 6.17
C4F8	Octafluorocyclobutane	115-25-3	0.98	IPCC Table 6.17
C4F6	Hexafluorobutadiene	685-63-2	0.98	IPCC Table 6.17
NF3	Nitrogen Trifluoride-Etch	7783-54-2	0.95	IPCC Table 6.17
SF6	Sulfur Hexafluoride	2551-62-4	0.96	IPCC Table 6.17

Table 5-3: Centralized Control Equipment DRE Values

Exhuast Type(s) Controlled	Chemical Names(s)	CAS #	Fleet Average DRE Value	Source
Acid & CVD	Hydrogen Fluoride	7664-39-3	0.60	Projected Performance from Preferred Vendor
Acid & CVD	Hydrogen Chloride	7647-01-0	0.60	Projected Performance from Preferred Vendor
Acid & CVD	Sulfuric Acid	7664-93-9	0.75	Projected Performance from Preferred Vendor
Acid & CVD	Nitric Acid	7697-37-2	0.40	Projected Performance from Preferred Vendor
Acid & CVD	Organic Acids	Multiple	0.00	Engineering Estimate
CVD	Particulate - CVD	Multiple	0.82	Projected Performance from Preferred Vendor
CVD	NO_2	0NY210-00-0	0.90	Projected Performance from Preferred Vendor
Ammonia	Ammonia	7664-41-7	0.98	Info. from Potential Supplier
Solvent	Solvent	Multiple	0.97	VOC LAER limit at projected inlet concentration

Table 5-4: Regenerative Catalytic System DRE Values

Category/Chemical Controlled	Chemical Names(s)	Primary CAS #	Fleet Average DRE Value	Source
C4F8	Octafluorocyclobutane	115-25-3	0.98	Info. from Potential Supplier
C4F6	Hexafluorobutadiene	685-63-2	0.98	Info. from Potential Supplier
CH2F2	Difluoromethane	75-10-5	0.99	Info. from Potential Supplier
CH3F	Fluoromethane	593-53-3	0.99	Info. from Potential Supplier
CHF3	Trifluoromethane	75-46-7	0.98	Info. from Potential Supplier
CF4	Tetrafluoromethane	75-73-0	0.89	Info. from Potential Supplier
NF3	Nitrogen Trifluoride-All	7783-54-2	0.95	Info. from Potential Supplier
SF6	Sulfur Hexafluoride	2551-62-4	0.96	Info. from Potential Supplier
C2F6	Hexafluoroethane	76-16-4	0.98	Info. from Potential Supplier
C3F8	Octafluoropropane	76-19-7	0.89	Assumed to be the same as CF4
C5F8	Octafluorocyclopentene	559-40-0	0.98	IPCC Table 6.17
N2O	Nitrous Oxide-All	10024-97-2	0.60	IPCC Table 6.17
CO2	Carbon Dioxide	124-38-9	0.00	
CH4	Methane	74-82-8	0.89	Assumed to be the same as CF4

Micron - Clay, NY Fabs 1 & 2
1-FABOP and 2-FABOP
Process Chemical Emissions Calculations

Table 6-1: Process Chemical Emissions Calculations

	Primary Chemical								Emission Chemical					Emission Chemical Classifications										Process Emission Quantification					
Chemical Use Case ID #	CAS #	Chemical Name	Common Acronym/Alternate Name	Molecular Formula	SHOW?	Process Category	% of Total Usage	Projected Usage in Process Category (lb/yr)	CAS #	Emission Chemical	Molecular Formula	Emission Chem Formation Depends on Primary Chem EF?	Process Emission Factor (lb emitted / lb used)	VOC	PM	NO_X	CO	SO_2	HAP	GHG	HTAC	Fluorides	Exhaust Type	PEEC Fraction Managed	Pre-Control Process Emissions (lb/yr)	POU or RCS DRE	Post POU Emissions (lb/yr)	Centralized Control DRE	Post-Control Emissions (lb/yr)
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-38-9	Carbon dioxide	CO2		[redacted]							X			Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-40-3	Dimethylamine	C2H7N		[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]		X								Fab CVD	0.00	[redacted]	N/A	[redacted]	0.82	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	67-56-1	Methanol	CH3OH		[redacted]	X					X				Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2		[redacted]			X							Fab CVD	0.00	[redacted]	N/A	[redacted]	0.90	[redacted]
1	20654-88-0	[11B]boron trifluoride		$^{11}BF_3$	Y	Ion Implant	100%	158.4	20654-88-0	[11B]boron trifluoride	11BF3		0.00									X	Fab Acid	0.00	0.00	N/A	N/A	0.00	0.00
1	20654-88-0	[11B]boron trifluoride		$^{11}BF_3$	Y	Ion Implant	100%	158.4	1303-86-2	Boron trioxide	B2O3		0.13		X								Fab Acid	0.00	20.3	N/A	N/A	0.00	20.3
1	20654-88-0	[11B]boron trifluoride		$^{11}BF_3$	Y	Ion Implant	100%	158.4	7664-39-3	Hydrogen fluoride	HF		0.89						X				Fab Acid	0.00	140.2	N/A	N/A	0.60	56.1
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-38-9	Carbon dioxide	CO2		[redacted]							X			Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	67-56-1	Methanol	CH3OH		[redacted]	X					X				Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Thin Films / Diffusion Deposition	100%	[redacted]	7631-86-9	Silicon dioxide	SiO2		[redacted]		X								Fab CVD	0.00	[redacted]	N/A	[redacted]	0.82	[redacted]
1	288-88-0	1,2,4-Triazole		$C_2H_3N_3$	Y	CMP	100%	17,354	288-88-0	1,2,4-Triazole	C2H3N3		0.05	X									Fab Ammonia	0.00	867.7	N/A	N/A	0.00	867.7
1	95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	TMB	C_9H_{12}	Y	Photolithography	100%	27,331	95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	C9H12		0.20	X									Fab Solvent	0.00	5,466	N/A	N/A	0.97	164.0
1	95-63-6	1,2,4-Trimethylbenzene	TMB	C_9H_{12}	Y	Photolithography	100%	27,331	124-38-9	Carbon dioxide	CO2	X	3.30							X			Fab Solvent	0.00	18,014	N/A	N/A	0.00	18,014
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	2634-33-5	1,2-Benzisothiazol-3(2H)-one	C7H5NOS		[redacted]	X	X								Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2	X	[redacted]			X							Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	7446-09-5	Sulfur dioxide	SO2	X	[redacted]					X					Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	1436-34-6	1,2-Epoxyhexane		$C_6H_{12}O$	Y	Photolithography	100%	19.7	1436-34-6	1,2-Epoxyhexane	C6H12O		0.20	X									Fab Solvent	0.00	3.93	N/A	N/A	0.97	0.12
1	1436-34-6	1,2-Epoxyhexane		$C_6H_{12}O$	Y	Photolithography	100%	19.7	124-38-9	Carbon dioxide	CO2	X	2.64							X			Fab Solvent	0.00	10.4	N/A	N/A	0.00	10.4
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Wet Etch / Wet Clean	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Acid	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	123-91-1	1,4-Dioxane		$C_4H_8O_2$	Y	Photolithography	100%	31.1	123-91-1	1,4-Dioxane	C4H8O2		0.20	X					X				Fab Solvent	0.00	6.23	N/A	N/A	0.97	0.19
1	123-91-1	1,4-Dioxane		$C_4H_8O_2$	Y	Photolithography	100%	31.1	124-38-9	Carbon dioxide	CO2	X	2.00							X			Fab Solvent	0.00	12.4	N/A	N/A	0.00	12.4
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	CMP	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	1569-02-4	1-Ethoxypropan-2-ol		$C_5H_{12}O_2$	Y	Photolithography	100%	0.00	1569-02-4	1-Ethoxypropan-2-ol	C5H12O2		0.20	X									Fab Solvent	0.00	0.00	N/A	N/A	0.97	0.00
1	1569-02-4	1-Ethoxypropan-2-ol		$C_5H_{12}O_2$	Y	Photolithography	100%	0.00	124-38-9	Carbon dioxide	CO2	X	2.11							X			Fab Solvent	0.00	0.00	N/A	N/A	0.00	0.00
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	CMP	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X	X								Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	107-98-2	1-Methoxy-2-propanol	PGME	$C_4H_{10}O_2$	Y	Photolithography	100%	35,817	107-98-2	1-Methoxy-2-propanol	C4H10O2		0.20	X									Fab Solvent	0.00	7,163	N/A	N/A	0.97	214.9
1	107-98-2	1-Methoxy-2-propanol	PGME	$C_4H_{10}O_2$	Y	Photolithography	100%	35,817	124-38-9	Carbon dioxide	CO2	X	1.95							X			Fab Solvent	0.00	13,993	N/A	N/A	0.00	13,993
1	872-50-4	1-Methyl-2-pyrrolidone	NMP	C_5H_9NO	Y	Wet Etch / Wet Clean	100%	2,213,132	872-50-4	1-Methyl-2-pyrrolidone	C5H9NO		0.05	X									Fab Solvent	0.00	110,657	N/A	N/A	0.97	3,320
1	872-50-4	1-Methyl-2-pyrrolidone	NMP	C_5H_9NO	Y	Wet Etch / Wet Clean	100%	2,213,132	124-38-9	Carbon dioxide	CO2	X	2.22							X			Fab Solvent	0.00	245,630	N/A	N/A	0.00	245,630
1	872-50-4	1-Methyl-2-pyrrolidone	NMP	C_5H_9NO	Y	Wet Etch / Wet Clean	100%	2,213,132	10102-44-0	Nitrogen dioxide	NO2	X	0.46			X							Fab Solvent	0.00	51,353	N/A	N/A	0.00	51,353
1	929-06-6	2-(2-aminoethoxy)ethanol		$C_4H_{11}NO_2$	Y	Photolithography	100%	10,845	929-06-6	2-(2-aminoethoxy)ethanol	C4H11NO2		0.20	X									Fab Solvent	0.00	2,169	N/A	N/A	0.97	65.1
1	929-06-6	2-(2-aminoethoxy)ethanol		$C_4H_{11}NO_2$	Y	Photolithography	100%	10,845	124-38-9	Carbon dioxide	CO2	X	1.67							X			Fab Solvent	0.00	3,632	N/A	N/A	0.00	3,632
1	929-06-6	2-(2-aminoethoxy)ethanol		$C_4H_{11}NO_2$	Y	Photolithography	100%	10,845	10102-44-0	Nitrogen dioxide	NO2	X	0.44			X							Fab Solvent	0.00	949.1	N/A	N/A	0.00	949.1
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2	X	[redacted]			X							Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	CMP	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Solvent	0.99	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	10102-44-0	Nitrogen Dioxide	NO2	X	[redacted]			X							Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X	X								Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	108-65-6	2-Methoxy-1-methylethyl acetate	PGMEA	$C_6H_{12}O_3$	Y	Photolithography	37%	5,352,987	108-65-6	2-Methoxy-1-methylethyl acetate	C6H12O3		0.20	X									Fab Solvent	0.00	1,070,597	N/A	N/A	0.97	32,118
1	108-65-6	2-Methoxy-1-methylethyl acetate	PGMEA	$C_6H_{12}O_3$	Y	Photolithography	37%	5,352,987	124-38-9	Carbon dioxide	CO2	X	2.00							X			Fab Solvent	0.00	2,139,105	N/A	N/A	0.00	2,139,105
2	108-65-6	2-Methoxy-1-methylethyl acetate	PGMEA	$C_6H_{12}O_3$	Y	Wet Etch / Wet Clean	63%	9,210,208	108-65-6	2-Methoxy-1-methylethyl acetate	C6H12O3		0.20	X									Fab Solvent	0.00	1,842,042	N/A	N/A	0.97	55,261
2	108-65-6	2-Methoxy-1-methylethyl acetate	PGMEA	$C_6H_{12}O_3$	Y	Wet Etch / Wet Clean	63%	9,210,208	124-38-9	Carbon dioxide	CO2	X	2.00							X			Fab Solvent	0.00	3,680,487	N/A	N/A	0.00	3,680,487
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	CMP	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	75-65-0	2-Methylpropan-2-ol		$C_4H_{10}O$	Y	Photolithography	100%	138.9	75-65-0	2-Methylpropan-2-ol	C4H10O		0.20	X									Fab Solvent	0.99	0.28	N/A	N/A	0.97	0.01
1	75-65-0	2-Methylpropan-2-ol		$C_4H_{10}O$	Y	Photolithography	100%	138.9	124-38-9	Carbon dioxide	CO2	X	2.38							X			Fab Solvent	0.00	66.0	N/A	N/A	0.00	66.0
1	3144-16-9	2-oxobornane-10-sulphonic acid		$C_{10}H_{16}O_4S$	Y	Wet Etch / Wet Clean	100%	0.00	3144-16-9	2-oxobornane-10-sulphonic acid	C10H16O4S		1.00E-03	X	X								Fab Acid	0.00	0.00	N/A	N/A	0.00	0.00
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X	X								Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	CMP	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	123-42-2	4-Hydroxy-4-methylpentan-2-one		$C_6H_{12}O_2$	Y	Photolithography	100%	393.4	123-42-2	4-Hydroxy-4-methylpentan-2-one	C6H12O2		0.20	X									Fab Solvent	0.99	0.79	N/A	N/A	0.97	0.02
1	123-42-2	4-Hydroxy-4-methylpentan-2-one		$C_6H_{12}O_2$	Y	Photolithography	100%	393.4	124-38-9	Carbon dioxide	CO2	X	2.27							X			Fab Solvent	0.00	178.9	N/A	N/A	0.00	178.9
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]	[redacted]	[redacted]	[redacted]	Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	108-11-2	4-Methylpentan-2-ol		$C_6H_{14}O$	Y	Photolithography	100%	131,329	108-11-2	4-Methylpentan-2-ol	C6H14O		0.20	X									Fab Solvent	0.00	26,266	N/A	N/A	0.97	788.0
1	108-11-2	4-Methylpentan-2-ol		$C_6H_{14}O$	Y	Photolithography	100%	131,329	124-38-9	Carbon dioxide	CO2	X	2.58							X			Fab Solvent	0.00	67,878	N/A	N/A	0.00	67,878

Table 6-1: Process Chemical Emissions Calculations

	Primary Chemical								Emission Chemical					Emission Chemical Classifications										Process Emission Quantification					
Chemical Use Case ID #	CAS #	Chemical Name	Common Acronym/Alternate Name	Molecular Formula	SHOW?	Process Category	% of Total Usage	Projected Usage in Process Category (lb/yr)	CAS #	Emission Chemical	Molecular Formula	Emission Chem Formation Depends on Primary Chem EF?	Process Emission Factor (lb emitted / lb used)	VOC	PM	NO_X	CO	SO_2	HAP	GHG	HTAC	Fluorides	Exhaust Type	PEEC Fraction Managed	Pre-Control Process Emissions (lb/yr)	POU or RCS DRE	Post POU Emissions (lb/yr)	Centralized Control DRE	Post-Control Emissions (lb/yr)
1	[redacted]				Y	Photolithography	100%	[redacted]					[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2	X	[redacted]			X							Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	CMP	100%	[redacted]					[redacted]	X									Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	CMP	100%	[redacted]					[redacted]	X	X								Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	64-19-7	Acetic acid		CH_4CO_2	Y	Wet Etch / Wet Clean	100%	8,389	64-19-7	Acetic acid	CH4CO2		0.05	X									Fab Acid	0.00	419.4	N/A	N/A	0.00	419.4
1	74-86-2	Acetylene		C_2H_2	Y	Thin Films / Diffusion Deposition	100%	37,524	74-86-2	Acetylene	C2H2		1.00	X									Fab CVD	0.99	375.2	N/A	N/A	0.00	375.2
1	74-86-2	Acetylene		C_2H_2	Y	Thin Films / Diffusion Deposition	100%	37,524	124-38-9	Carbon dioxide	CO2	X	3.38							X			Fab CVD	0.00	126,839	N/A	N/A	0.00	126,839
1	[redacted]				Y	Photolithography	100%	[redacted]					[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	7664-41-7	Ammonia		NH_3	Y	Thin Films / Diffusion Deposition	16%	446,468	7664-41-7	Ammonia	NH3		0.90										Fab CVD	0.95	20,091	N/A	N/A	0.00	20,091
1	7664-41-7	Ammonia		NH_3	Y	Thin Films / Diffusion Deposition	16%	446,468	10102-44-0	Nitrogen dioxide	NO2		1.08			X							Fab CVD	0.00	482,414	N/A	N/A	0.90	48,241
3	7664-41-7	Ammonia		NH_3	Y	CMP	10%	272,102	7664-41-7	Ammonia	NH3		0.50										Fab Ammonia	0.00	136,051	N/A	N/A	0.98	2,721
4	7664-41-7	Ammonia		NH_3	Y	Wet Etch / Wet Clean	74%	2,026,052	7664-41-7	Ammonia	NH3		0.50										Fab Ammonia	0.00	1,013,026	N/A	N/A	0.98	20,261
1	1341-49-7	Ammonium bifluoride		F_2H_5N	Y	Wet Etch / Wet Clean	100%	588,349	1341-49-7	Ammonium bifluoride	F2H5N		0.00		X							X	Fab Acid	0.00	0.00	N/A	N/A	0.00	0.00
1	1341-49-7	Ammonium bifluoride		F_2H_5N	Y	Wet Etch / Wet Clean	100%	588,349	7664-41-7	Ammonia	NH3		0.01										Fab Acid	0.00	5,883	N/A	N/A	0.00	5,883
1	1341-49-7	Ammonium bifluoride		F_2H_5N	Y	Wet Etch / Wet Clean	100%	588,349	7664-39-3	Hydrogen fluoride	HF		0.02						X				Fab Acid	0.00	11,767	N/A	N/A	0.60	4,707
1	12125-01-8	Ammonium fluoride		NH_4F	Y	Wet Etch / Wet Clean	100%	724,074	12125-01-8	Ammonium fluoride	NH4F		0.00		X							X	Fab Acid	0.00	0.00	N/A	N/A	0.00	0.00
1	12125-01-8	Ammonium fluoride		NH_4F	Y	Wet Etch / Wet Clean	100%	724,074	7664-41-7	Ammonia	NH3		0.01										Fab Acid	0.00	7,241	N/A	N/A	0.00	7,241
1	12125-01-8	Ammonium fluoride		NH_4F	Y	Wet Etch / Wet Clean	100%	724,074	7664-39-3	Hydrogen fluoride	HF		0.01						X				Fab Acid	0.00	7,241	N/A	N/A	0.60	2,896
1	100-66-3	Anisole		C_7H_8O	Y	Photolithography	100%	0.00	100-66-3	Anisole	C7H8O		0.20	X									Fab Solvent	0.00	0.00	N/A	N/A	0.97	0.00
1	100-66-3	Anisole		C_7H_8O	Y	Photolithography	100%	0.00	124-38-9	Carbon dioxide	CO2	X	2.85							X			Fab Solvent	0.00	0.00	N/A	N/A	0.00	0.00
1	7784-42-1	Arsine		AsH_3	Y	Ion Implant	100%	82.9	7784-42-1	Arsine	AsH3		0.05						X		X		Fab Acid	0.00	4.15	N/A	N/A	0.00	4.15
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]					[redacted]	X									Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	7664-41-7	Ammonia	NH3		[redacted]										Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-38-9	Carbon dioxide	CO2		[redacted]							X			Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-40-3	Dimethylamine	C2H7N		[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	74-82-8	Methane	CH4		[redacted]							X			Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2		[redacted]			X							Fab CVD	0.00	[redacted]	N/A	[redacted]	0.90	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	7631-86-9	Silicon dioxide	SiO2		[redacted]		X								Fab CVD	0.00	[redacted]	N/A	[redacted]	0.82	[redacted]
1	[redacted]				Y	CMP	100%	[redacted]					[redacted]	X									Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	10294-34-5	Boron trichloride		BCl_3	Y	Plasma Etch	100%	68,999	10294-34-5	Boron trichloride	BCl3		0.00										Fab Acid	0.00	0.00	0.95	0.00	0.00	0.00
1	10294-34-5	Boron trichloride		BCl_3	Y	Plasma Etch	100%	68,999	1344-28-1	Aluminum oxide	Al2O3		3.92E-03		X								Fab Acid	0.00	270.1	0	270.1	0.00	270.1
1	10294-34-5	Boron trichloride		BCl_3	Y	Plasma Etch	100%	68,999	1303-86-2	Boron trioxide	B2O3		0.01		X								Fab Acid	0.00	1,025	0	1,025	0.00	1,025
1	10294-34-5	Boron trichloride		BCl_3	Y	Plasma Etch	100%	68,999	7647-01-0	Hydrogen chloride	HCl		0.05						X				Fab Acid	0.00	3,222	0.99	32.2	0.60	12.9
1	10294-34-5	Boron trichloride		BCl_3	Y	Plasma Etch	100%	68,999	13463-67-7	Titanium dioxide	TiO2		5.10E-04		X								Fab Acid	0.00	35.2	0	35.2	0.00	35.2
1	124-38-9	Carbon dioxide		CO_2	Y	Wet Etch / Wet Clean	100%	4,047,301	124-38-9	Carbon dioxide	CO2		1.00							X			Fab Acid	0.00	4,047,301	N/A	N/A	0.00	4,047,301
1	630-08-0	Carbon monoxide		CO	Y	Plasma Etch	100%	36,835	630-08-0	Carbon monoxide	CO		1.00				X						Fab Acid	0.00	36,835	0.99	368.3	0.00	368.3
1	463-58-1	Carbonyl sulfide		COS	Y	Plasma Etch	100%	1,442	463-58-1	Carbonyl sulfide	COS		1.00	X					X				Fab Acid	0.00	1,442	0.99	14.4	0.00	14.4
1	463-58-1	Carbonyl sulphide		COS	Y	Plasma Etch	100%	1,442	124-38-9	Carbon dioxide	CO2	X	0.73							X			Fab Acid	0.00	1,057	0	1,057	0.00	1,057
1	463-58-1	Carbonyl sulphide		COS	Y	Plasma Etch	100%	1,442	7446-09-5	Sulfur dioxide	SO2	X	1.07					X					Fab Acid	0.00	1,538	0	1,538	0.00	1,538
1	7782-50-5	Chlorine		Cl_2	Y	Plasma Etch	100%	79,183	7782-50-5	Chlorine	Cl2		1.00						X				Fab Acid	0.00	79,183	0.99	791.8	0.00	791.8
1	7790-91-2	Chlorine trifluoride		ClF_3	Y	Thin Films / Diffusion Deposition	100%	6,845	7790-91-2	Chlorine trifluoride	ClF3		0.00									X	Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	7790-91-2	Chlorine trifluoride		ClF_3	Y	Thin Films / Diffusion Deposition	100%	6,845	7647-01-0	Hydrogen chloride	HCl		0.39						X				Fab CVD	0.99	27.0	N/A	N/A	0.60	10.8
1	7790-91-2	Chlorine trifluoride		ClF_3	Y	Thin Films / Diffusion Deposition	100%	6,845	7664-39-3	Hydrogen fluoride	HF		0.65						X				Fab CVD	0.99	44.4	N/A	N/A	0.60	17.8
1	77-92-9	Citric acid		$C_6H_8O_7$	Y	Wet Etch / Wet Clean	100%	3,331	77-92-9	Citric acid	C6H8O7		0.05	X									Fab Acid	0.00	166.5	N/A	N/A	0.00	166.5
1	[redacted]				Y	Photolithography	100%	[redacted]					[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2	X	[redacted]			X							Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]					[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2	X	[redacted]			X							Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	7446-09-5	Sulfur dioxide	SO2	X	[redacted]					X					Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	108-94-1	Cyclohexanone		$C_6H_{10}O$	Y	Photolithography	100%	260,863	108-94-1	Cyclohexanone	C6H10O		0.20	X									Fab Solvent	0.00	52,173	N/A	N/A	0.97	1,565
1	108-94-1	Cyclohexanone		$C_6H_{10}O$	Y	Photolithography	100%	260,863	124-38-9	Carbon dioxide	CO2	X	2.69							X			Fab Solvent	0.00	140,378	N/A	N/A	0.00	140,378
1	120-92-3	Cyclopentanone		C_5H_8O	Y	Photolithography	100%	164.1	120-92-3	Cyclopentanone	C5H8O		0.20	X									Fab Solvent	0.00	32.8	N/A	N/A	0.97	0.98
1	120-92-3	Cyclopentanone		C_5H_8O	Y	Photolithography	100%	164.1	124-38-9	Carbon dioxide	CO2	X	2.62							X			Fab Solvent	0.00	85.9	N/A	N/A	0.00	85.9
1	19287-45-7	Diborane		B_2H_6	Y	Thin Films / Diffusion Deposition	100%	196.6	19287-45-7	Diborane	B2H6		1.00										Fab CVD	0.99	1.97	N/A	N/A	0.00	1.97
1	19287-45-7	Diborane		B_2H_6	Y	Thin Films / Diffusion Deposition	100%	196.6	1303-86-2	Boron trioxide	B2O3	X	2.52		X								Fab CVD	0.00	494.6	N/A	N/A	0.82	89.0
1	142-96-1	Dibutyl ether		$C_8H_{18}O$	Y	Photolithography	100%	24,263	142-96-1	Dibutyl ether	C8H18O		0.20	X									Fab Solvent	0.00	4,853	N/A	N/A	0.97	145.6
1	142-96-1	Dibutyl ether		$C_8H_{18}O$	Y	Photolithography	100%	24,263	124-38-9	Carbon dioxide	CO2	X	2.70							X			Fab Solvent	0.00	13,119	N/A	N/A	0.00	13,119
1	4109-96-0	Dichlorosilane	DCS	H_2SiCl_2	Y	Thin Films / Diffusion Deposition	100%	201,565	4109-96-0	Dichlorosilane	H2SiCl2		0.00										Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	4109-96-0	Dichlorosilane	DCS	H_2SiCl_2	Y	Thin Films / Diffusion Deposition	100%	201,565	7647-01-0	Hydrogen chloride	HCl		0.72						X				Fab CVD	0.99	1,455	N/A	N/A	0.60	582.1
1	4109-96-0	Dichlorosilane	DCS	H_2SiCl_2	Y	Thin Films / Diffusion Deposition	100%	201,565	7631-86-9	Silicon dioxide	SiO2		0.59		X								Fab CVD	0.90	11,989	N/A	N/A	0.82	2,158
1	[redacted]				Y	CMP	100%	[redacted]					[redacted]	X									Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	75-10-5	Difluoromethane		CH_2F_2	Y	Plasma Etch	100%	14,066	75-10-5	Difluoromethane	CH2F2		0.20	X						X			Fab Acid	0.00	2,813	0.99	28.1	0.00	28.1
1	75-10-5	Difluoromethane		CH_2F_2	Y	Plasma Etch	100%	14,066	124-38-9	Carbon dioxide	CO2		0.85							X			Fab Acid	0.00	11,900	0	11,900	0.00	11,900
1	75-10-5	Difluoromethane		CH_2F_2	Y	Plasma Etch	100%	14,066	593-53-3	Fluoromethane	CH3F		4.40E-03	X						X			Fab Acid	0.00	61.9	0.99	0.62	0.00	0.62
1	75-10-5	Difluoromethane		CH_2F_2	Y	Plasma Etch	100%	14,066	76-16-4	Hexafluoroethane	C2F6		0.04							X			Fab Acid	0.00	618.9	0.98	12.4	0.00	12.4
1	75-10-5	Difluoromethane		CH_2F_2	Y	Plasma Etch	100%	14,066	7664-39-3	Hydrogen fluoride	HF		0.77						X				Fab Acid	0.00	10,817	0.99	108.2	0.60	43.3
1	75-10-5	Difluoromethane		CH_2F_2	Y	Plasma Etch	100%	14,066	75-73-0	Tetrafluoromethane	CF4		0.06							X			Fab Acid	0.00	843.9	0.89	92.8	0.00	92.8
1	75-10-5	Difluoromethane		CH_2F_2	Y	Plasma Etch	100%	14,066	75-46-7	Trifluoromethane	CHF3		0.06							X			Fab Acid	0.00	801.8	0.98	16.0	0.00	16.0
1	75-10-5	Difluoromethane		CH_2F_2	Y	Plasma Etch	100%	14,066	115-25-3	Octafluorocyclobutane	C4F8		0.07							X			Fab Acid	0.00	1,013	0.98	20.3	0.00	20.3
1	1590-87-0	Disilane		Si_2H_6	Y	Thin Films / Diffusion Deposition	100%	4,134	1590-87-0	Disilane	Si2H6		0.00										Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	1590-87-0	Disilane		Si_2H_6	Y	Thin Films / Diffusion Deposition	100%	4,134	7631-86-9	Silicon dioxide	SiO2		1.93		X								Fab CVD	0.00	7,984	N/A	N/A	0.82	1,437
1	[redacted]				Y	Wet Etch / Wet Clean	100%	[redacted]					[redacted]	X									Fab Acid	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	107-21-1	Ethanediol		$C_2H_6O_2$	Y	CMP	100%	3,471	107-21-1	Ethanediol	C2H6O2		0.05	X					X				Fab Ammonia	0.00	173.5	N/A	N/A	0.00	173.5
1	[redacted]				Y	Photolithography	100%	[redacted]					[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]

Table 6-1: Process Chemical Emissions Calculations

	Primary Chemical								Emission Chemical					Emission Chemical Classifications										Process Emission Quantification					
Chemical Use Case ID #	CAS #	Chemical Name	Common Acronym/Alternate Name	Molecular Formula	SHOW?	Process Category	% of Total Usage	Projected Usage in Process Category (lb/yr)	CAS #	Emission Chemical	Molecular Formula	Emission Chem Formation Depends on Primary Chem EF?	Process Emission Factor (lb emitted / lb used)	VOC	PM	NO_X	CO	SO_2	HAP	GHG	HTAC	Fluorides	Exhaust Type	PEEC Fraction Managed	Pre-Control Process Emissions (lb/yr)	POU or RCS DRE	Post POU Emissions (lb/yr)	Centralized Control DRE	Post-Control Emissions (lb/yr)
1	[redacted]				Y	Photolithography	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2	X	[redacted]			X							Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	687-47-8	ethyl (S)-2-hydroxypropionate		$C_5H_{10}O_3$	Y	Photolithography	100%	35,947	687-47-8	ethyl (S)-2-hydroxypropionate	C5H10O3		0.20	X									Fab Solvent	0.00	7,189	N/A	N/A	0.97	215.7
1	687-47-8	ethyl (S)-2-hydroxypropionate		$C_5H_{10}O_3$	Y	Photolithography	100%	35,947	124-38-9	Carbon dioxide	CO2	X	1.86							X			Fab Solvent	0.00	13,392	N/A	N/A	0.00	13,392
1	97-64-3	Ethyl lactate		$C_5H_{10}O_3$	Y	Photolithography	100%	31,809	97-64-3	Ethyl lactate	C5H10O3		0.20	X									Fab Solvent	0.00	6,362	N/A	N/A	0.97	190.9
1	97-64-3	Ethyl lactate		$C_5H_{10}O_3$	Y	Photolithography	100%	31,809	124-38-9	Carbon dioxide	CO2	X	1.86							X			Fab Solvent	0.00	11,851	N/A	N/A	0.00	11,851
1	74-85-1	Ethylene		C_2H_4	Y	Thin Films / Diffusion Deposition	100%	0.00	74-85-1	Ethylene	C2H4		1.00	X									Fab CVD	0.99	0.00	N/A	N/A	0.00	0.00
1	74-85-1	Ethylene		C_2H_4	Y	Thin Films / Diffusion Deposition	100%	0.00	124-38-9	Carbon dioxide	CO2	X	3.14							X			Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	7782-41-4	Fluorine		F_2	Y	Thin Films / Diffusion Deposition	100%	1,795	7782-41-4	Fluorine	F2		1.00									X	Fab CVD	0.995	8.97	N/A	N/A	0.00	8.97
1	7782-41-4	Fluorine		F_2	Y	Thin Films / Diffusion Deposition	100%	1,795	7664-39-3	Hydrogen fluoride	HF		1.05						X				Fab CVD	0.99	18.8	N/A	N/A	0.60	7.54
1	7782-41-4	Fluorine		F_2	Y	Thin Films / Diffusion Deposition	100%	1,795	75-73-0	Tetrafluoromethane	CF4		0.12							X			Fab CVD	0.00	208.2	N/A	N/A	0.00	208.2
1	593-53-3	Fluoromethane		CH_3F	Y	Plasma Etch	100%	3,201	593-53-3	Fluoromethane	CH3F		0.32	X						X			Fab Acid	0.00	1,024	0.99	10.2	0.00	10.2
1	593-53-3	Fluoromethane		CH_3F	Y	Plasma Etch	100%	3,201	124-38-9	Carbon dioxide	CO2		1.29							X			Fab Acid	0.00	4,140	0	4,140	0.00	4,140
1	593-53-3	Fluoromethane		CH_3F	Y	Plasma Etch	100%	3,201	75-10-5	Difluoromethane	CH2F2		2.30E-03	X						X			Fab Acid	0.00	7.36	0.99	0.07	0.00	0.07
1	593-53-3	Fluoromethane		CH3F	Y	Plasma Etch	100%	3,201	685-63-2	Hexafluorobutadiene	C4F6		1.20E-03	X						X			Fab Acid	0.00	3.84	0.98	0.08	0.00	0.08
1	593-53-3	Fluoromethane		CH_3F	Y	Plasma Etch	100%	3,201	76-16-4	Hexafluoroethane	C2F6		0.01							X			Fab Acid	0.00	35.2	0.98	0.70	0.00	0.70
1	593-53-3	Fluoromethane		CH_3F	Y	Plasma Etch	100%	3,201	7664-39-3	Hydrogen fluoride	HF		0.59						X				Fab Acid	0.00	1,882	0.99	18.8	0.60	7.53
1	593-53-3	Fluoromethane		CH_3F	Y	Plasma Etch	100%	3,201	75-73-0	Tetrafluoromethane	CF4		0.03							X			Fab Acid	0.00	99.2	0.89	10.9	0.00	10.9
1	593-53-3	Fluoromethane		CH_3F	Y	Plasma Etch	100%	3,201	75-46-7	Trifluoromethane	CHF3		1.60E-03							X			Fab Acid	0.00	5.12	0.98	0.10	0.00	0.10
1	593-53-3	Fluoromethane		CH3F	Y	Plasma Etch	100%	3,201	115-25-3	Octafluorocyclobutane	C4F8		0.01							X			Fab Acid	0.00	22.4	0.98	0.45	0.00	0.45
1	96-48-0	Gamma-butyrolactone		$C_4H_6O_2$	Y	Photolithography	100%	13,766	96-48-0	Gamma-butyrolactone	C4H6O2		0.20	X									Fab Solvent	0.00	2,753	N/A	N/A	0.97	82.6
1	96-48-0	Gamma-butyrolactone		$C_4H_6O_2$	Y	Photolithography	100%	13,766	124-38-9	Carbon dioxide	CO2	X	2.04							X			Fab Solvent	0.00	5,630	N/A	N/A	0.00	5,630
1	62566-74-9	Germanium tetrafluoride		GeF_4	Y	Thin Films / Diffusion Deposition	100%	81.5	62566-74-9	Germanium tetrafluoride	GeF4		0.00									X	Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	62566-74-9	Germanium tetrafluoride		GeF_4	Y	Thin Films / Diffusion Deposition	100%	81.5	1310-53-8	Germanium dioxide	GeO2		0.70		X								Fab CVD	0.00	57.4	N/A	N/A	0.82	10.3
1	62566-74-9	Germanium tetrafluoride		GeF_4	Y	Thin Films / Diffusion Deposition	100%	81.5	7664-39-3	Hydrogen fluoride	HF		0.54						X				Fab CVD	0.99	0.44	N/A	N/A	0.60	0.18
1	7782-65-2	Germanium tetrahydride	Germane	GeH_4	Y	Thin Films / Diffusion Deposition	100%	96.6	7782-65-2	Germanium tetrahydride	GeH4		0.00										Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	7782-65-2	Germanium tetrahydride	Germane	GeH_4	Y	Thin Films / Diffusion Deposition	100%	96.6	1310-53-8	Germanium dioxide	GeO2		1.36		X								Fab CVD	0.00	131.8	N/A	N/A	0.82	23.7
1	[redacted]				Y	Wet Etch / Wet Clean	100%	[redacted]					[redacted]	X									Fab Acid	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	110-43-0	Heptan-2-one		$C_7H_{14}O$	Y	Photolithography	100%	2,366	110-43-0	Heptan-2-one	C7H14O		0.20	X									Fab Solvent	0.00	473.1	N/A	N/A	0.97	14.2
1	110-43-0	Heptan-2-one		$C_7H_{14}O$	Y	Photolithography	100%	2,366	124-38-9	Carbon dioxide	CO2	X	2.70							X			Fab Solvent	0.00	1,276	N/A	N/A	0.00	1,276
1	13465-77-5	Hexachlorodisilane		Si_2Cl_6	Y	Thin Films / Diffusion Deposition	100%	5,266	13465-77-5	Hexachlorodisilane	Si2Cl6		0.00										Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	13465-77-5	Hexachlorodisilane		Si_2Cl_6	Y	Thin Films / Diffusion Deposition	100%	5,266	7647-01-0	Hydrogen chloride	HCl		0.81						X				Fab CVD	0.99	42.9	N/A	N/A	0.60	17.1
1	13465-77-5	Hexachlorodisilane		Si_2Cl_6	Y	Thin Films / Diffusion Deposition	100%	5,266	7631-86-9	Silicon dioxide	SiO2		0.45		X								Fab CVD	0.00	2,353	N/A	N/A	0.82	423.6
1	685-63-2	Hexafluorobutadiene		C_4F_6	Y	Plasma Etch	100%	11,751	685-63-2	Hexafluorobutadiene	C4F6		0.15	X						X			Fab Acid	0.00	1,763	0.98	35.3	0.00	35.3
1	685-63-2	Hexafluorobutadiene		C_4F_6	Y	Plasma Etch	100%	11,751	124-38-9	Carbon dioxide	CO2		1.09							X			Fab Acid	0.00	12,767	0	12,767	0.00	12,767
1	685-63-2	Hexafluorobutadiene		C_4F_6	Y	Plasma Etch	100%	11,751	75-10-5	Difluoromethane	CH2F2		3.00E-05	X						X			Fab Acid	0.00	0.35	0.99	3.53E-03	0.00	3.53E-03
1	685-63-2	Hexafluorobutadiene		C_4F_6	Y	Plasma Etch	100%	11,751	593-53-3	Fluoromethane	CH3F		6.50E-04	X						X			Fab Acid	0.00	7.64	0.99	0.08	0.00	0.08
1	685-63-2	Hexafluorobutadiene		C_4F_6	Y	Plasma Etch	100%	11,751	76-16-4	Hexafluoroethane	C2F6		0.06							X			Fab Acid	0.00	728.6	0.98	14.6	0.00	14.6
1	685-63-2	Hexafluorobutadiene		C_4F_6	Y	Plasma Etch	100%	11,751	7664-39-3	Hydrogen fluoride	HF		0.74						X				Fab Acid	0.00	8,708	0.99	87.1	0.60	34.8
1	685-63-2	Hexafluorobutadiene		C_4F_6	Y	Plasma Etch	100%	11,751	75-73-0	Tetrafluoromethane	CF4		0.06							X			Fab Acid	0.00	693.3	0.89	76.3	0.00	76.3
1	685-63-2	Hexafluorobutadiene		C_4F_6	Y	Plasma Etch	100%	11,751	75-46-7	Trifluoromethane	CHF3		0.02							X			Fab Acid	0.00	199.8	0.98	4.00	0.00	4.00
1	685-63-2	Hexafluorobutadiene		C_4F_6	Y	Plasma Etch	100%	11,751	115-25-3	Octafluorocyclobutane	C4F8		0.01							X			Fab Acid	0.00	59.9	0.98	1.20	0.00	1.20
1	999-97-3	Hexamethyldisilazane	HMDS	$C_6H_{19}NSi_2$	Y	Photolithography	100%	43,928	999-97-3	Hexamethyldisilazane	C6H19NSi2		1.00	X									Fab Solvent	0.00	43,928	N/A	N/A	0.97	1,318
1	999-97-3	Hexamethyldisilazane	HMDS	$C_6H_{19}NSi_2$	Y	Photolithography	100%	43,928	124-38-9	Carbon dioxide	CO2	X	1.64							X			Fab Solvent	0.00	71,874	N/A	N/A	0.00	71,874
1	999-97-3	Hexamethyldisilazane	HMDS	$C_6H_{19}NSi_2$	Y	Photolithography	100%	43,928	10102-44-0	Nitrogen dioxide	NO2	X	0.29			X							Fab Solvent	0.00	12,522	N/A	N/A	0.00	12,522
1	999-97-3	Hexamethyldisilazane	HMDS	$C_6H_{19}NSi_2$	Y	Photolithography	100%	43,928	7631-86-9	Silicon dioxide	SiO2	X	0.74		X								Fab Solvent	0.00	32,706	N/A	N/A	0.00	32,706
1	[redacted]				Y	Photolithography	100%	[redacted]					[redacted]	X									Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	2.23							X			Fab Solvent	0.00	0.00	N/A	N/A	0.00	0.00
1	10035-10-6	Hydrogen bromide		HBr	Y	Plasma Etch	100%	52,840	10035-10-6	Hydrogen bromide	HBr		1.00										Fab Acid	0.00	52,840	0.99	528.4	0.00	528.4
1	10035-10-6	Hydrogen bromide		HBr	Y	Plasma Etch	100%	52,840	7726-95-6	Bromine	Br2		0.99										Fab Acid	0.00	52,206	0.5	26,103	0.00	26,103
1	7647-01-0	Hydrogen chloride		HCl	Y	Thin Films / Diffusion Deposition	1.2%	35,832	7647-01-0	Hydrogen chloride	HCl		1.00						X				Fab CVD	0.99	358.3	N/A	N/A	0.60	143.3
3	7647-01-0	Hydrogen chloride		HCl	Y	Wet Etch / Wet Clean	99%	2,955,998	7647-01-0	Hydrogen chloride	HCl		0.05						X				Fab Acid	0.99	1,478	N/A	N/A	0.60	591.2
1	7664-39-3	Hydrogen fluoride		HF	Y	Thin Films / Diffusion Deposition	0.1%	12,150	7664-39-3	Hydrogen fluoride	HF		1.00						X				Fab CVD	0.99	121.5	N/A	N/A	0.60	48.6
3	7664-39-3	Hydrogen fluoride		HF	Y	Wet Etch / Wet Clean - Single Wafer Tools	94%	8,541,932	7664-39-3	Hydrogen fluoride	HF		0.05						X				Fab Acid	0.99	4,271	N/A	N/A	0.60	1,708
4	7664-39-3	Hydrogen fluoride		HF	Y	Wet Etch / Wet Clean - Bench Tools	6%	471,036	7664-39-3	Hydrogen fluoride	HF		0.05						X				Fab Acid	0.00	23,552	N/A	N/A	0.60	9,421
1	7722-84-1	Hydrogen peroxide		H_2O_2	Y	Wet Etch / Wet Clean	100%	17,068,915	7722-84-1	Hydrogen peroxide	H2O2		1.00E-03										Fab Acid	0.00	17,069	N/A	N/A	0.00	17,069
1	[redacted]				Y	Wet Etch / Wet Clean	100%	[redacted]					[redacted]	X	X								Fab Acid	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	13966-94-4	Indium iodide		InI	Y	Wet Etch / Wet Clean	100%	8.74	13966-94-4	Indium iodide	InI		1.00E-03		X								Fab Acid	0.00	0.01	N/A	N/A	0.00	0.01
1	67-63-0	Isopropanol	IPA	C_3H_8O	Y	Wet Etch / Wet Clean	99%	23,237,104	67-63-0	Isopropanol	C3H8O		0.20	X									Fab Solvent	0.00	4,647,421	N/A	N/A	0.97	139,423
1	67-63-0	Isopropanol	IPA	C_3H_8O	Y	Wet Etch / Wet Clean	99%	23,237,104	124-38-9	Carbon dioxide	CO2		2.20							X			Fab Solvent	0.00	51,048,166	N/A	N/A	0.00	51,048,166
2	[redacted]				Y	CMP	100%	[redacted]					[redacted]		X								Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
2	[redacted]				Y	CMP	100%	[redacted]					[redacted]		X								Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Wet Etch / Wet Clean	100%	[redacted]					[redacted]	X									Fab Acid	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]					[redacted]	X	X								Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	79-41-4	Methacrylic Acid		$C_4H_6O_2$	Y	Photolithography	100%	22,361	79-41-4	Methacrylic Acid	C4H6O2		0.20	X									Fab Solvent	0.00	4,472	N/A	N/A	0.97	134.2
1	79-41-4	Methacrylic Acid		$C_4H_6O_2$	Y	Photolithography	100%	22,361	124-38-9	Carbon dioxide	CO2	X	2.04							X			Fab Solvent	0.00	9,145	N/A	N/A	0.00	9,145
1	74-82-8	Methane		CH_4	Y	Plasma Etch	100%	3,411	74-82-8	Methane	CH4		1.00							X			Fab Acid	0.00	3,411	0.99	34.1	0.00	34.1
1	74-82-8	Methane		CH_4	Y	Plasma Etch	100%	3,411	124-38-9	Carbon dioxide	CO2		2.74							X			Fab Acid	0.00	9,358	0	9,358	0.00	9,358
1	67-56-1	Methanol		CH_4O	Y	Photolithography	100%	167.8	67-56-1	Methanol	CH4O		1.00	X					X				Fab General	0.00	167.8	N/A	N/A	0.00	167.8
1	2110-78-3	Methyl 2-hydroxy-2-methylpropionate		$C_5H_{10}O_3$	Y	Photolithography	100%	6,168	2110-78-3	Methyl 2-hydroxy-2-methylpropionate	C5H10O3		0.20	X									Fab Solvent	0.00	1,234	N/A	N/A	0.97	37.0
1	2110-78-3	Methyl 2-hydroxy-2-methylpropionate		$C_5H_{10}O_3$	Y	Photolithography	100%	6,168	124-38-9	Carbon dioxide	CO2	X	1.86							X			Fab Solvent	0.00	2,298	N/A	N/A	0.00	2,298
1	1319-77-3	Mixed cresols		C_7H_8O	Y	Photolithography	100%	31.1	1319-77-3	Mixed cresols	C7H8O		0.20	X					X				Fab Solvent	0.00	6.23	N/A	N/A	0.97	0.19
1	1319-77-3	Mixed cresols		C_7H_8O	Y	Photolithography	100%	31.1	124-38-9	Carbon dioxide	CO2	X	2.85							X			Fab Solvent	0.00	17.7	N/A	N/A	0.00	17.7
1	[redacted]				Y	CMP	100%	[redacted]					[redacted]	X									Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]					[redacted]	X									Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	7664-41-7	Ammonia	NH3		[redacted]										Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-38-9	Carbon dioxide	CO2		[redacted]							X			Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2		[redacted]			X							Fab CVD	0.00	[redacted]	N/A	[redacted]	0.90	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	74-98-6	Propane	C3H8		[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	7631-86-9	Silicon dioxide	SiO2		[redacted]		X								Fab CVD	0.00	[redacted]	N/A	[redacted]	0.82	[redacted]
1	68-12-2	N,N-Dimethylformamide		C_3H_7NO	Y	Photolithography	100%	0.00	68-12-2	N,N-Dimethylformamide	C3H7NO		1.00	X					X				Fab Solvent	0.00	0.00	N/A	N/A	0.97	0.00
1	68-12-2	N,N-Dimethylformamide		C_3H_7NO	Y	Photolithography	100%	0.00	124-38-9	Carbon dioxide	CO2	X	1.81							X			Fab Solvent	0.00	0.00	N/A	N/A	0.00	0.00
1	68-12-2	N,N-Dimethylformamide		C_3H_7NO	Y	Photolithography	100%	0.00	10102-44-0	Nitrogen dioxide	NO2	X	0.63			X							Fab Solvent	0.00	0.00	N/A	N/A	0.00	0.00
1	91-20-3	Naphthalene		$C_{10}H_8$	Y	Photolithography	100%	13,665	91-20-3	Naphthalene	C10H8		0.20	X					X				Fab Solvent	0.00	2,733	N/A	N/A	0.97	82.0
1	91-20-3	Naphthalene		$C_{10}H_9$	Y	Photolithography	100%	13,665	124-38-9	Carbon dioxide	CO2	X	3.43							X			Fab Solvent	0.00	9,385	N/A	N/A	0.00	9,385

Table 6-1: Process Chemical Emissions Calculations

	Primary Chemical								Emission Chemical					Emission Chemical Classifications										Process Emission Quantification					
Chemical Use Case ID #	CAS #	Chemical Name	Common Acronym/Alternate Name	Molecular Formula	SHOW?	Process Category	% of Total Usage	Projected Usage in Process Category (lb/yr)	CAS #	Emission Chemical	Molecular Formula	Emission Chem Formation Depends on Primary Chem EF?	Process Emission Factor (lb emitted / lb used)	VOC	PM	NO_X	CO	SO_2	HAP	GHG	HTAC	Fluorides	Exhaust Type	PEEC Fraction Managed	Pre-Control Process Emissions (lb/yr)	POU or RCS DRE	Post POU Emissions (lb/yr)	Centralized Control DRE	Post-Control Emissions (lb/yr)
1	123-86-4	n-Butyl acetate		$C_6H_{12}O_2$	Y	Photolithography	100%	1,780,301	123-86-4	n-Butyl acetate	C6H12O2		0.20	X									Fab Solvent	0.00	356,060	N/A	N/A	0.97	10,682
1	123-86-4	n-Butyl acetate		$C_6H_{12}O_2$	Y	Photolithography	100%	1,780,301	124-38-9	Carbon dioxide	CO2	X	2.27							X			Fab Solvent	0.00	809,412	N/A	N/A	0.00	809,412
1	7697-37-2	Nitric acid		HNO_3	Y	Wet Etch / Wet Clean	100%	4,483,725	7697-37-2	Nitric acid	HNO3		0.01										Fab Acid	0.00	44,837	N/A	N/A	0.40	26,902
1	7783-54-2	Nitrogen trifluoride		NF_3	Y	Plasma Etch	24%	266,465	7783-54-2	Nitrogen trifluoride	NF3		0.16							X			Fab Acid	0.00	42,634	0.95	2,132	0.00	2,132
1	7783-54-2	Nitrogen trifluoride		NF_3	Y	Plasma Etch	24%	266,465	75-10-5	Difluoromethane	CH2F2		8.60E-04	X						X			Fab Acid	0.00	229.2	0.99	2.29	0.00	2.29
1	7783-54-2	Nitrogen trifluoride		NF_3	Y	Plasma Etch	24%	266,465	593-53-3	Fluoromethane	CH3F		0.01	X						X			Fab Acid	0.00	2,132	0.99	21.3	0.00	21.3
1	7783-54-2	Nitrogen trifluoride		NF_3	Y	Plasma Etch	24%	266,465	76-16-4	Hexafluoroethane	C2F6		0.05							X			Fab Acid	0.00	11,991	0.98	239.8	0.00	239.8
1	7783-54-2	Nitrogen trifluoride		NF_3	Y	Plasma Etch	24%	266,465	7664-39-3	Hydrogen fluoride	HF		0.85						X				Fab Acid	0.00	225,163	0.99	2,252	0.60	900.7
1	7783-54-2	Nitrogen trifluoride		NF_3	Y	Plasma Etch	24%	266,465	10102-44-0	Nitrogen dioxide	NO2	X	0.65			X							Fab Acid	0.00	27,626	0	27,626	0.00	27,626
1	7783-54-2	Nitrogen trifluoride		NF_3	Y	Plasma Etch	24%	266,465	75-73-0	Tetrafluoromethane	CF4		0.05							X			Fab Acid	0.00	11,991	0.89	1,319	0.00	1,319
1	7783-54-2	Nitrogen trifluoride		NF_3	Y	Plasma Etch	24%	266,465	75-46-7	Trifluoromethane	CHF3		0.03							X			Fab Acid	0.00	6,662	0.98	133.2	0.00	133.2
2	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - In-Situ Clean	1%	5,665	7783-54-2	Nitrogen trifluoride	NF3		0.20							X			Fab CVD	0.95	56.6	N/A	N/A	0.00	56.6
2	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - In-Situ Clean	1%	5,665	7664-39-3	Hydrogen fluoride	HF		0.85						X				Fab CVD	0.99	47.9	N/A	N/A	0.60	19.1
2	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - In-Situ Clean	1%	5,665	10102-44-0	Nitrogen dioxide	NO2	X	0.65			X							Fab CVD	0.00	734.1	N/A	N/A	0.90	73.4
2	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - In-Situ Clean	1%	5,665	75-73-0	Tetrafluoromethane	CF4		0.04							X			Fab CVD	0.89	23.1	N/A	N/A	0.00	23.1
3	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Remote Clean	76%	866,532	7783-54-2	Nitrogen trifluoride	NF3		0.02							X			Fab CVD	0.95	779.9	N/A	N/A	0.00	779.9
3	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Remote Clean	76%	866,532	7782-41-4	Fluorine	F2		0.80									X	Fab CVD	1.00	3,479	N/A	N/A	0.00	3,479
3	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Remote Clean	76%	866,532	7664-39-3	Hydrogen fluoride	HF		0.85						X				Fab CVD	0.99	7,322	N/A	N/A	0.60	2,929
3	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Remote Clean	76%	866,532	10102-44-0	Nitrogen dioxide	NO2	X	0.65			X							Fab CVD	0.00	10,107	N/A	N/A	0.90	1,011
3	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Remote Clean	76%	866,532	75-73-0	Tetrafluoromethane	CF4		0.04							X			Fab CVD	0.89	3,622	N/A	N/A	0.00	3,622
3	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Remote Clean	76%	866,532	75-73-0	Tetrafluoromethane	CF4		0.09							X			Fab CVD	0.00	80,588	N/A	N/A	0.00	80,588
4	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Thermal Clean	1%	5,665	7783-54-2	Nitrogen trifluoride	NF3		0.28							X			Fab CVD	0.95	79.3	N/A	N/A	0.00	79.3
4	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Thermal Clean	1%	5,665	7664-39-3	Hydrogen fluoride	HF		0.85						X				Fab CVD	0.99	47.9	N/A	N/A	0.60	19.1
4	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Thermal Clean	1%	5,665	10102-44-0	Nitrogen dioxide	NO2	X	0.65			X							Fab CVD	0.00	1,028	N/A	N/A	0.90	102.8
4	7783-54-2	Nitrogen trifluoride		NF_3	Y	Thin Films - Thermal Clean	1%	5,665	75-73-0	Tetrafluoromethane	CF4		0.01							X			Fab CVD	0.00	56.6	N/A	N/A	0.00	56.6
2	10024-97-2	Nitrous oxide		N_2O	Y	Thin Films / Diffusion Deposition	100%	1,576,605	10024-97-2	Nitrous oxide	N2O		0.50							X			Fab CVD	0.60	315,321	N/A	N/A	0.00	315,321
2	10024-97-2	Nitrous oxide	*FROM POU*	N_2O	Y	Thin Films / Diffusion Deposition	100%	1,576,605	10102-44-0	Nitrogen dioxide	NO2	X	1.25			X							Fab CVD	0.00	988,787	N/A	N/A	0.90	98,879
2	10024-97-2	Nitrous oxide	*FROM TOOL*	N_2O	Y	Thin Films / Diffusion Deposition	100%	1,576,605	10102-44-1	Nitrogen dioxide	NO2		0.21			X							Fab CVD	0.00	329,596	N/A	N/A	0.90	32,960
1	115-25-3	Octafluorocyclobutane		C_4F_8	Y	Plasma Etch	100%	11,619	115-25-3	Octafluorocyclobutane	C4F8		0.18							X			Fab Acid	0.00	2,091	0.98	41.8	0.00	41.8
1	115-25-3	Octafluorocyclobutane		C_4F_8	Y	Plasma Etch	100%	11,619	124-38-9	Carbon dioxide	CO2		0.88							X			Fab Acid	0.00	10,226	0	10,226	0.00	10,226
1	115-25-3	Octafluorocyclobutane		C_4F_8	Y	Plasma Etch	100%	11,619	75-10-5	Difluoromethane	CH2F2		1.40E-03	X						X			Fab Acid	0.00	16.3	0.99	0.16	0.00	0.16
1	115-25-3	Octafluorocyclobutane		C_4F_8	Y	Plasma Etch	100%	11,619	593-53-3	Fluoromethane	CH3F		2.20E-03	X						X			Fab Acid	0.00	25.6	0.99	0.26	0.00	0.26
1	115-25-3	Octafluorocyclobutane		C_4F_8	Y	Plasma Etch	100%	11,619	685-63-2	Hexafluorobutadiene	C4F6		0.01	X						X			Fab Acid	0.00	109.2	0.98	2.18	0.00	2.18
1	115-25-3	Octafluorocyclobutane		C_4F_8	Y	Plasma Etch	100%	11,619	76-16-4	Hexafluoroethane	C2F6		0.03							X			Fab Acid	0.00	313.7	0.98	6.27	0.00	6.27
1	115-25-3	Octafluorocyclobutane		C_4F_8	Y	Plasma Etch	100%	11,619	7664-39-3	Hydrogen fluoride	HF		0.80						X				Fab Acid	0.00	9,295	0.99	93.0	0.60	37.2
1	115-25-3	Octafluorocyclobutane		C_4F_8	Y	Plasma Etch	100%	11,619	75-73-0	Tetrafluoromethane	CF4		0.05							X			Fab Acid	0.00	522.9	0.89	57.5	0.00	57.5
1	115-25-3	Octafluorocyclobutane		C_4F_8	Y	Plasma Etch	100%	11,619	75-46-7	Trifluoromethane	CHF3		0.03							X			Fab Acid	0.00	337.0	0.98	6.74	0.00	6.74
1	556-67-2	Octamethylcyclotetrasiloxane	OMCTS / D4	$C_8H_{24}O_4Si_4$	Y	Thin Films / Diffusion Deposition	100%	26,181	556-67-2	Octamethylcyclotetrasiloxane	C8H24O4Si4		0.00										Fab CVD	0.99	0.00	N/A	N/A	0.00	0.00
1	556-67-2	Octamethylcyclotetrasiloxane	OMCTS / D4	$C_8H_{24}O_4Si_4$	Y	Thin Films / Diffusion Deposition	100%	26,181	124-38-9	Carbon dioxide	CO2		1.19							X			Fab CVD	0.00	31,077	N/A	N/A	0.00	31,077
1	556-67-2	Octamethylcyclotetrasiloxane	OMCTS / D4	$C_8H_{24}O_4Si_4$	Y	Thin Films / Diffusion Deposition	100%	26,181	67-56-1	Methanol	CH3OH		0.86	X					X				Fab CVD	0.99	226.2	N/A	N/A	0.00	226.2
1	556-67-2	Octamethylcyclotetrasiloxane	OMCTS / D4	$C_8H_{24}O_4Si_4$	Y	Thin Films / Diffusion Deposition	100%	26,181	7631-86-9	Silicon dioxide	SiO2		0.81		X								Fab CVD	0.00	21,212	N/A	N/A	0.82	3,818
1	[redacted]				Y	CMP	100%	[redacted]					[redacted]	X	X								Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	7803-51-2	Phosphine		PH_3	Y	Thin Films / Diffusion Deposition	46%	118.9	7803-51-2	Phosphine	PH3		1.00						X				Fab CVD	0.99	1.19	N/A	N/A	0.00	1.19
1	7803-51-2	Phosphine		PH_3	Y	Thin Films / Diffusion Deposition	46%	118.9	1314-56-3	Phosphorus pentoxide	P2O5	X	2.09		X								Fab CVD	0.00	248.1	N/A	N/A	0.82	44.7
2	7803-51-2	Phosphine		PH_3	Y	Ion Implant	54%	138.7	7803-51-2	Phosphine	PH3		0.05						X				Fab Acid	0.00	6.93	N/A	N/A	0.00	6.93
1	7664-38-2	Phosphoric acid		H_3PO_4	Y	Wet Etch / Wet Clean	100%	458,679	7664-38-2	Phosphoric acid	H3PO4		1.00E-03		X								Fab Acid	0.00	458.7	N/A	N/A	0.00	458.7
1	7783-55-3	Phosphorous Trifluoride		PF_3	Y	Plasma Etch	100%	2,458	7783-55-3	Phosphorous Trifluoride	PF3		0.00										Fab Acid	0.00	0.00	0	0.00	0.00	0.00
1	7783-55-3	Phosphorous Trifluoride		PF_3	Y	Plasma Etch	100%	2,458	7664-39-3	Hydrogen fluoride	HF		0.68						X				Fab Acid	0.00	1,677	0.99	16.8	0.60	6.71
1	7783-55-3	Phosphorous Trifluoride		PF_3	Y	Plasma Etch	100%	2,458	1314-56-3	Phosphorus pentoxide	P2O5		0.81		X								Fab Acid	0.00	1,983	0	1,983	0.00	1,983
1	1310-58-3	Potassium hydroxide		KOH	Y	Wet Etch / Wet Clean	100%	11,874	1310-58-3	Potassium hydroxide	KOH		1.00E-03		X								Fab Acid	0.00	11.9	N/A	N/A	0.00	11.9
1	52125-53-8	Propanol, 1(or 2)-ethoxy-		$C_5H_{12}O_2$	Y	Photolithography	100%	18,616	52125-53-8	Propanol, 1(or 2)-ethoxy-	C5H12O2		0.20	X									Fab Solvent	0.00	3,723	N/A	N/A	0.97	111.7
1	52125-53-8	Propanol, 1(or 2)-ethoxy-		$C_5H_{12}O_2$	Y	Photolithography	100%	18,616	124-38-9	Carbon dioxide	CO2	X	2.11							X			Fab Solvent	0.00	7,866	N/A	N/A	0.00	7,866
1	[redacted]												[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]								124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	108-32-7	Propylene carbonate		$C_4H_6O_3$	Y	None Identified	100%	0.00	108-32-7	Propylene carbonate	C4H6O3		1.00E-03										Fab Acid	0.00	0.00	N/A	N/A	0.00	0.00
1	110-86-1	Pyridine		C_5H_5N	Y	Photolithography	100%	379.1	110-86-1	Pyridine	C5H5N		0.20	X									Fab Solvent	0.00	75.8	N/A	N/A	0.97	2.27
1	110-86-1	Pyridine		C_5H_5N	Y	Photolithography	100%	379.1	124-38-9	Carbon dioxide	CO2	X	2.78							X			Fab Solvent	0.00	210.9	N/A	N/A	0.00	210.9
1	110-86-1	Pyridine		C_5H_5N	Y	Photolithography	100%	379.1	10102-44-0	Nitrogen dioxide	NO2	X	0.58			X							Fab Solvent	0.00	44.1	N/A	N/A	0.00	44.1
1	[redacted]				Y	Photolithography	100%	[redacted]					[redacted]	X	X								Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	124-38-9	Carbon dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2	X	[redacted]			X							Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	CMP	100%	[redacted]					[redacted]	X	X								Fab Ammonia	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	7803-62-5	Silane		SiH_4	Y	Thin Films / Diffusion Deposition	100%	[redacted]	7803-62-5	Silane	SiH4		[redacted]										Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	7803-62-5	Silane		SiH_4	Y	Thin Films / Diffusion Deposition	100%	[redacted]	7631-86-9	Silicon dioxide	SiO2		[redacted]		X								Fab CVD	0.95	[redacted]	N/A	[redacted]	0.82	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]					[redacted]	X									Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	7664-41-7	Ammonia	NH3		[redacted]										Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-38-9	Carbon dioxide	CO2		[redacted]							X			Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	109-89-7	Diethylamine	C4H11N		[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	74-84-0	Ethane	C2H6		[redacted]										Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2		[redacted]			X							Fab CVD	0.00	[redacted]	N/A	[redacted]	0.90	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	7631-86-9	Silicon dioxide	SiO2		[redacted]		X								Fab CVD	0.00	[redacted]	N/A	[redacted]	0.82	[redacted]
2	10026-04-7	Silicon tetrachloride		$SiCl_4$	Y	Plasma Etch	100%	46,254	10026-04-7	Silicon tetrachloride	SiCl4		0.00		X								Fab Acid	0.00	0.00	0.95	0.00	0.00	0.00
2	10026-04-7	Silicon tetrachloride		$SiCl_4$	Y	Plasma Etch	100%	46,254	7647-01-0	Hydrogen chloride	HCl		0.04						X				Fab Acid	0.00	1,984	0.99	19.8	0.60	7.94
2	10026-04-7	Silicon tetrachloride		$SiCl_4$	Y	Plasma Etch	100%	46,254	7631-86-9	Silicon dioxide	SiO2		0.02		X								Fab Acid	0.00	817.8	0	817.8	0.00	817.8
1	64742-94-5	Solvent naphtha (petroleum), heavy arom.		Varies	Y	Photolithography	100%	273,307	64742-94-5	Solvent naphtha (petroleum), heavy arom.	Varies		0.20	X									Fab Solvent	0.00	54,661	N/A	N/A	0.97	1,640
1	64742-94-5	Solvent naphtha (petroleum), heavy arom.		Varies	Y	Photolithography	100%	273,307	124-38-9	Carbon dioxide	CO2	X	3.67							X			Fab Solvent	0.00	200,471	N/A	N/A	0.00	200,471
1	7446-09-5	Sulfur dioxide		SO_2	Y	Plasma Etch	100%	34,597	7446-09-5	Sulfur dioxide	SO2		1.00					X					Fab Acid	0.00	34,597	0	34,597	0.00	34,597
1	2551-62-4	Sulfur hexafluoride		SF_6	Y	Plasma Etch	100%	5,149	2551-62-4	Sulfur hexafluoride	SF6		0.29							X			Fab Acid	0.00	1,493	0.96	59.7	0.00	59.7
1	2551-62-4	Sulfur hexafluoride		SF_6	Y	Plasma Etch	100%	5,149	75-10-5	Difluoromethane	CH2F2		2.00E-05	X						X			Fab Acid	0.00	0.10	0.99	1.03E-03	0.00	1.03E-03

Table 6-1: Process Chemical Emissions Calculations

	Primary Chemical								Emission Chemical					Emission Chemical Classifications										Process Emission Quantification					
Chemical Use Case ID #	CAS #	Chemical Name	Common Acronym/Alternate Name	Molecular Formula	SHOW?	Process Category	% of Total Usage	Projected Usage in Process Category (lb/yr)	CAS #	Emission Chemical	Molecular Formula	Emission Chem Formation Depends on Primary Chem EF?	Process Emission Factor (lb emitted / lb used)	VOC	PM	NO_X	CO	SO_2	HAP	GHG	HTAC	Fluorides	Exhaust Type	PEEC Fraction Managed	Pre-Control Process Emissions (lb/yr)	POU or RCS DRE	Post POU Emissions (lb/yr)	Centralized Control DRE	Post-Control Emissions (lb/yr)
1	2551-62-4	Sulfur hexafluoride		SF_6	Y	Plasma Etch	100%	5,149	593-53-3	Fluoromethane	CH3F		0.01	X						X			Fab Acid	0.00	42.2	0.99	0.42	0.00	0.42
1	2551-62-4	Sulfur hexafluoride		SF_6	Y	Plasma Etch	100%	5,149	76-16-4	Hexafluoroethane	C2F6		0.04							X			Fab Acid	0.00	211.1	0.98	4.22	0.00	4.22
1	2551-62-4	Sulfur hexafluoride		SF_6	Y	Plasma Etch	100%	5,149	7664-39-3	Hydrogen fluoride	HF		0.82						X				Fab Acid	0.00	4,233	0.99	42.3	0.60	16.9
1	2551-62-4	Sulfur hexafluoride		SF_6	Y	Plasma Etch	100%	5,149	7446-09-5	Sulfur dioxide	SO2		0.44					X					Fab Acid	0.00	2,259	0	2,259	0.00	2,259
1	2551-62-4	Sulfur hexafluoride		SF_6	Y	Plasma Etch	100%	5,149	75-73-0	Tetrafluoromethane	CF4		0.03							X			Fab Acid	0.00	175.1	0.89	19.3	0.00	19.3
1	2551-62-4	Sulfur hexafluoride		SF_6	Y	Plasma Etch	100%	5,149	75-46-7	Trifluoromethane	CHF3		3.90E-03							X			Fab Acid	0.00	20.1	0.98	0.40	0.00	0.40
1	7664-93-9	Sulfuric acid		H_2SO_4	Y	Wet Etch / Wet Clean	100%	23,673,997	7664-93-9	Sulfuric acid	H2SO4		1.00E-03		X								Fab Acid	0.00	23,674	N/A	N/A	0.75	5,918
1	78-10-4	Tetraethyl orthosilicate	TEOS	$SiC_8H_{20}O_4$	Y	Thin Films / Diffusion Deposition	100%	[redacted]	78-10-4	Tetraethyl orthosilicate	SiC8H20O4		[redacted]	X									Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	78-10-4	Tetraethyl orthosilicate	TEOS	$SiC_8H_{20}O_4$	Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-38-9	Carbon dioxide	CO2		[redacted]							X			Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	78-10-4	Tetraethyl orthosilicate	TEOS	$SiC_8H_{20}O_4$	Y	Thin Films / Diffusion Deposition	100%	[redacted]	64-17-5	Ethanol	C2H5OH		[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	78-10-4	Tetraethyl orthosilicate	TEOS	$SiC_8H_{20}O_4$	Y	Thin Films / Diffusion Deposition	100%	[redacted]	7631-86-9	Silicon dioxide	SiO2		[redacted]		X								Fab CVD	0.00	[redacted]	N/A	[redacted]	0.82	[redacted]
1	75-73-0	Tetrafluoromethane	Tetrafluoromethane	CF_4	Y	Plasma Etch	100%	392,549	75-73-0	Tetrafluoromethane	CF4		0.65							X			Fab Acid	0.00	255,157	0.89	28,067	0.00	28,067
1	75-73-0	Tetrafluoromethane	Tetrafluoromethane	CF_4	Y	Plasma Etch	100%	392,549	124-38-9	Carbon dioxide	CO2		0.50							X			Fab Acid	0.00	196,309	0	196,309	0.00	196,309
1	75-73-0	Tetrafluoromethane	Tetrafluoromethane	CF_4	Y	Plasma Etch	100%	392,549	75-10-5	Difluoromethane	CH2F2		0.01	X						X			Fab Acid	0.00	5,496	0.99	55.0	0.00	55.0
1	75-73-0	Tetrafluoromethane	Tetrafluoromethane	CF_4	Y	Plasma Etch	100%	392,549	593-53-3	Fluoromethane	CH3F		0.01	X						X			Fab Acid	0.00	2,081	0.99	20.8	0.00	20.8
1	75-73-0	Tetrafluoromethane	Tetrafluoromethane	CF_4	Y	Plasma Etch	100%	392,549	685-63-2	Hexafluorobutadiene	C4F6		1.50E-03	X						X			Fab Acid	0.00	588.8	0.98	11.8	0.00	11.8
1	75-73-0	Tetrafluoromethane	Tetrafluoromethane	CF_4	Y	Plasma Etch	100%	392,549	76-16-4	Hexafluoroethane	C2F6		0.06							X			Fab Acid	0.00	23,945	0.98	478.9	0.00	478.9
1	75-73-0	Tetrafluoromethane	Tetrafluoromethane	CF_4	Y	Plasma Etch	100%	392,549	7664-39-3	Hydrogen fluoride	HF		0.91						X				Fab Acid	0.00	357,023	0.99	3,570	0.60	1,428
1	75-73-0	Tetrafluoromethane	Tetrafluoromethane	CF_4	Y	Plasma Etch	100%	392,549	75-46-7	Trifluoromethane	CHF3		0.01							X			Fab Acid	0.00	5,103	0.98	102.1	0.00	102.1
1	75-73-0	Tetrafluoromethane	Tetrafluoromethane	CF_4	Y	Plasma Etch	100%	392,549	115-25-3	Octafluorocyclobutane	C4F8		3.30E-03							X			Fab Acid	0.00	1,295	0.98	25.9	0.00	25.9
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]					[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-38-9	Carbon dioxide	CO2		[redacted]							X			Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	97-99-4	Tetrahydrofurfuryl Alcohol		$C_5H_{10}O_2$	Y	Photolithography	100%	3,571	97-99-4	Tetrahydrofurfuryl Alcohol	C5H10O2		0.20	X									Fab Solvent	0.00	714.1	N/A	N/A	0.97	21.4
1	97-99-4	Tetrahydrofurfuryl Alcohol		$C_5H_{10}O_2$	Y	Photolithography	100%	3,571	124-38-9	Carbon dioxide	CO2	X	2.15							X			Fab Solvent	0.00	1,539	N/A	N/A	0.00	1,539
1	[redacted]				Y	Photolithography	100%	[redacted]					[redacted]	X	X								Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.97	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	124-38-9	Carbon Dioxide	CO2	X	[redacted]							X			Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Photolithography	100%	[redacted]	10102-44-0	Nitrogen Dioxide	NO2	X	[redacted]			X							Fab Solvent	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Wet Etch / Wet Clean	100%	[redacted]					[redacted]	X	X							X	Fab Acid	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	75-59-2	Tetramethylammonium hydroxide	TMAH	$C_4H_{13}NO$	Y	Photolithography	100%	934,483	75-59-2	Tetramethylammonium hydroxide	C4H13NO		1.00E-03	X	X								Fab Ammonia	0.00	934.5	N/A	N/A	0.00	934.5
1	7550-45-0	Titanium tetrachloride		$TiCl_4$	Y	Thin Films / Diffusion Deposition	100%	30,122	7550-45-0	Titanium tetrachloride	TiCl4		0.00		X				X		X		Fab CVD	0.00	0.00	N/A	N/A	0.82	0.00
1	7550-45-0	Titanium tetrachloride		$TiCl_4$	Y	Thin Films / Diffusion Deposition	100%	30,122	7647-01-0	Hydrogen chloride	HCl		0.77						X				Fab CVD	0.99	231.6	N/A	N/A	0.60	92.7
1	7550-45-0	Titanium tetrachloride		$TiCl_4$	Y	Thin Films / Diffusion Deposition	100%	30,122	13463-67-7	Titanium dioxide	TiO2		0.42		X								Fab CVD	0.00	12,683	N/A	N/A	0.82	2,283
1	[redacted]				Y	Wet Etch / Wet Clean	100%	[redacted]					[redacted]	X	X								Fab Acid	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	150-46-9	Triethyl borate	TEB	$C_6H_{15}BO_3$	Y	Thin Films / Diffusion Deposition	100%	0.00	150-46-9	Triethyl borate	C6H15BO3		0.00	X									Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	150-46-9	Triethyl borate	TEB	$C_6H_{15}BO_3$	Y	Thin Films / Diffusion Deposition	100%	0.00	1303-86-2	Boron trioxide	B2O3		0.24		X								Fab CVD	0.00	0.00	N/A	N/A	0.82	0.00
1	150-46-9	Triethyl borate	TEB	$C_6H_{15}BO_3$	Y	Thin Films / Diffusion Deposition	100%	0.00	124-38-9	Carbon dioxide	CO2		1.81							X			Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	150-46-9	Triethyl borate	TEB	$C_6H_{15}BO_3$	Y	Thin Films / Diffusion Deposition	100%	0.00	64-17-5	Ethanol	C2H5OH		0.95	X									Fab CVD	0.99	0.00	N/A	N/A	0.00	0.00
1	78-40-0	Triethyl phosphate	TEPO	$C_6H_{15}O_4P$	Y	Thin Films / Diffusion Deposition	100%	0.00	78-40-0	Triethyl phosphate	C6H15O4P		0.00	X									Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	78-40-0	Triethyl phosphate	TEPO	$C_6H_{15}O_4P$	Y	Thin Films / Diffusion Deposition	100%	0.00	124-38-9	Carbon dioxide	CO2		1.45							X			Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	78-40-0	Triethyl phosphate	TEPO	$C_6H_{15}O_4P$	Y	Thin Films / Diffusion Deposition	100%	0.00	64-17-5	Ethanol	C2H5OH		0.76	X									Fab CVD	0.99	0.00	N/A	N/A	0.00	0.00
1	78-40-0	Triethyl phosphate	TEPO	$C_6H_{15}O_4P$	Y	Thin Films / Diffusion Deposition	100%	0.00	1314-56-3	Phosphorus pentoxide	P2O5		0.39		X								Fab CVD	0.00	0.00	N/A	N/A	0.82	0.00
1	121-44-8	Triethylamine		$C_6H_{15}N$	Y	Wet Etch / Wet Clean	100%	196.3	121-44-8	Triethylamine	C6H15N		0.05	X					X				Fab Acid	0.00	9.82	N/A	N/A	0.00	9.82
1	75-46-7	Trifluoromethane		CHF_3	Y	Plasma Etch	100%	31,689	75-46-7	Trifluoromethane	CHF3		0.38							X			Fab Acid	0.00	12,042	0.98	240.8	0.00	240.8
1	75-46-7	Trifluoromethane		CHF_3	Y	Plasma Etch	100%	31,689	124-38-9	Carbon dioxide	CO2		0.63							X			Fab Acid	0.00	19,920	0	19,920	0.00	19,920
1	75-46-7	Trifluoromethane		CHF_3	Y	Plasma Etch	100%	31,689	75-10-5	Difluoromethane	CH2F2		2.60E-03	X						X			Fab Acid	0.00	82.4	0.99	0.82	0.00	0.82
1	75-46-7	Trifluoromethane		CHF_3	Y	Plasma Etch	100%	31,689	593-53-3	Fluoromethane	CH3F		0.04	X						X			Fab Acid	0.00	1,173	0.99	11.7	0.00	11.7
1	75-46-7	Trifluoromethane		CHF_3	Y	Plasma Etch	100%	31,689	685-63-2	Hexafluorobutadiene	C4F6		1.00E-04	X						X			Fab Acid	0.00	3.17	0.98	0.06	0.00	0.06
1	75-46-7	Trifluoromethane		CHF_3	Y	Plasma Etch	100%	31,689	76-16-4	Hexafluoroethane	C2F6		0.06							X			Fab Acid	0.00	1,965	0.98	39.3	0.00	39.3
1	75-46-7	Trifluoromethane		CHF_3	Y	Plasma Etch	100%	31,689	7664-39-3	Hydrogen fluoride	HF		0.86						X				Fab Acid	0.00	27,172	0.99	271.7	0.60	108.7
1	75-46-7	Trifluoromethane		CHF_3	Y	Plasma Etch	100%	31,689	75-73-0	Tetrafluoromethane	CF4		0.08							X			Fab Acid	0.00	2,408	0.89	264.9	0.00	264.9
1	75-46-7	Trifluoromethane		CHF_3	Y	Plasma Etch	100%	31,689	115-25-3	Octafluorocyclobutane	C4F8		6.70E-04							X			Fab Acid	0.00	21.2	0.98	0.42	0.00	0.42
1	75-24-1	Trimethylaluminium	TMAl	C_3H_9Al	Y	Thin Films / Diffusion Deposition	100%	1,182	75-24-1	Trimethylaluminium	C3H9Al		0.00	X									Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	75-24-1	Trimethylaluminium	TMAl	C_3H_9Al	Y	Thin Films / Diffusion Deposition	100%	1,182	1344-28-1	Aluminum oxide	Al2O3		0.71		X								Fab CVD	0.00	835.8	N/A	N/A	0.82	150.4
1	75-24-1	Trimethylaluminium	TMAl	C_3H_9Al	Y	Thin Films / Diffusion Deposition	100%	1,182	124-38-9	Carbon dioxide	CO2		1.83							X			Fab CVD	0.00	2,165	N/A	N/A	0.00	2,165
1	75-24-1	Trimethylaluminium	TMAl	C_3H_9Al	Y	Thin Films / Diffusion Deposition	100%	1,182	50-00-0	Formaldehyde	CH2O		1.25	X					X		X		Fab CVD	0.99	14.8	N/A	N/A	0.00	14.8
1	75-24-1	Trimethylaluminium	TMAl	C_3H_9Al	Y	Thin Films / Diffusion Deposition	100%	1,182	67-56-1	Methanol	CH3OH		1.33	X					X				Fab CVD	0.99	15.7	N/A	N/A	0.00	15.7
1	993-07-7	Trimethylsilane		$C_3H_{10}Si$	Y	Thin Films / Diffusion Deposition	100%	5,853	993-07-7	Trimethylsilane	C3H10Si		0.00	X									Fab CVD	0.00	0.00	N/A	N/A	0.00	0.00
1	993-07-7	Trimethylsilane		$C_3H_{10}Si$	Y	Thin Films / Diffusion Deposition	100%	5,853	74-82-8	Methane	CH4		0.65							X			Fab CVD	0.99	38.0	N/A	N/A	0.00	38.0
1	993-07-7	Trimethylsilane		$C_3H_{10}Si$	Y	Thin Films / Diffusion Deposition	100%	5,853	124-38-9	Carbon dioxide	CO2		1.78							X			Fab CVD	0.00	10,414	N/A	N/A	0.00	10,414
1	993-07-7	Trimethylsilane		$C_3H_{10}Si$	Y	Thin Films / Diffusion Deposition	100%	5,853	7631-86-9	Silicon dioxide	SiO2		0.81		X								Fab CVD	0.00	4,739	N/A	N/A	0.82	853.0
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]					[redacted]										Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-38-9	Carbon dioxide	CO2		[redacted]							X			Fab CVD	0.00	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]					[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	124-40-3	Dimethylamine	C2H7N		[redacted]	X									Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	67-56-1	Methanol	CH3OH		[redacted]	X					X				Fab CVD	0.99	[redacted]	N/A	[redacted]	0.00	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]	10102-44-0	Nitrogen dioxide	NO2		[redacted]			X							Fab CVD	0.00	[redacted]	N/A	[redacted]	0.90	[redacted]
1	[redacted]				Y	Thin Films / Diffusion Deposition	100%	[redacted]					[redacted]		X								Fab CVD	0.00	[redacted]	N/A	[redacted]	0.82	[redacted]
1	7783-82-6	Tungsten hexafluoride		WF_6	Y	Thin Films / Diffusion Deposition	100%	119,647	7783-82-6	Tungsten hexafluoride	WF6		0.00		X							X	Fab CVD	0.95	0.00	N/A	N/A	0.82	0.00
1	7783-82-6	Tungsten hexafluoride		WF_6	Y	Thin Films / Diffusion Deposition	100%	119,647	7664-39-3	Hydrogen fluoride	HF		0.02						X				Fab CVD	0.99	24.1	N/A	N/A	0.60	9.64
1	7783-82-6	Tungsten hexafluoride		WF_6	Y	Thin Films / Diffusion Deposition	100%	119,647	1314-35-8	Tungsten trioxide	WO3		0.04		X								Fab CVD	0.00	4,657	N/A	N/A	0.82	838.2

Micron - Clay, NY Fabs 1 & 2
1-FABOP and 2-FABOP
Process Chemical Emissions Summary

Table 7-1: Process Chemical Emissions Per Stack Type

CAS	Emission Chemical Name	Stack Type	Annual Pre-Control Emissions (lb/yr)	Average Hourly Pre-Control Emissions (lb/hr)	Variance Factor to Account for Hourly Operational Differences	Emission Rate Potential per Half[1] (lb/hr)	POU or RCS DRE	Centralized Control DRE	Annual Potential Emissions (lb/yr)	Number of Operational Stacks	Maximum Hourly Emissions Per Stack (lb/hr/stack)	Average Hourly Emissions Per Stack (lb/hr/stack)	Env. Rating[2,3,4]	SGC (ug/m^3)	AGC (ug/m3)
288-88-0	1,2,4-Triazole	Fab Ammonia	867.7	0.10	25%	3.10E-02	N/A	0.00	868	24	5.16E-03	4.13E-03	INT-B	-	0.48
95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	Fab Solvent	5,466	0.62	25%	0.19	N/A	0.97	164	64	3.66E-04	2.92E-04	B	-	60.0
1436-34-6	1,2-Epoxyhexane	Fab Solvent	3.93	4.49E-04	25%	1.40E-04	N/A	0.97	0.12	64	2.63E-07	2.11E-07	INT-B	-	-
[redacted]	[redacted]	Fab Acid	[redacted]	[redacted]	25%	[redacted]	N/A	0.00	[redacted]	72	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
123-91-1	1,4-Dioxane	Fab Solvent	6.23	7.11E-04	25%	2.22E-04	N/A	0.97	0.19	64	4.16E-07	3.33E-07	B	3,000	0.20
[redacted]	[redacted]	Fab Ammonia	[redacted]	[redacted]	25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
[redacted]	[redacted]	Fab Ammonia	[redacted]	[redacted]	25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
107-98-2	1-Methoxy-2-propanol	Fab Solvent	7,163	0.82	25%	0.26	N/A	0.97	215	64	4.79E-04	3.83E-04	B	36,850	2,000
872-50-4	1-Methyl-2-pyrrolidone	Fab Solvent	110,657	12.6	25%	3.95	N/A	0.97	3,320	64	7.40E-03	5.92E-03	B	-	100
929-06-6	2-(2-aminoethoxy)ethanol	Fab Solvent	2,169	0.25	25%	0.08	N/A	0.97	65.1	64	1.45E-04	1.16E-04	INT-B	1,500	18.0
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
[redacted]	[redacted]	Fab Ammonia	[redacted]	[redacted]	25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]	[redacted]	B*	[redacted]	[redacted]
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B*	[redacted]	[redacted]
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
108-65-6	2-Methoxy-1-methylethyl acetate	Fab Solvent	2,912,639	332.5	25%	103.9	N/A	0.97	87,379	64	1.95E-01	1.56E-01	B	36,850	2,000
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
[redacted]	[redacted]	Fab Ammonia	[redacted]	[redacted]	25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]	[redacted]	INT-A	[redacted]	[redacted]
75-65-0	2-Methylpropan-2-ol	Fab Solvent	0.28	3.17E-05	25%	9.91E-06	N/A	0.97	0.01	64	1.86E-08	1.49E-08	B*	-	720
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
123-42-2	4-Hydroxy-4-methylpentan-2-one	Fab Solvent	0.79	8.98E-05	25%	2.81E-05	N/A	0.97	0.02	64	5.26E-08	4.21E-08	B	-	570
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	B*	[redacted]	[redacted]
108-11-2	4-Methylpentan-2-ol	Fab Solvent	26,266	3.00	25%	0.94	N/A	0.97	788	64	1.76E-03	1.41E-03	B*	17,000	250
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
[redacted]	[redacted]	Fab Ammonia	[redacted]	[redacted]	25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
[redacted]	[redacted]	Fab Ammonia	[redacted]	[redacted]	25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
64-19-7	Acetic acid	Fab Acid	419.4	0.05	25%	1.50E-02	N/A	0.00	419	72	8.31E-04	6.65E-04	B*	3,700	60.0
74-86-2	Acetylene	Fab CVD	375.2	0.04	25%	1.34E-02	N/A	0.00	375	24	2.23E-03	1.78E-03	INT-C	2,400	500
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
1344-28-1	Aluminum oxide	Fab Acid	270.1	0.03	25%	9.64E-03	0.00	0.00	270	72	5.35E-04	4.28E-04	B*	-	2.40
1344-28-1	Aluminum oxide	Fab CVD	835.8	0.10	25%	2.98E-02	N/A	0.82	150	24	8.94E-04	7.16E-04	B*	-	2.40
7664-41-7	Ammonia	Fab Acid	13,124	1.50	25%	0.47	N/A	0.00	13,124	72	2.60E-02	2.08E-02	C	2,400	500
7664-41-7	Ammonia	Fab Ammonia	1,149,077	131.2	25%	41.0	N/A	0.98	22,982	24	1.37E-01	1.09E-01	C	2,400	500
7664-41-7	Ammonia	Fab CVD	20,151	2.30	25%	0.72	N/A	0.00	20,151	24	1.20E-01	9.58E-02	C	2,400	500
7784-42-1	Arsine	Fab Acid	4.15	4.73E-04	25%	1.48E-04	N/A	0.00	4.15	72	8.22E-06	6.58E-06	A	0.20	0.05
1303-86-2	Boron trioxide	Fab Acid	1,045	0.12	25%	3.73E-02	0.00	0.00	1,045	72	2.07E-03	1.66E-03	B*	-	24.0
1303-86-2	Boron trioxide	Fab CVD	494.6	0.06	25%	1.76E-02	N/A	0.82	89.0	24	5.29E-04	4.24E-04	B*	-	24.0
7726-95-6	Bromine	Fab Acid	52,206	5.96	25%	1.86	0.50	0.00	26,103	72	5.17E-02	4.14E-02	B	130	1.60
124-38-9	Carbon dioxide	Fab CVD	505,318	57.7	25%	18.0	N/A	0.00	505,318	24	3.00E+00	2.40E+00	D	-	21,000
124-38-9	Carbon dioxide	Fab Solvent	58,538,662	6,682	25%	2,088	N/A	0.00	58,538,662	64	1.31E+02	1.04E+02	D	-	21,000
124-38-9	Carbon dioxide	Fab Acid	4,312,977	492.3	25%	153.9	0.00	0.00	4,312,977	72	8.55E+00	6.84E+00	D	-	21,000
463-58-1	Carbonyl sulfide	Fab Acid	1,442	0.16	25%	0.05	0.99	0.00	14.4	72	2.86E-05	2.29E-05	B	250	28.0
7782-50-5	Chlorine	Fab Acid	79,183	9.04	25%	2.82	0.99	0.00	792	72	1.57E-03	1.26E-03	B	116	0.20
77-92-9	Citric acid	Fab Acid	166.5	0.02	25%	5.94E-03	N/A	0.00	167	72	3.30E-04	2.64E-04	INT-B	2,100	20.0
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
[redacted]	[redacted]	Fab Solvent	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]	INT-B	[redacted]	[redacted]
108-94-1	Cyclohexanone	Fab Solvent	52,173	5.96	25%	1.86	N/A	0.97	1,565	64	3.49E-03	2.79E-03	B	20,000	190
[redacted]	[redacted]	Fab CVD	[redacted]	[redacted]	25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]	[redacted]	B	[redacted]	[redacted]
120-92-3	Cyclopentanone	Fab Solvent	32.8	3.75E-03	25%	1.17E-03	N/A	0.97	0.98	64	2.20E-06	1.76E-06	INT-B	4,000	30.0
19287-45-7	Diborane	Fab CVD	1.97	2.24E-04	25%	7.01E-05	N/A	0.00	1.97	24	1.17E-05	9.35E-06	B*	-	0.26
142-96-1	Dibutyl ether	Fab Solvent	4,853	0.55	25%	0.17	N/A	0.97	146	64	3.25E-04	2.60E-04	INT-C	15,000	2,887
109-89-7	Diethylamine	Fab CVD	227.2	0.03	25%	8.10E-03	N/A	0.00	227	24	1.35E-03	1.08E-03	B*	4,500	36.0
[redacted]	[redacted]	Fab Ammonia	[redacted]	[redacted]	25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]	[redacted]	B	[redacted]	[redacted]
75-10-5	Difluoromethane	Fab Acid	8,644	0.99	25%	0.31	0.99	0.00	86.4	72	1.71E-04	1.37E-04	INT-C	-	50,600

124-40-3	Dimethylamine	Fab CVD	78.5	0.01	25%	2.80E-03	N/A	0.00	78.5	24	4.67E-04	3.73E-04	B*	2,800	22.0
[redacted]		Fab Acid	[redacted]		25%	[redacted]	N/A	0.00	[redacted]	72	[redacted]		INT-B	[redacted]	
74-84-0	Ethane	Fab CVD	186.9	0.02	25%	6.67E-03	N/A	0.00	187	24	1.11E-03	8.89E-04	N/A	N/A	N/A
107-21-1	Ethanediol	Fab Ammonia	173.5	0.02	25%	6.19E-03	N/A	0.00	174	24	1.03E-03	8.25E-04	B*	1,000	400
64-17-5	Ethanol	Fab CVD	551.1	0.06	25%	1.97E-02	N/A	0.00	551	24	3.28E-03	2.62E-03	C	-	45,000
[redacted]		Fab Solvent	[redacted]		25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]		B	[redacted]	
687-47-8	ethyl (S)-2-hydroxypropionate	Fab Solvent	7,189	0.82	25%	0.26	N/A	0.97	216	64	4.81E-04	3.85E-04	INT-B	-	71.0
97-64-3	Ethyl lactate	Fab Solvent	6,362	0.73	25%	0.23	N/A	0.97	191	64	4.26E-04	3.40E-04	INT-B	370	71.0
7782-41-4	Fluorine	Fab CVD	3,488	0.40	25%	0.12	N/A	0.00	3,488	24	2.07E-02	1.66E-02	B	5.30	0.07
593-53-3	Fluoromethane	Fab Acid	6,547	0.75	25%	0.23	0.99	0.00	65.5	72	1.30E-04	1.04E-04	INT-C	-	50,600
50-00-0	Formaldehyde	Fab CVD	14.8	1.69E-03	25%	5.27E-04	N/A	0.00	14.8	24	8.78E-05	7.03E-05	A	30.0	6.0E-02
96-48-0	Gamma-butyrolactone	Fab Solvent	2,753	0.31	25%	0.10	N/A	0.97	82.6	64	1.84E-04	1.47E-04	B	-	3.60
1310-53-8	Germanium dioxide	Fab CVD	189.2	0.02	25%	6.75E-03	N/A	0.82	34.1	24	2.02E-04	1.62E-04	INT-B		
[redacted]		Fab Acid	[redacted]		25%	[redacted]	N/A	0.00	[redacted]	72	[redacted]		INT-C	[redacted]	
[redacted]		Fab CVD	[redacted]		25%	[redacted]	N/A	0.82	[redacted]	24	[redacted]		INT-B	[redacted]	
110-43-0	Heptan-2-one	Fab Solvent	473.1	0.05	25%	1.69E-02	N/A	0.97	14.2	64	3.16E-05	2.53E-05	B*	-	550
685-63-2	Hexafluorobutadiene	Fab Acid	2,468	0.28	25%	0.09	0.98	0.00	49.4	72	9.78E-05	7.83E-05	INT-A	7.50	0.10
76-16-4	Hexafluoroethane	Fab Acid	39,809	4.54	25%	1.42	0.98	0.00	796	72	1.58E-03	1.26E-03	INT-C*	-	16,799
999-97-3	Hexamethyldisilazane	Fab Solvent	43,928	5.01	25%	1.57	N/A	0.97	1,318	64	2.94E-03	2.35E-03	INT-B	-	36.0
10035-10-6	Hydrogen bromide	Fab Acid	52,840	6.03	25%	1.88	0.99	0.00	528	72	1.05E-03	8.38E-04	C	680	-
7647-01-0	Hydrogen chloride	Fab Acid	6,685	0.76	25%	0.24	0.99	0.60	612	72	1.21E-03	9.70E-04	B	2,100	20.0
7647-01-0	Hydrogen chloride	Fab CVD	2,115	0.24	25%	0.08	N/A	0.60	846	24	5.03E-03	4.02E-03	B	2,100	20.0
7664-39-3	Hydrogen fluoride	Fab Acid	692,941	79.1	25%	24.7	0.99	0.60	21,372	72	4.24E-02	3.39E-02	B	5.60	0.07
7664-39-3	Hydrogen fluoride	Fab CVD	7,627	0.87	25%	0.27	N/A	0.60	3,051	24	1.81E-02	1.45E-02	B	5.60	0.07
7722-84-1	Hydrogen peroxide	Fab Acid	17,069	1.95	25%	0.61	N/A	0.00	17,069	72	3.38E-02	2.71E-02	B*	-	3.30
[redacted]		Fab Acid	[redacted]		25%	[redacted]	N/A	0.00	[redacted]	72	[redacted]		INT-B	[redacted]	
13966-94-4	Indium iodide	Fab Acid	0.01	9.97E-07	25%	3.12E-07	N/A	0.00	0.01	72	1.73E-08	1.39E-08	INT-A	100	0.24
67-63-0	Isopropanol	Fab Solvent	4,647,421	530.5	25%	165.8	N/A	0.97	139,423	64	3.11E-01	2.49E-01	B	98,000	7,000
[redacted]		Fab Ammonia	[redacted]		25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]		INT-B	[redacted]	
		Fab Ammonia			25%		N/A	0.00		24			INT-B		
		Fab Acid			25%		N/A	0.00		72			INT-B		
		Fab Solvent			25%		N/A	0.97		64			INT-B		
79-41-4	Methacrylic Acid	Fab Solvent	4,472	0.51	25%	0.16	N/A	0.97	134	64	2.99E-04	2.39E-04	B*	Not in DAR-1	170.0
74-82-8	Methane	Fab CVD	53.1	0.01	25%	1.89E-03	N/A	0.00	53.1	24	3.16E-04	2.53E-04	N/A	N/A	N/A
74-82-8	Methane	Fab Acid	3,411	0.39	25%	0.12	0.99	0.00	34.1	72	6.76E-05	5.41E-05	N/A	N/A	N/A
67-56-1	Methanol	Fab CVD	408.1	0.05	25%	1.46E-02	N/A	0.00	408	24	2.43E-03	1.94E-03	B	33,000	4,000
67-56-1	Methanol	Fab General	167.8	0.02	25%	5.99E-03	N/A	0.00	168	70	3.42E-04	2.74E-04	B	33,000	4,000
2110-78-3	Methyl 2-hydroxy-2-methylpropionate	Fab Solvent	1,234	0.14	25%	4.40E-02	N/A	0.97	37.0	64	8.25E-05	6.60E-05	INT-B	-	71.0
1319-77-3	Mixed cresols	Fab Solvent	6.23	7.11E-04	25%	2.22E-04	N/A	0.97	0.19	64	4.16E-07	3.33E-07	B	-	180
[redacted]		Fab Ammonia	[redacted]		25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]		INT-B	[redacted]	
91-20-3	Naphthalene	Fab Solvent	2,733	0.31	25%	0.10	N/A	0.97	82.0	64	1.83E-04	1.46E-04	B	7,900	3.00
123-86-4	n-Butyl acetate	Fab Solvent	356,060	40.6	25%	12.7	N/A	0.97	10,682	64	2.38E-02	1.91E-02	C	71,300	565
7697-37-2	Nitric acid	Fab Acid	44,837	5.12	25%	1.60	N/A	0.40	26,902	72	5.33E-02	4.27E-02	B	86.0	12.3
7783-54-2	Nitrogen trifluoride	Fab Acid	42,634	4.87	25%	1.52	0.95	0.00	2,132	72	4.22E-03	3.38E-03	B*	6.60	0.08
7783-54-2	Nitrogen trifluoride	Fab CVD	915.8	0.10	25%	3.27E-02	N/A	0.00	916	24	5.45E-03	4.36E-03	B*	6.60	0.08
10024-97-2	Nitrous oxide	Fab CVD	315,321	36.0	25%	11.2	N/A	0.00	315,321	24	1.87E+00	1.50E+00	B*	-	210
115-25-3	Octafluorocyclobutane	Fab Acid	4,503	0.51	25%	0.16	0.98	0.00	90.1	72	1.78E-04	1.43E-04	INT-C*	-	16,799
[redacted]		Fab Ammonia	[redacted]		25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]		B	[redacted]	
7803-51-2	Phosphine	Fab CVD	1.19	1.36E-04	25%	4.24E-05	N/A	0.00	1.19	24	7.07E-06	5.65E-06	B	21.0	0.30
7803-51-2	Phosphine	Fab Acid	6.93	7.92E-04	25%	2.47E-04	N/A	0.00	6.93	72	1.37E-05	1.10E-05	B	21.0	0.30
7664-38-2	Phosphoric acid	Fab Acid	458.7	0.05	25%	1.64E-02	N/A	0.00	459	72	9.09E-04	7.27E-04	B	300	10.0

1314-56-3	Phosphorus pentoxide	Fab CVD	248.1	0.03	25%	8.85E-03	N/A	0.82	44.7	24	2.66E-04	2.12E-04	INT-B	300	4.80
1314-56-3	Phosphorus pentoxide	Fab Acid	1,983	0.23	25%	0.07	0.00	0.00	1,983	72	3.93E-03	3.14E-03	INT-B	300	4.80
1310-58-3	Potassium hydroxide	Fab Acid	11.9	1.36E-03	25%	4.24E-04	N/A	0.00	11.9	72	2.35E-05	1.88E-05	B*	200	-
74-98-6	Propane	Fab CVD	2.32	2.64E-04	25%	8.26E-05	N/A	0.00	2.32	24	1.38E-05	1.10E-05	N/A	N/A	N/A
52125-53-8	Propanol, 1(or 2)-ethoxy-	Fab Solvent	3,723	0.43	25%	0.13	N/A	0.97	112	64	2.49E-04	1.99E-04	INT-B	36,850	2,000
115-07-1	Propylene	Fab CVD	70.2	0.01	25%	2.50E-03	N/A	0.00	70.2	24	4.17E-04	3.34E-04	B*	-	3,000
110-86-1	Pyridine	Fab Solvent	75.8	0.01	25%	2.71E-03	N/A	0.97	2.27	64	5.07E-06	4.06E-06	C	-	74.0
[redacted]		Fab Ammonia	[redacted]		25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]		INT-C	[redacted]	
7631-86-9	Silicon dioxide	Fab CVD	92,902	10.6	25%	3.31	N/A	0.82	16,722	24	9.94E-02	7.95E-02	INT-B	-	2.00
7631-86-9	Silicon dioxide	Fab Solvent	32,706	3.73	25%	1.17	N/A	0.00	32,706	64	7.29E-02	5.83E-02	INT-B	-	2.00
7631-86-9	Silicon dioxide	Fab Acid	817.8	0.09	25%	2.92E-02	0.00	0.00	818	72	1.62E-03	1.30E-03	INT-B	-	2.00
7664-93-9	Sulfuric acid	Fab Acid	23,674	2.70	25%	0.84	N/A	0.75	5,918	72	1.17E-02	9.38E-03	B	120	1.00
64742-94-5	Solvent naphtha (petroleum), heavy arom.	Fab Solvent	54,661	6.24	25%	1.95	N/A	0.97	1,640	64	3.66E-03	2.92E-03	B	-	100
7446-09-5	Sulfur dioxide	Fab Solvent	21.5	2.45E-03	25%	7.66E-04	N/A	0.00	21.5	64	4.79E-05	3.83E-05	B*	196	80.0
7446-09-5	Sulfur dioxide	Fab Acid	38,393	4.38	25%	1.37	0.00	0.00	38,393	72	7.61E-02	6.09E-02	B*	196	80.0
2551-62-4	Sulfur hexafluoride	Fab Acid	1,493	0.17	25%	0.05	0.96	0.00	59.7	72	1.18E-04	9.47E-05	B*	6.80	0.09
75-73-0	Tetrafluoromethane	Fab Acid	271,890	31.0	25%	9.70	0.89	0.00	29,908	72	5.93E-02	4.74E-02	INT-B	-	330
75-73-0	Tetrafluoromethane	Fab CVD	84,498	9.65	25%	3.01	N/A	0.00	84,498	24	5.02E-01	4.02E-01	INT-B	-	330
[redacted]		Fab CVD	[redacted]		25%	[redacted]	N/A	0.00	[redacted]	24	[redacted]		B	[redacted]	
97-99-4	Tetrahydrofurfuryl Alcohol	Fab Solvent	714.1	0.08	25%	2.55E-02	N/A	0.97	21.4	64	4.78E-05	3.82E-05	INT-B	N/A	N/A
[redacted]		Fab Solvent	[redacted]		25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]		INT-B	[redacted]	
		Fab Acid			25%		N/A	0.00		72			INT-B		
75-59-2	Tetramethylammonium hydroxide	Fab Ammonia	934.5	0.11	25%	3.33E-02	N/A	0.00	934	24	5.56E-03	4.44E-03	INT-B	3,600	29.0
13463-67-7	Titanium dioxide	Fab Acid	35.2	4.02E-03	25%	1.26E-03	0.00	0.00	35.2	72	6.97E-05	5.58E-05	B*	-	24.0
13463-67-7	Titanium dioxide	Fab CVD	12,683	1.45	25%	0.45	N/A	0.82	2,283	24	1.36E-02	1.09E-02	B*	-	24.0
3458-72-8	Triammonium citrate	Fab Acid	83.3	0.01	25%	2.97E-03	N/A	0.00	83.3	72	1.65E-04	1.32E-04	INT-C	2,400	500
121-44-8	Triethylamine	Fab Acid	9.82	1.12E-03	25%	3.50E-04	N/A	0.00	9.82	72	1.95E-05	1.56E-05	B*	2,800	7.00
75-46-7	Trifluoromethane	Fab Acid	25,170	2.87	25%	0.90	0.98	0.00	503	72	9.98E-04	7.98E-04	INT-C	-	50,600
1314-35-8	Tungsten trioxide	Fab CVD	4,657	0.53	25%	0.17	N/A	0.82	838	24	4.98E-03	3.99E-03	INT-B	-	7.10
1314-23-4	Zirconium oxide	Fab CVD	4,354	0.50	25%	0.16	N/A	0.82	784	24	4.66E-03	3.73E-03	INT-B	380	12.0
[redacted]		Fab Ammonia	[redacted]		25%	[redacted]	N/A	0	[redacted]	24	[redacted]		INT-B	[redacted]	
107-98-2	1-Methoxy-2-propanol Group	Fab Ammonia	4,544	0.52	25%	0.16	N/A	0	4,544	24	2.70E-02	2.16E-02	B	36,850	2,000
107-98-2	1-Methoxy-2-propanol Group	Fab Solvent	2,923,527	333.7	25%	104.3	N/A	0.97	87,706	64	1.96E-01	1.56E-01	B	36,850	2,000
64-19-7	Acetic Acid Group	Fab Solvent	0.00	0.00	25%	0.00	N/A	0.97	0.00	64	0.00E+00	0.00E+00	B*	3,700	60.0
64-19-7	Acetic Acid Group	Fab Acid	419.4	0.05	25%	1.50E-02	N/A	0	419	72	8.31E-04	6.65E-04	B*	3,700	60.0
7664-41-7	Ammonia Group	Fab CVD	20,526	2.34	25%	0.73	N/A	0	20,526	24	1.22E-01	9.76E-02	C	2,400	500
7664-41-7	Ammonia Group	Fab Ammonia	1,149,077	131.2	25%	41.0	N/A	0.98	22,982	24	1.37E-01	1.09E-01	C	2,400	500
7664-41-7	Ammonia Group	Fab Acid	13,207	1.51	25%	0.47	N/A	0	13,207	72	2.62E-02	2.09E-02	C	2,400	500
138-22-7	Butyl Lactate Group	Fab Solvent	8,424	0.96	25%	0.30	N/A	0.97	253	64	5.63E-04	4.51E-04	B*	-	-
75-10-5	Difluoromethane Group	Fab Acid	40,361	4.61	25%	1.44	0.99, 0.98	0	655	72	1.30E-03	1.04E-03	INT-C	-	50,600
107-21-1	Ethanediol Group	Fab Solvent	590.2	0.07	25%	2.11E-02	N/A	0.97	17.7	64	3.95E-05	3.16E-05	B*	1,000	400
107-21-1	Ethanediol Group	Fab Ammonia	173.5	0.02	25%	6.19E-03	N/A	0	174	24	1.03E-03	8.25E-04	B*	1,000	400
[redacted]		Fab Solvent	[redacted]		25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]		B	[redacted]	
		Fab Acid			25%		N/A	0		72			INT-C		
76-16-4	Hexafluoroethane Group	Fab Acid	44,312	5.06	25%	1.58	0.98	0	886	72	1.76E-03	1.41E-03	INT-C*	-	16,799
[redacted]		Fab Solvent	[redacted]		25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]		B	[redacted]	
		Fab Ammonia			25%		N/A	0		24			B		
7664-93-9	Sulfuric Acid Group	Fab Acid	23,674	2.70	25%	0.84	N/A	0, 0.75	5,918	72	1.17E-02	9.38E-03	B	120	1.00
7803-62-5	Silane Group	Fab CVD	[redacted]		25%	[redacted]	N/A	0	[redacted]	24	[redacted]		B	[redacted]	
7803-62-5	Silane Group	Fab Ammonia			25%		N/A	0		24			B		
121-44-8	Triethylamine Group	Fab Acid	9.82	1.12E-03	25%	3.50E-04	N/A	0	9.82	72	1.95E-05	1.56E-05	B*	2,800	7.00
121-44-8	Triethylamine Group	Fab Ammonia	273.2	0.03	25%	9.75E-03	N/A	0	273	24	1.62E-03	1.30E-03	B*	2,800	7.00

1. The Proposed Air Permit Project is divided into two fabs each of which is divided into two halves with similar operations and stack design.
2. B* indicates that a B rating has been assumed for chemicals not assigned an environmental rating in DAR-1.
3. A** indicates that an A rating has been assumed for chemicals that are not listed in DAR-1.
4. INT - (X) indicates an environmental rating was assigned by NYSDEC for chemicals not listed in DAR-1.

Table 7-2: Process Chemical Criteria Pollutant Emissions per Stack Type

Criteria Pollutant	Stack Type[1]	Annual Pre-Control Emissions (lb/yr)	Average Hourly Pre-Control Emissions (lb/hr)	Variance Factor to Account for Hourly Operational Differences	Emission Rate Potential per Half[2] (lb/hr)	POU or RCS DRE	Centralized Control DRE	Annual Potential Emissions (lb/yr)	Number of Operational Stacks	Maximum Hourly Emissions Per Stack (lb/hr/stack)	Average Hourly Emissions Per Stack (lb/hr/stack)
PM-10	Fab Acid	29,859	3.41	25%	1.07	Process Category/Emission Chemical Specific - Refer to Table 6-1		12,103	72	0.02	0.02
PM-2.5	Fab Acid	29,859	3.41	25%	1.07			12,103	72	0.02	0.02
NOx	Fab Acid	27,626	3.15	25%	0.99			27,626	72	0.05	0.04
SO2	Fab Acid	38,393	4.38	25%	1.37			38,393	72	0.08	0.06
PM-10	Fab Ammonia	2,308	0.26	25%	0.08			2,308	24	0.01	0.01
PM-2.5	Fab Ammonia	2,308	0.26	25%	0.08			2,308	24	0.01	0.01
NOx	Fab Ammonia	0.00	0.00	25%	0.00			0.00	24	0.00	0.00
PM-10	Fab CVD	118,495	13.5	25%	4.23			21,329	24	0.13	0.10
PM-2.5	Fab CVD	118,495	13.5	25%	4.23			21,329	24	0.13	0.10
NOx	Fab CVD	1,835,087	209.5	25%	65.5			183,509	24	1.09	0.87
PM-10	Fab Solvent	32,715	3.73	25%	1.17			32,706	64	0.07	0.06
PM-2.5	Fab Solvent	32,715	3.73	25%	1.17			32,706	64	0.07	0.06
NOx	Fab Solvent	66,695	7.61	25%	2.38			66,695	64	0.15	0.12
SO_2	Fab Solvent	21.5	2.45E-03	25%	7.66E-04			21.5	64	4.79E-05	3.83E-05

1. PM, NOx, and SO_2 emitted from the Fab Solvent exhaust will be created in and emitted from the RCTO burner, not the zeolite rotor exhaust.
2. The Proposed Air Permit Project is divided into two fabs each of which is divided into two halves with similar operations and stack design.

Table 7-3: Solvent Exhaust Emissions per Exhaust Type

CAS	Emission Chemical Name	Exhaust Type[1,2]	Annual Pre-Control Emissions (lb/yr)	Average Hourly Pre-Control Emissions (lb/hr)	Variance Factor to Account for Hourly Operational Differences	Emission Rate per Half[3] (lb/hr)	POU or RCS DRE	Centralized Control DRE	Annual Potential Emissions (lb/yr)	Number of Operational Stacks	Maximum Hourly Emissions Per Stack (lb/hr/stack)	Average Hourly Emissions Per Stack (lb/hr/stack)
95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	Solvent Exhaust	5,193	0.59	25%	0.19	N/A	0.97	155.8	64	3.47E-04	2.78E-04
95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	RCTO Burner Exhaust	273.3	0.03	25%	0.01	N/A	0.97	8.20	64	1.83E-05	1.46E-05
1436-34-6	1,2-Epoxyhexane	Solvent Exhaust	3.74	4.27E-04	25%	1.33E-04	N/A	0.97	0.11	64	2.50E-07	2.00E-07
1436-34-6	1,2-Epoxyhexane	RCTO Burner Exhaust	0.20	2.25E-05	25%	7.02E-06	N/A	0.97	0.01	64	1.32E-08	1.05E-08
123-91-1	1,4-Dioxane	Solvent Exhaust	5.91	6.75E-04	25%	2.11E-04	N/A	0.97	0.18	64	3.96E-07	3.16E-07
123-91-1	1,4-Dioxane	RCTO Burner Exhaust	0.31	3.55E-05	25%	1.11E-05	N/A	0.97	0.01	64	2.08E-08	1.67E-08
107-98-2	1-Methoxy-2-propanol	Solvent Exhaust	6,805	0.78	25%	0.24	N/A	0.97	204.2	64	4.55E-04	3.64E-04
107-98-2	1-Methoxy-2-propanol	RCTO Burner Exhaust	358.2	0.04	25%	0.01	N/A	0.97	10.7	64	2.40E-05	1.92E-05
872-50-4	1-Methyl-2-pyrrolidone	Solvent Exhaust	105,124	12.0	25%	3.75	N/A	0.97	3,154	64	0.01	0.01
872-50-4	1-Methyl-2-pyrrolidone	RCTO Burner Exhaust	5,533	0.63	25%	0.20	N/A	0.97	166.0	64	3.70E-04	2.96E-04
929-06-6	2-(2-aminoethoxy)ethanol	Solvent Exhaust	2,061	0.24	25%	0.07	N/A	0.97	61.8	64	1.38E-04	1.10E-04
929-06-6	2-(2-aminoethoxy)ethanol	RCTO Burner Exhaust	108.4	0.01	25%	3.87E-03	N/A	0.97	3.25	64	7.25E-06	5.80E-06
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
108-65-6	2-Methoxy-1-methylethyl acetate	Solvent Exhaust	2,767,007	315.9	25%	98.7	N/A	0.97	83,010	64	0.19	0.15
108-65-6	2-Methoxy-1-methylethyl acetate	RCTO Burner Exhaust	145,632	16.6	25%	5.20	N/A	0.97	4,369	64	0.01	0.01
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
75-65-0	2-Methylpropan-2-ol	Solvent Exhaust	0.26	3.01E-05	25%	9.41E-06	N/A	0.97	0.01	64	1.76E-08	1.41E-08
75-65-0	2-Methylpropan-2-ol	RCTO Burner Exhaust	0.01	1.59E-06	25%	4.95E-07	N/A	0.97	4.17E-04	64	9.29E-10	7.43E-10
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
123-42-2	4-Hydroxy-4-methylpentan-2-one	Solvent Exhaust	0.75	8.53E-05	25%	2.67E-05	N/A	0.97	0.02	64	5.00E-08	4.00E-08
123-42-2	4-Hydroxy-4-methylpentan-2-one	RCTO Burner Exhaust	0.04	4.49E-06	25%	1.40E-06	N/A	0.97	1.18E-03	64	2.63E-09	2.11E-09
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
124-38-9	Carbon dioxide	Solvent Exhaust	55,611,729	6,348	25%	1,984	N/A	0.00	55,611,729	64	124.0	99.2
124-38-9	Carbon dioxide	RCTO Burner Exhaust	2,926,933	334.1	25%	104.4	N/A	0.00	2,926,933	64	6.53	5.22
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
108-94-1	Cyclohexanone	Solvent Exhaust	49,564	5.66	25%	1.77	N/A	0.97	1,487	64	3.32E-03	2.65E-03
108-94-1	Cyclohexanone	RCTO Burner Exhaust	2,609	0.30	25%	0.09	N/A	0.97	78.3	64	1.74E-04	1.40E-04
120-92-3	Cyclopentanone	Solvent Exhaust	31.2	3.56E-03	25%	1.11E-03	N/A	0.97	0.94	64	2.09E-06	1.67E-06
120-92-3	Cyclopentanone	RCTO Burner Exhaust	1.64	1.87E-04	25%	5.85E-05	N/A	0.97	0.05	64	1.10E-07	8.78E-08
142-96-1	Dibutyl ether	Solvent Exhaust	4,610	0.53	25%	0.16	N/A	0.97	138.3	64	3.08E-04	2.47E-04
142-96-1	Dibutyl ether	RCTO Burner Exhaust	242.6	0.03	25%	0.01	N/A	0.97	7.28	64	1.62E-05	1.30E-05
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]

[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
687-47-8	ethyl (S)-2-hydroxypropionate	Solvent Exhaust	6,830	0.78	25%	0.24	N/A	0.97	204.9	64	4.57E-04	3.65E-04
687-47-8	ethyl (S)-2-hydroxypropionate	RCTO Burner Exhaust	359.5	0.04	25%	0.01	N/A	0.97	10.8	64	2.40E-05	1.92E-05
97-64-3	Ethyl lactate	Solvent Exhaust	6,044	0.69	25%	0.22	N/A	0.97	181.3	64	4.04E-04	3.23E-04
97-64-3	Ethyl lactate	RCTO Burner Exhaust	318.1	0.04	25%	0.01	N/A	0.97	9.54	64	2.13E-05	1.70E-05
96-48-0	Gamma-butyrolactone	Solvent Exhaust	2,615	0.30	25%	0.09	N/A	0.97	78.5	64	1.75E-04	1.40E-04
96-48-0	Gamma-butyrolactone	RCTO Burner Exhaust	137.7	0.02	25%	4.91E-03	N/A	0.97	4.13	64	9.21E-06	7.37E-06
110-43-0	Heptan-2-one	Solvent Exhaust	449.5	0.05	25%	0.02	N/A	0.97	13.5	64	3.01E-05	2.41E-05
110-43-0	Heptan-2-one	RCTO Burner Exhaust	23.7	2.70E-03	25%	8.44E-04	N/A	0.97	0.71	64	1.58E-06	1.27E-06
999-97-3	Hexamethyldisilazane	Solvent Exhaust	41,732	4.76	25%	1.49	N/A	0.97	1,252	64	2.79E-03	2.23E-03
999-97-3	Hexamethyldisilazane	RCTO Burner Exhaust	2,196	0.25	25%	0.08	N/A	0.97	65.9	64	1.47E-04	1.18E-04
67-63-0	Isopropanol	Solvent Exhaust	4,415,050	504.0	25%	157.5	N/A	0.97	132,451	64	0.30	0.24
67-63-0	Isopropanol	RCTO Burner Exhaust	232,371	26.5	25%	8.29	N/A	0.97	6,971	64	0.02	0.01
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
79-41-4	Methacrylic Acid	Solvent Exhaust	4,249	0.48	25%	0.15	N/A	0.97	127.5	64	2.84E-04	2.27E-04
79-41-4	Methacrylic Acid	RCTO Burner Exhaust	223.6	0.03	25%	0.01	N/A	0.97	6.71	64	1.50E-05	1.20E-05
2110-78-3	Methyl 2-hydroxy-2-methylpropionate	Solvent Exhaust	1,172	0.13	25%	0.04	N/A	0.97	35.2	64	7.84E-05	6.27E-05
2110-78-3	Methyl 2-hydroxy-2-methylpropionate	RCTO Burner Exhaust	61.7	0.01	25%	2.20E-03	N/A	0.97	1.85	64	4.13E-06	3.30E-06
1319-77-3	Mixed cresols	Solvent Exhaust	5.91	6.75E-04	25%	2.11E-04	N/A	0.97	0.18	64	3.96E-07	3.16E-07
1319-77-3	Mixed cresols	RCTO Burner Exhaust	0.31	3.55E-05	25%	1.11E-05	N/A	0.97	0.01	64	2.08E-08	1.67E-08
91-20-3	Naphthalene	Solvent Exhaust	2,596	0.30	25%	0.09	N/A	0.97	77.9	64	1.74E-04	1.39E-04
91-20-3	Naphthalene	RCTO Burner Exhaust	136.7	0.02	25%	4.87E-03	N/A	0.97	4.10	64	9.14E-06	7.31E-06
123-86-4	n-Butyl acetate	Solvent Exhaust	338,257	38.6	25%	12.1	N/A	0.97	10,148	64	0.02	0.02
123-86-4	n-Butyl acetate	RCTO Burner Exhaust	17,803	2.03	25%	0.64	N/A	0.97	534.1	64	1.19E-03	9.53E-04
52125-53-8	Propanol, 1(or 2)-ethoxy-	Solvent Exhaust	3,537	0.40	25%	0.13	N/A	0.97	106.1	64	2.37E-04	1.89E-04
52125-53-8	Propanol, 1(or 2)-ethoxy-	RCTO Burner Exhaust	186.2	0.02	25%	0.01	N/A	0.97	5.58	64	1.25E-05	9.96E-06
110-86-1	Pyridine	Solvent Exhaust	72.0	0.01	25%	2.57E-03	N/A	0.97	2.16	64	4.82E-06	3.85E-06
110-86-1	Pyridine	RCTO Burner Exhaust	3.79	4.33E-04	25%	1.35E-04	N/A	0.97	0.11	64	2.54E-07	2.03E-07
7631-86-9	Silicon dioxide	Solvent Exhaust	31,071	3.55	25%	1.11	N/A	0.00	31,071	64	0.07	0.06
7631-86-9	Silicon dioxide	RCTO Burner Exhaust	1,635	0.19	25%	0.06	N/A	0.00	1,635	64	3.65E-03	2.92E-03
64742-94-5	Solvent naphtha (petroleum), heavy arom.	Solvent Exhaust	51,928	5.93	25%	1.85	N/A	0.97	1,558	64	3.47E-03	2.78E-03
64742-94-5	Solvent naphtha (petroleum), heavy arom.	RCTO Burner Exhaust	2,733	0.31	25%	0.10	N/A	0.97	82.0	64	1.83E-04	1.46E-04
7446-09-5	Sulfur dioxide	Solvent Exhaust	20.4	2.33E-03	25%	7.28E-04	N/A	0.00	20.4	64	4.55E-05	3.64E-05
7446-09-5	Sulfur dioxide	RCTO Burner Exhaust	1.07	1.23E-04	25%	3.83E-05	N/A	0.00	1.07	64	2.39E-06	1.92E-06
97-99-4	Tetrahydrofurfuryl Alcohol	Solvent Exhaust	678.4	0.08	25%	0.02	N/A	0.97	20.4	64	4.54E-05	3.63E-05
97-99-4	Tetrahydrofurfuryl Alcohol	RCTO Burner Exhaust	35.7	4.08E-03	25%	1.27E-03	N/A	0.97	1.07	64	2.39E-06	1.91E-06
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
107-98-2	1-Methoxy-2-propanol Group	Solvent Exhaust	2,777,351	317.0	25%	99.1	N/A	0.97	83,321	64	0.19	0.15
107-98-2	1-Methoxy-2-propanol Group	RCTO Burner Exhaust	146,176	16.7	25%	5.21	N/A	0.97	4,385	64	0.01	0.01
64-19-7	Acetic Acid Group	Solvent Exhaust	0.00	0.00	25%	0.00	N/A	0.97	0.00	64	0.00	0.00
64-19-7	Acetic Acid Group	RCTO Burner Exhaust	0.00	0.00	25%	0.00	N/A	0.97	0.00	64	0.00	0.00
138-22-7	Butyl Lactate Group	Solvent Exhaust	8,003	0.91	25%	0.29	N/A	0.97	240.1	64	5.35E-04	4.28E-04
138-22-7	Butyl Lactate Group	RCTO Burner Exhaust	421.2	0.05	25%	0.02	N/A	0.97	12.6	64	2.82E-05	2.25E-05
107-21-1	Ethanediol Group	Solvent Exhaust	560.7	0.06	25%	0.02	N/A	0.97	16.8	64	3.75E-05	3.00E-05
107-21-1	Ethanediol Group	RCTO Burner Exhaust	29.5	3.37E-03	25%	1.05E-03	N/A	0.97	0.89	64	1.97E-06	1.58E-06
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	Solvent Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]
[redacted]	[redacted]	RCTO Burner Exhaust	[redacted]	[redacted]	25%	[redacted]	N/A	0.97	[redacted]	64	[redacted]	[redacted]

1. 95% of total emissions are emitted through the Solvent Exhaust
2. 5% of total emissions are emitted through the RCTO Burner Exhaust
3. The Proposed Air Permit Project is divided into two fabs each of which is divided into two halves with similar operations and stack design.

Table 7-4: Total Fluorides Emissions per Exhaust Type

CAS	Emission Chemical Name	Stack Type	Annual Potential Emissions as Emission Chemical (lb/yr)	Total Molecular Weight	Molecular Weight of Fluorine Atoms	Annual Potential Emissions as Fluoride (lb/yr)	Average Hourly Potential Emissions as F (lb/hr)	Variance Factor for Hourly Operational Differences	Number of Operational Stacks	Maximum Hourly Emissions Per (lb/hr/stack)	Average Hourly Emissions Per Stack as F (lb/hr/stack)
7782-41-4	Fluorine	Fab CVD	3,488	38	38	3,488	0.40	25%	24	2.07E-02	1.66E-02
373-68-2	Tetramethylammonium fluoride tetrahydrate	Fab Acid	1,475	93.14	19	301.0	0.03	25%	72	5.96E-04	4.77E-04
7664-39-3	Hydrogen fluoride	Fab Acid	21,372	20.01	19	20,293	2.32	25%	72	4.02E-02	3.22E-02
7664-39-3	Hydrogen fluoride	Fab CVD	3,051	20.01	19	2,897	0.33	25%	24	1.72E-02	1.38E-02

Micron - Clay, NY Fabs 1 & 2
1-FABOP and 2-FABOP
Isopropanol Cleaning Emissions

Table 10-1: Isopropanol Cleaning Emissions Data

Chemical Name	CAS	Total Usage (lb/yr)	Emission Factor (lb/lb)	Total Emissions (lb/yr)	Molecular Weight (lb/lb-mol)
Isopropanol	67-63-0	23,424	1.00	23,424	60.1

Table 10-2: Isopropanol Cleaning Emission Rates and Stack Concentrations

Stack Type	Number of Operational Stacks	Exhaust Rate (scfm)	Annual Emissions per Stack Type (lb/yr)	Annual Emissions per Stack (lb/yr)	Average Hourly Emissions per Stack Type (lb/hr)	Variance Factor to Account for Hourly Operational Differences	Emission Rate Potential per Half[3] (lb/hr)	Maximum Hourly Emissions per Stack (lb/hr/stack)	Average Hourly Emissions per Stack (lb/hr/stack)	Avg. IPA Conc. per Stack (ppmv)
Fab Acid[1]	72	80,000	9,263	128.7	1.06	25%	0.33	0.02	0.01	0.02
Fab CVD[1]	24	26,500	1,023	42.6	0.12	25%	0.04	0.01	0.00	0.02
Fab Ammonia[1]	24	40,000	1,544	64.3	0.18	25%	0.06	0.01	0.01	0.02
Fab General[1]	70	55,000	6,191	88.4	0.71	25%	0.22	0.01	0.01	0.02
Fab Solvent[1]	64	52,500	5,403	84.4	0.62	25%	0.19	0.01	0.01	0.02
Fab General[2]	70	55,000	23,424	335	2.7	25%	0.84	0.05	0.04	0.07

1. Emission rates calculated assuming Isopropanol is dispersed and vented through all stacks.
2. Emission rates calculated assuming Isopropanol is vented exclusively through General Exhaust.
3. The Proposed Air Permit Project includes two fabs, each of which is divided into two halves with similar operations and stack design.

Conversions

1 year =	525,600	minutes
1 lb-mole of gas (@ 20C) =	385.3	Cubic feet

Micron - Clay, NY Fabs 1 & 2
1-FABOP and 2-FABOP
Tool-Level Thermal Oxidation System Combustion Emissions

Table 13-1. Tool-Level Thermal Oxidation System Specifications and Inventory

Exhaust Type	Number of Operational Exhaust Stacks	Total Natural Gas Usage (MMscf/year)[1,2]
Metal Etch POUs - Process FA1 and FA2	72	650
Thin Films PEECs - Process FC1 and FC2	24	2,300
	Total NG Flow Rate	2,950

1. Total natural gas usage by thermal oxidation systems provided by Micron and scaled accordingly for Fab 1 and Fab 2.
2. Emissions from GHG thermal oxidation system natural gas combustion will pass through acid exhausts.

Table 13-2. Tool-Level Thermal Oxidation System Criteria Pollutant and GHG Potential to Emit

Pollutant	Emission Factor[1,2,3] (lb/MMscf)	Potential to Emit (per Stack)[4]				Potential to Emit (Total per Stack Type)	
		Metal Etch POUs - FA1 and FA2		Thin Films PEECs - FC1 and FC2		FA1 and FA2	FC1 and FC2
		(lb/hr)	(tpy)	(lb/hr)	(tpy)	(tpy)	(tpy)
PM (Total)	7.6	0.01	0.03	0.01	0.07	2.47	1.57
PM_{10}	7.6	0.01	0.03	0.01	0.07	2.47	1.57
$PM_{2.5}$	7.6	0.01	0.03	0.01	0.07	2.47	1.57
SO_2	0.6	6.18E-04	2.71E-03	0.01	0.03	0.20	0.69
CO	420	0.43	1.90	4.59	20.1	136.5	483.0
NO_x	100	0.10	0.45	0.11	0.48	32.5	11.5
VOC	5.5	0.01	0.02	0.06	0.26	1.79	6.33
Lead	0.0005	5.15E-07	2.26E-06	5.47E-06	2.40E-05	1.63E-04	5.75E-04
CO_2	120,000	123.7	541.7	1,313	5,750	39,000	138,000
CH_4	2.3	2.37E-03	0.01	0.03	0.11	0.75	2.65
N_2O	2.2	2.27E-03	0.01	0.02	0.11	0.72	2.53
CO_2e - 20-yr[5]	-	124.5	545.2	1,321	5,787	39,252	138,890
CO_2e - 100-yr[6]	-	124.3	544.6	1,320	5,781	39,210	138,745
Upstream CO_2e[7]	91,921	94.7	414.9	1,006	4,405	29,874	105,709
Upstream CO_2[7]	28,219	29.1	127.4	308.7	1,352	9,171	32,452
Upstream CH_4[7]	758	0.78	3.42	8.29	36.3	246.3	871.5
Upstream N_2O[7]	0.31	3.24E-04	1.42E-03	3.44E-03	0.02	0.10	0.36

1. Emission Factors from AP-42 Section 1.4 Table 1.4-1 and 1.4-2 for Small Boilers.
2. Per AP-42 Section 1.4 Table 1.4-2, PM (total) = PM_{10} = $PM_{2.5}$.
3. AP-42 emission factor for CO from NG combustion multiplied by safety factor of 5 to account for emissions as a result of partial oxidation of process chemicals.
4. The CVD exhaust ionizing wet scrubbers (IWS) will provide the following destruction and removal efficiencies:

$PM/PM_{10}/PM_{2.5}$:	82%
NO_X:	90%

5. 20-yr Global warming potentials per 6 NYCRR Part 496.
6. 100-yr Global warming potentials per 40 CFR Part 98, Table A-1 (*Global Warming Potentials*).
7. Upstream GHG emission factors per Appendix of 2024 NYS Statewide GHG Emissions Report:

CO_2e:	40,877	g/MMBtu
CO_2:	12,549	g/MMBtu
CH_4:	337	g/MMBtu
N_2O:	0.14	g/MMBtu

Table 13-3. Tool-Level Thermal Oxidation System HAP Potential to Emit

Pollutant	HAP?	Emission Factor[1]	Potential to Emit (per Stack)				Potential to Emit (Total per Stack Type)	
			Metal Etch POUs - FA1 and FA2		Thin Films PEECs - FC1 and FC2		FA1 and FA2	FC1 and FC2
		(lb/MMscf)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(tpy)	(tpy)
Benzene	Yes	2.10E-03	2.16E-06	9.48E-06	2.30E-05	1.01E-04	6.83E-04	2.42E-03
Formaldehyde	Yes	7.50E-02	7.73E-05	3.39E-04	8.20E-04	3.59E-03	0.02	0.09
Toluene	Yes	3.40E-03	3.50E-06	1.53E-05	3.72E-05	1.63E-04	1.11E-03	3.91E-03
2-Methylnaphthalene	Yes	2.40E-05	2.47E-08	1.08E-07	2.63E-07	1.15E-06	7.80E-06	2.76E-05
3-Methylchloranthrene	Yes	1.80E-06	1.86E-09	8.13E-09	1.97E-08	8.63E-08	5.85E-07	2.07E-06
7,12-Dimethylbenz(a)anthracene	Yes	1.60E-05	1.65E-08	7.22E-08	1.75E-07	7.67E-07	5.20E-06	1.84E-05
Acenaphthylene	Yes	1.80E-06	1.86E-09	8.13E-09	1.97E-08	8.63E-08	5.85E-07	2.07E-06
Benzo(a)pyrene	Yes	1.20E-06	1.24E-09	5.42E-09	1.31E-08	5.75E-08	3.90E-07	1.38E-06
Benzo(b)fluoranthene	Yes	1.80E-06	1.86E-09	8.13E-09	1.97E-08	8.63E-08	5.85E-07	2.07E-06
Benzo(k)fluoranthene	Yes	1.80E-06	1.86E-09	8.13E-09	1.97E-08	8.63E-08	5.85E-07	2.07E-06
Dibenzo(a,h)anthracene	Yes	1.20E-06	1.24E-09	5.42E-09	1.31E-08	5.75E-08	3.90E-07	1.38E-06
Dichlorobenzene	Yes	1.20E-03	1.24E-06	5.42E-06	1.31E-05	5.75E-05	3.90E-04	1.38E-03
Hexane	Yes	1.80E+00	1.86E-03	0.01	0.02	0.09	0.59	2.07
Naphthalene	Yes	6.10E-04	6.29E-07	2.75E-06	6.67E-06	2.92E-05	1.98E-04	7.02E-04
Acenaphthene	Yes	1.80E-06	1.86E-09	8.13E-09	1.97E-08	8.63E-08	5.85E-07	2.07E-06
Anthracene	Yes	2.40E-06	2.47E-09	1.08E-08	2.63E-08	1.15E-07	7.80E-07	2.76E-06
Benzo(a)anthracene	Yes	1.80E-06	1.86E-09	8.13E-09	1.97E-08	8.63E-08	5.85E-07	2.07E-06
Benzo(g,h,i)perylene	Yes	1.20E-06	1.24E-09	5.42E-09	1.31E-08	5.75E-08	3.90E-07	1.38E-06
Chrysene	Yes	1.80E-06	1.86E-09	8.13E-09	1.97E-08	8.63E-08	5.85E-07	2.07E-06
Fluoranthene	Yes	3.00E-06	3.09E-09	1.35E-08	3.28E-08	1.44E-07	9.75E-07	3.45E-06
Fluorene	Yes	2.80E-06	2.89E-09	1.26E-08	3.06E-08	1.34E-07	9.10E-07	3.22E-06
Indeno(1,2,3-cd)pyrene	Yes	1.80E-06	1.86E-09	8.13E-09	1.97E-08	8.63E-08	5.85E-07	2.07E-06
Phenanthrene	Yes	1.70E-05	1.75E-08	7.67E-08	1.86E-07	8.15E-07	5.53E-06	1.96E-05
Pyrene	Yes	5.00E-06	5.15E-09	2.26E-08	5.47E-08	2.40E-07	1.63E-06	5.75E-06
Arsenic	Yes	2.00E-04	2.06E-07	9.03E-07	2.19E-06	9.58E-06	6.50E-05	2.30E-04
Beryllium	Yes	1.20E-05	1.24E-08	5.42E-08	1.31E-07	5.75E-07	3.90E-06	1.38E-05
Cadmium	Yes	1.10E-03	1.13E-06	4.97E-06	1.20E-05	5.27E-05	3.58E-04	1.27E-03
Chromium	Yes	1.40E-03	1.44E-06	6.32E-06	1.53E-05	6.71E-05	4.55E-04	1.61E-03
Cobalt	Yes	8.40E-05	8.66E-08	3.79E-07	9.19E-07	4.03E-06	2.73E-05	9.66E-05
Lead	Yes	5.00E-04	5.15E-07	2.26E-06	5.47E-06	2.40E-05	1.63E-04	5.75E-04
Manganese	Yes	3.80E-04	3.92E-07	1.72E-06	4.16E-06	1.82E-05	1.24E-04	4.37E-04
Mercury	Yes	2.60E-04	2.68E-07	1.17E-06	2.84E-06	1.25E-05	8.45E-05	2.99E-04
Nickel	Yes	2.10E-03	2.16E-06	9.48E-06	2.30E-05	1.01E-04	6.83E-04	2.42E-03
Selenium	Yes	2.40E-05	2.47E-08	1.08E-07	2.63E-07	1.15E-06	7.80E-06	2.76E-05
		Total HAP PTE	**1.95E-03**	**8.52E-03**	**0.02**	**0.09**	**0.61**	**2.17**

1. Emission factors are from AP-42, Section 1.4, Tables 1.4-3 and 1.4-4.

Conversions

1 lb =	453.59 g
1 scf NG =	1,020 BTU - Average heat content of NG from AP-42 1.4.1.
1 year =	8,760 hours

Micron - Clay, NY Fabs 1 & 2
1-FABOP, 2-FABOP, 1-HPMCU, 2-HPMCU
RCTO Combustion Emissions

Table 14-1. RCTO Specifications and Inventory

Description	Operating Status	Equipment Count	Burner Rating (Each) (MMBtu/hr)	Natural Gas Flow (scfh)
Fab RCTOs - Process FS1 and FS2	Active	64	4.00	3,922
Fab RCTOs - Process FS1 and FS2	Redundant	8	4.00	3,922
HPM RCTOs - Process HS1 and HS2	Active	12	1.00	980.4
HPM RCTOs - Process HS1 and HS2	Redundant	4	1.00	980.4
			Total NG Flow Rate (scfh)	**298,039**

Table 14-2. RCTO Criteria Pollutant and GHG Potential to Emit

Pollutant	Emission Factor[1,2,3] (lb/MMscf)	Potential to Emit (per RCTO)				Potential to Emit (RCTO Totals)
		Fab RCTOs - FS1 and FS2		HPM RCTOs - HS1 and HS2		
		(lb/hr)	(tpy)	(lb/hr)	(tpy)	(tpy)
PM (Total)	7.6	0.03	0.13	0.01	0.03	9.92
PM_{10}	7.6	0.03	0.13	0.01	0.03	9.92
$PM_{2.5}$	7.6	0.03	0.13	0.01	0.03	9.92
SO_2	0.6	2.35E-03	0.01	5.88E-04	2.58E-03	0.78
CO[2]	420	1.65	7.21	0.41	1.80	548.3
NO_x	100	0.39	1.72	0.10	0.43	130.5
VOC	5.5	0.02	0.09	0.01	0.02	7.18
Lead	0.0005	1.96E-06	8.59E-06	4.90E-07	2.15E-06	6.53E-04
CO_2	120,000	470.6	2,061	117.6	515.3	156,649
CH_4	2.3	0.01	0.04	2.25E-03	0.01	3.00
N_2O	2.2	0.01	0.04	2.16E-03	0.01	2.87
CO_2e - 20-yr[4]	-	473.6	2,074	118.4	518.6	157,660
CO_2e - 100-yr[5]	-	473.1	2,072	118.3	518.1	157,495
Upstream CO_2e[6]	91,921	360.5	1,579	90.1	394.7	119,994
Upstream CO_2[6]	28,219	110.7	484.7	27.7	121.2	36,838
Upstream CH_4[6]	758	2.97	13.0	0.74	3.25	989.3
Upstream N_2O[6]	0	1.23E-03	0.01	3.09E-04	1.35E-03	0.41

1. Emission factors are from AP-42, Section 1.4, Tables 1.4-1 and 1.4-2.
2. Per AP-42 Section 1.4 Table 1.4-2, PM (total) = PM_{10} = $PM_{2.5}$.
3. AP-42 emission factor for CO from NG combustion multiplied by safety factor of 5 to account for emissions as a result of partial oxidation of process chemicals.
4. 20-yr Global warming potentials per 6 NYCRR Part 496.
5. 100-yr Global warming potentials per 40 CFR Part 98, Table A-1 (*Global Warming Potentials*).
6. Upstream GHG emission factors per Appendix of 2024 NYS Statewide GHG Emissions Report:

CO_2e:	40,877	g/MMBtu
CO_2:	12,549	g/MMBtu
CH_4:	337	g/MMBtu
N_2O:	0.14	g/MMBtu

Table 14-3. RCTO HAP Potential to Emit

Pollutant	HAP?	Emission Factor[1]	Potential to Emit (per RCTO)				Potential to Emit (RCTO Totals)
			Fab RCTOs - FS1 and FS2		HPM RCTOs - HS1 and HS2		
		(lb/MMscf)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(tpy)
Benzene	Yes	2.10E-03	8.24E-06	3.61E-05	2.06E-06	9.02E-06	2.74E-03
Formaldehyde	Yes	0.08	2.94E-04	1.29E-03	7.35E-05	3.22E-04	0.10
Toluene	Yes	3.40E-03	1.33E-05	5.84E-05	3.33E-06	1.46E-05	4.44E-03
2-Methylnaphthalene	Yes	2.40E-05	9.41E-08	4.12E-07	2.35E-08	1.03E-07	3.13E-05
3-Methylchloranthrene	Yes	1.80E-06	7.06E-09	3.09E-08	1.76E-09	7.73E-09	2.35E-06
7,12-Dimethylbenz(a)anthracene	Yes	1.60E-05	6.27E-08	2.75E-07	1.57E-08	6.87E-08	2.09E-05
Acenaphthylene	Yes	1.80E-06	7.06E-09	3.09E-08	1.76E-09	7.73E-09	2.35E-06
Benzo(a)pyrene	Yes	1.20E-06	4.71E-09	2.06E-08	1.18E-09	5.15E-09	1.57E-06
Benzo(b)fluoranthene	Yes	1.80E-06	7.06E-09	3.09E-08	1.76E-09	7.73E-09	2.35E-06
Benzo(k)fluoranthene	Yes	1.80E-06	7.06E-09	3.09E-08	1.76E-09	7.73E-09	2.35E-06
Dibenzo(a,h)anthracene	Yes	1.20E-06	4.71E-09	2.06E-08	1.18E-09	5.15E-09	1.57E-06
Dichlorobenzene	Yes	1.20E-03	4.71E-06	2.06E-05	1.18E-06	5.15E-06	1.57E-03
Hexane	Yes	1.80	0.01	0.03	1.76E-03	0.01	2.35
Naphthalene	Yes	6.10E-04	2.39E-06	1.05E-05	5.98E-07	2.62E-06	7.96E-04
Acenaphthene	Yes	1.80E-06	7.06E-09	3.09E-08	1.76E-09	7.73E-09	2.35E-06
Anthracene	Yes	2.40E-06	9.41E-09	4.12E-08	2.35E-09	1.03E-08	3.13E-06
Benzo(a)anthracene	Yes	1.80E-06	7.06E-09	3.09E-08	1.76E-09	7.73E-09	2.35E-06
Benzo(g,h,i)perylene	Yes	1.20E-06	4.71E-09	2.06E-08	1.18E-09	5.15E-09	1.57E-06
Chrysene	Yes	1.80E-06	7.06E-09	3.09E-08	1.76E-09	7.73E-09	2.35E-06
Fluoranthene	Yes	3.00E-06	1.18E-08	5.15E-08	2.94E-09	1.29E-08	3.92E-06
Fluorene	Yes	2.80E-06	1.10E-08	4.81E-08	2.75E-09	1.20E-08	3.66E-06
Indeno(1,2,3-cd)pyrene	Yes	1.80E-06	7.06E-09	3.09E-08	1.76E-09	7.73E-09	2.35E-06
Phenanthrene	Yes	1.70E-05	6.67E-08	2.92E-07	1.67E-08	7.30E-08	2.22E-05
Pyrene	Yes	5.00E-06	1.96E-08	8.59E-08	4.90E-09	2.15E-08	6.53E-06
Arsenic	Yes	2.00E-04	7.84E-07	3.44E-06	1.96E-07	8.59E-07	2.61E-04
Beryllium	Yes	1.20E-05	4.71E-08	2.06E-07	1.18E-08	5.15E-08	1.57E-05
Cadmium	Yes	1.10E-03	4.31E-06	1.89E-05	1.08E-06	4.72E-06	1.44E-03
Chromium	Yes	1.40E-03	5.49E-06	2.40E-05	1.37E-06	6.01E-06	1.83E-03
Cobalt	Yes	8.40E-05	3.29E-07	1.44E-06	8.24E-08	3.61E-07	1.10E-04
Lead	Yes	5.00E-04	1.96E-06	8.59E-06	4.90E-07	2.15E-06	6.53E-04
Manganese	Yes	3.80E-04	1.49E-06	6.53E-06	3.73E-07	1.63E-06	4.96E-04
Mercury	Yes	2.60E-04	1.02E-06	4.47E-06	2.55E-07	1.12E-06	3.39E-04
Nickel	Yes	2.10E-03	8.24E-06	3.61E-05	2.06E-06	9.02E-06	2.74E-03
Selenium	Yes	2.40E-05	9.41E-08	4.12E-07	2.35E-08	1.03E-07	3.13E-05
		Total HAP PTE	**7.41E-03**	**0.03**	**1.85E-03**	**8.11E-03**	**2.47**

1. HAP emission factors are from AP-42, Section 1.4, Tables 1.4-3 and 1.4-4.

Conversions

1 lb =	453.59 g
1 year =	8,760 hr
1 scf NG =	1,020 BTU - Average heat content of NG from AP-42 1.4.1.

Micron - Clay, NY Fabs 1 & 2
1-CMBOP and 2-CMBOP
Water Bath Vaporizer Combustion Emissions

Table 15-1. Water Bath Vaporizer Inventory

Equipment Description	Operating Status	Equipment Count	Operating Hours Limit (hrs)[1]	Burner Rating (Each)	Natural Gas Flow Rate[2]	Maximum Stack Flow Rate
				(MMBtu/hr)	(scfh)	(scfm)
Water Bath Vaporizers - Process WBV	Active	4	2,000	42.8	42,000	22,500
Water Bath Vaporizers - Process WBV	Redundant	4	0	42.8	0	0
				Total	**168,000**	**90,000**

1. Micron proposes a permit condition limiting total hours of WBV operation to 8,000 per year and specifying that no more than 4 WBV are operated at any given time. Therefore, the PTE is calculated assuming that redundant units do not operate.
2. Natural gas flow rate to the vaporizer based on manufacturer specifications.

Table 15-2. Water Bath Vaporizer Criteria Pollutant and GHG Potential to Emit

Pollutant	Molecular Weight	Emission Factor[1,2] (lb/MMscf)	BACT/LAER Limits		Potential to Emit (Per Unit)		Potential to Emit (All Units)	
	(lb/lb-mole)		Value	Unit	(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM (Total)		7.6			0.32	0.32	1.28	1.28
PM_{10}		7.6			0.32	0.32	1.28	1.28
$PM_{2.5}$		7.6			0.32	0.32	1.28	1.28
SO_2		0.6			0.03	0.03	0.10	0.10
CO			84	lb/MMscf	3.53	3.53	14.1	14.1
NO_x	46.01		50	lb/MMscf	2.10	2.10	8.40	8.40
VOC			0.0054	lb/MMBtu	0.23	0.23	0.92	0.92
Lead		0.0005			2.10E-05	2.10E-05	8.40E-05	8.40E-05
CO_2		120,000			5,040	5,040	20,160	20,160
CH_4		2.3			0.10	0.10	0.39	0.39
N_2O		0.64			0.03	0.03	0.11	0.11
CO_2e - 20-yr[3]		-			5,055	5,055	40,442	40,442
CO_2e - 100-yr[4]		-			5,050	5,050	40,399	40,399
Upstream CO_2e[5]		91,921			3,861	3,861	30,885	30,885
Upstream CO_2[5]		28,219			1,185	1,185	9,482	9,482
Upstream CH_4[5]		758			31.8	31.8	254.6	254.6
Upstream N_2O[5]		0			0.01	0.01	0.11	0.11

1. Emission Factors from AP-42 Section 1.4 Tables 1.4-1 and 1.4-2 for Small Boilers. Assuming low NO_x burners.
2. Per AP-42 Section 1.4 Table 1.4-2, PM (total) = PM_{10} = $PM_{2.5}$.
3. 20-yr Global warming potentials per 6 NYCRR Part 496.
4. 100-yr Global warming potentials per 40 CFR Part 98, Table A-1 (*Global Warming Potentials*).
5. Upstream GHG emission factors per Appendix of 2024 NYS Statewide GHG Emissions Report:

CO_2e:	40,877	g/MMBtu
CO_2:	12,549	g/MMBtu
CH_4:	337	g/MMBtu
N_2O:	0.14	g/MMBtu

Table 15-3. Water Bath Vaporizer HAP Potential to Emit

Pollutant	HAP?	Emission Factor[1]	Potential to Emit (All Units)	
		(lb/MMscf)	(lb/hr)	(tpy)
Benzene	Yes	2.10E-03	3.53E-04	3.53E-04
Formaldehyde	Yes	7.50E-02	0.01	0.01
Toluene	Yes	3.40E-03	5.71E-04	5.71E-04
2-Methylnaphthalene	Yes	2.40E-05	4.03E-06	4.03E-06
3-Methylchloranthrene	Yes	1.80E-06	3.02E-07	3.02E-07
7,12-Dimethylbenz(a)anthracene	Yes	1.60E-05	2.69E-06	2.69E-06
Acenaphthylene	Yes	1.80E-06	3.02E-07	3.02E-07
Benzo(a)pyrene	Yes	1.20E-06	2.02E-07	2.02E-07
Benzo(b)fluoranthene	Yes	1.80E-06	3.02E-07	3.02E-07
Benzo(k)fluoranthene	Yes	1.80E-06	3.02E-07	3.02E-07
Dibenzo(a,h)anthracene	Yes	1.20E-06	2.02E-07	2.02E-07
Dichlorobenzene	Yes	1.20E-03	2.02E-04	2.02E-04
Hexane	Yes	1.80E+00	0.30	0.30
Naphthalene	Yes	6.10E-04	1.02E-04	1.02E-04
Acenaphthene	Yes	1.80E-06	3.02E-07	3.02E-07
Anthracene	Yes	2.40E-06	4.03E-07	4.03E-07
Benzo(a)anthracene	Yes	1.80E-06	3.02E-07	3.02E-07
Benzo(g,h,i)perylene	Yes	1.20E-06	2.02E-07	2.02E-07
Chrysene	Yes	1.80E-06	3.02E-07	3.02E-07
Fluoranthene	Yes	3.00E-06	5.04E-07	5.04E-07
Fluorene	Yes	2.80E-06	4.70E-07	4.70E-07
Indeno(1,2,3-cd)pyrene	Yes	1.80E-06	3.02E-07	3.02E-07
Phenanthrene	Yes	1.70E-05	2.86E-06	2.86E-06
Pyrene	Yes	5.00E-06	8.40E-07	8.40E-07
Arsenic	Yes	2.00E-04	3.36E-05	3.36E-05
Beryllium	Yes	1.20E-05	2.02E-06	2.02E-06
Cadmium	Yes	1.10E-03	1.85E-04	1.85E-04
Chromium	Yes	1.40E-03	2.35E-04	2.35E-04
Cobalt	Yes	8.40E-05	1.41E-05	1.41E-05
Lead	Yes	5.00E-04	8.40E-05	8.40E-05
Manganese	Yes	3.80E-04	6.38E-05	6.38E-05
Mercury	Yes	2.60E-04	4.37E-05	4.37E-05
Nickel	Yes	2.10E-03	3.53E-04	3.53E-04
Selenium	Yes	2.40E-05	4.03E-06	4.03E-06
		Total HAP PTE	**0.32**	**0.32**

1. HAP emission factors are from AP-42, Section 1.4, Tables 1.4-3 and 1.4-4.

Conversions

1 lb =	453.59	g
1 year =	8,760	hr
1 scf NG =	1,020	BTU - Average heat content of NG from AP-42 1.4.1.
1 year =	525,600	minutes
1 lb-mole of gas (@ 20C) =	385.3	Cubic feet
1 hr=	60	minutes
Fd Factor=	8,710	

Micron - Clay, NY Fabs 1 & 2
1-CMBOP and 2-CMBOP
Natural Gas Boiler Combustion Emissions

Table 16-1. Total Boiler Burner Rating

Equipment Description	Equipment Count	Operating Hours Limit[1] (hrs/yr)	Burner Rating (MMBtu/hr)	Maximum Outlet Flow (scfm)
Natural Gas Boilers - Process BLR	6	6,000	32.7	22,500
		Total	196.2	135,000

1. Micron proposes a permit condition limiting each boiler to 6,000 hours of operation per year.

Table 16-2. Boiler Criteria Pollutant/GHG Potential to Emit

Pollutant	Molecular Weight	Emission Factor[1,2] (lb/MMscf)	BACT/LAER Limits		Potential to Emit (Per Unit)		Potential to Emit (All Units)	
	(lb/lb-mole)		Value	Unit	(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM (Total)		7.6			0.24	0.73	1.46	4.39
PM_{10}		7.6			0.24	0.73	1.46	4.39
$PM_{2.5}$		7.6			0.24	0.73	1.46	4.39
SO_2		0.6			0.02	0.06	0.12	0.35
CO	28.01		50	ppmvd @3% O2	4.91	14.7	29.4	88.3
NO_X	46.01		9	ppmvd @3% O2	0.36	1.09	2.19	6.56
VOC			0.0017	lb/MMBtu	0.06	0.17	0.33	1.00
Lead		0.0005			1.60E-05	4.81E-05	9.62E-05	2.89E-04
CO_2		120,000			3,847	11,541	23,082	69,247
CH_4		2.3			0.07	0.22	0.44	1.33
N_2O		0.64			0.02	0.06	0.12	0.37
CO_2e - 20-yr[3]		-			3,859	11,576	23,152	69,456
CO_2e - 100-yr[4]		-			3,855	11,564	23,127	69,382
Upstream CO_2e[5]		91,921			2,947	8,841	17,681	53,044
Upstream CO_2[5]		28,219			904.7	2,714	5,428	16,284
Upstream CH_4[5]		758			24.3	72.9	145.8	437.3
Upstream N_2O[5]		0.31			0.01	0.03	0.06	0.18

1. Criteria pollutant emission factors are from AP-42, Section 1.4, Tables 1.4-1 and 1.4-2. Assuming low-NO_x burners and flue gas recirculation.
2. Per AP-42 Section 1.4 Table 1.4-2, PM (total) = PM_{10} = $PM_{2.5}$.
3. 20-yr Global warming potentials per 6 NYCRR Part 496.
4. 100-yr Global warming potentials per 40 CFR Part 98, Table A-1 (*Global Warming Potentials).*
5. Upstream GHG emission factors per Appendix of 2024 NYS Statewide GHG Emissions Report:

CO_2e:	40,877	g/MMBtu
CO_2:	12,549	g/MMBtu
CH_4:	337	g/MMBtu
N_2O:	0.14	g/MMBtu

Table 16-3. Boiler HAP Potential to Emit

Pollutant	HAP?	Emission Factor[1]	Potential to Emit (All Units)	
		(lb/MMscf)	(lb/hr)	(tpy)
Benzene	Yes	2.10E-03	4.04E-04	1.21E-03
Formaldehyde	Yes	7.50E-02	0.01	0.04
Toluene	Yes	3.40E-03	6.54E-04	1.96E-03
2-Methylnaphthalene	Yes	2.40E-05	4.62E-06	1.38E-05
3-Methylchloranthrene	Yes	1.80E-06	3.46E-07	1.04E-06
7,12-Dimethylbenz(a)anthracene	Yes	1.60E-05	3.08E-06	9.23E-06
Acenaphthylene	Yes	1.80E-06	3.46E-07	1.04E-06
Benzo(a)pyrene	Yes	1.20E-06	2.31E-07	6.92E-07
Benzo(b)fluoranthene	Yes	1.80E-06	3.46E-07	1.04E-06
Benzo(k)fluoranthene	Yes	1.80E-06	3.46E-07	1.04E-06
Dibenzo(a,h)anthracene	Yes	1.20E-06	2.31E-07	6.92E-07
Dichlorobenzene	Yes	1.20E-03	2.31E-04	6.92E-04
Hexane	Yes	1.80E+00	0.35	1.04
Naphthalene	Yes	6.10E-04	1.17E-04	3.52E-04
Acenaphthene	Yes	1.80E-06	3.46E-07	1.04E-06
Anthracene	Yes	2.40E-06	4.62E-07	1.38E-06
Benzo(a)anthracene	Yes	1.80E-06	3.46E-07	1.04E-06
Benzo(g,h,i)perylene	Yes	1.20E-06	2.31E-07	6.92E-07
Chrysene	Yes	1.80E-06	3.46E-07	1.04E-06
Fluoranthene	Yes	3.00E-06	5.77E-07	1.73E-06
Fluorene	Yes	2.80E-06	5.39E-07	1.62E-06
Indeno(1,2,3-cd)pyrene	Yes	1.80E-06	3.46E-07	1.04E-06
Phenanthrene	Yes	1.70E-05	3.27E-06	9.81E-06
Pyrene	Yes	5.00E-06	9.62E-07	2.89E-06
Arsenic	Yes	2.00E-04	3.85E-05	1.15E-04
Beryllium	Yes	1.20E-05	2.31E-06	6.92E-06
Cadmium	Yes	1.10E-03	2.12E-04	6.35E-04
Chromium	Yes	1.40E-03	2.69E-04	8.08E-04
Cobalt	Yes	8.40E-05	1.62E-05	4.85E-05
Lead	Yes	5.00E-04	9.62E-05	2.89E-04
Manganese	Yes	3.80E-04	7.31E-05	2.19E-04
Mercury	Yes	2.60E-04	5.00E-05	1.50E-04
Nickel	Yes	2.10E-03	4.04E-04	1.21E-03
Selenium	Yes	2.40E-05	4.62E-06	1.38E-05
		Total HAP PTE	**0.36**	**1.09E+00**

1. Emission factors are from AP-42, Section 1.4, Tables 1.4-3 and 1.4-4. Emissions factors corrected for actual heating value from standard of 1020 BTU/ft^3.

Conversions

1 lb =	453.59	g
1 year =	8,760	hr
1 scf NG =	1,020	BTU - Average heat content of NG from AP-42 1.4.1.
1 kW =	3,413	BTU - AP-42 appendix A pg. 15
	0.85	kW out/kW in
1 year =	525,600	minutes
1 lb-mole of gas (@ 20C) =	385.3	Cubic feet
1 hr=	60	minutes
Fd Factor=	8,710	

Micron - Clay, NY Fabs 1 & 2
1-CMBOP and 2-CMBOP
Diesel Emergency Generator Combustion Emissions

Table 17-1. Diesel Generator Inventory

Equipment Description	Equipment Count	Annual Operating Hours Limit (hrs/yr/engine)	Engine Full Load	Engine Power
			HP	kW
CUB 1 Diesel Emergency Generators - Process EMD	60	100	3,350	2,498
CUB 2 Diesel Emergency Generators - Process EMD	58			
Total Load (All Units)	118	--	**395,300**	**8,367,272**

1. Emergency generators are limited to the following 24-hour operation during emergencies: 46 engines limited to 4 hours of operation, 80 engines limited to 8 hours of operation, and the remaining 118 engines are unlimited in a 24-hour period.

Table 17-2. Diesel Emergency Generators Criteria Pollutant and GHG Potential to Emit

Pollutant	Tier 4 Exhaust Emission Standards[1,2]	AP-42 Emission Factors[3]	GHG Emission Factors[4]	Potential to Emit (Per Unit)		Potential to Emit (All Diesel Generators)
	(g/kW-hr)	(lb/HP-hr)	(kg/MMBtu)	(lb/hr)	(tpy)	(tpy)
PM (Total)	0.008	-	-	0.05	2.29E-03	0.27
PM_{10}	0.008	-	-	0.04	2.20E-03	0.26
$PM_{2.5}$	0.008	-	-	0.04	2.20E-03	0.26
SO_2	-	1.21E-05	-	0.04	2.03E-03	0.24
CO	3.5	-	-	19.3	0.96	114
NO_x	0.67	-	-	3.69	0.18	21.77
VOC	0.19	-	-	1.05	0.05	6.17
CO_2	-	-	73.96	1,391	69.5	8,206
CH_4	-	-	0.0030	0.06	2.82E-03	0.33
N_2O	-	-	0.00060	0.01	5.64E-04	0.07
CO_2e - 20-yr[5]	-	-	-	1,399	69.9	8,251
CO_2e - 100-yr[6]	-	-	-	1,395	69.8	8,233
Upstream CO_2e[7]	-	-	23.54	442.7	22.1	2,612
Upstream CO_2[7]	-	-	13.63	256.4	12.8	1,513
Upstream CH_4[7]	-	-	0.12	2.20	0.11	13
Upstream N_2O[7]	-	-	0.00	4.70E-03	2.35E-04	2.77E-02

1. PM Emissions factors are based on manufacturer gaurantee. Tier 4 emission factors for balance of the pollutants are from Table 1 of 40 CFR Part 1039 Subpart B - Emission Standards and Related Requirements.
2. $PM_{2.5}$ and PM_{10} emission factors conservatively assumed to be equal to that of PM (total).
3. AP-42 Section 3.4 SO_2 emission factor based on ULSD which contains 15 ppm sulfur content.
4. CO_2, N_2O and CH_4 emission factors based on 40 CFR Part 98 Table C-1 and C-2 Default diesel emissions factors.
5. 20-yr Global warming potentials per 6 NYCRR Part 496.
6. 100-yr Global warming potentials per 40 CFR Part 98, Table A-1 (*Global Warming Potentials*).
7. Upstream GHG emission factors per Appendix of 2024 NYS Statewide GHG Emissions Report:

CO_2e:	23,540	g/MMBtu
CO_2:	13,634	g/MMBtu
CH_4:	117	g/MMBtu
N_2O:	0.25	g/MMBtu

Table 17-3. Diesel Emergency Generators HAP Potential to Emit

Pollutant	HAP?	Emission Factor[1]	Potential to Emit	
		(lb/MMBtu)	(lb/hr)	(tpy)
Benzene	Yes	7.76E-04	0.78	0.04
Toluene	Yes	2.81E-04	0.28	0.01
Xylenes	Yes	1.93E-04	0.19	0.01
Formaldehyde	Yes	7.89E-05	0.08	3.97E-03
Acetaldehyde	Yes	2.52E-05	0.03	1.27E-03
Acrolein	Yes	7.88E-06	0.01	3.97E-04
Total PAH	Yes	2.12E-04	0.21	0.01
		Total HAP PTE	**1.58**	**0.08**

1. Emissions are calculated based on emission factors for diesel engines per AP-42 Section 3.4, Table 3.4-3 and 3.4-4.

2. Emergency generators covered by NSPS Subpart IIII.

Conversions

1 lb =	453.59	g
1 year (Emergency Operation) =	500	hr
Energy Conversion Factor:	392.75	bhp-hr/MMBtu (mechanical) in AP-42 Appendix A
15 ppm S =	0.0015	wt% S
Hoursepower (mechanical) =	0.74558	Kilowatts
Diesel Usage Conversion Factor:	0.138	MMBtu/gal

Micron - Clay, NY Fabs 1 & 2
1-HPMCU and 2-HPMCU
Cooling Tower Particulate Matter Emissions

Table 20-1. Percent of PM Emissions Based on Drift

Drift[1]	PM_{10}[1]	$PM_{2.5}$[1]
0.01%	18.7%	0.68%
0.002%	**64.7%**	**0.45%**
0.005%	47.5%	0.54%
0.0005%	**76.4%**	**0.26%**
0.0003%	77.6%	0.24%

1. Bold values were interpolated from calculated data.

Table 20-2. Cooling Tower Inventory and Specifications

Description	Equipment Count	Drift Loss[1]	Flow Rate[2]	Total Annual Flow Rate	
		(%)	(gpm)	(gal/yr)	(lb/yr)
CUB Cooling Tower - Process CT1 and CT2	210	0.0005%	5,300	5.85E+11	4.88E+12
Gas Yard Cooling Tower - Process CT1 and CT2	12	0.0005%	5,330	3.36E+10	2.80E+11
		Total	10,630	6.19E+11	5.16E+12

1. The drift loss is based on BACT determinations.
2. Flow rate for each new cooling tower is based on manufacturer's specifications.

Table 20-3. Cooling Tower Speciated Particulate Matter Speciated Potential to Emit

Additive Mixture	CAS #	Chemical Name	Density	Annual Usage of Mixture	Weight Percent in Mixture	Concentration in Cooling Water	Total PM Emissions[2]
			(lb/gal)	lb/yr	(%)	(ppmw)	tpy
Sodium Hypochlorite, 12%	7681-52-9	Sodium hypochlorite	9.76	204,133	12.5	0.49	6.38E-03
	1310-73-2	Sodium hydroxide	9.76	204,133	5.0	0.20	2.55E-03
Sulfuric Acid, 70%	7664-93-9	Sulfuric acid	15.35	1,600,853	100	31.03	4.00E-01
Biocide (NALCO 77352NA)	10377-60-3	Magnesium Nitrate	8.50	298,520	5.0	2.89E-01	3.73E-03
	2682-20-4	2-Methyl-4-Isothiazolin-3-one	8.50	298,520	1.0	5.79E-02	7.46E-04
	26172-55-4	5-Chloro-2-Methyl-4-Isothiazolin-3-one	8.50	298,520	5.0	0.29	3.73E-03
Corrosion Inhibitor	37971-36-1	2-Phosphonobutane-1,2,4-tricarboxylic acid	9.76	670,556	10.00	1.30	1.68E-02
	29329-71-3	Phosphonic acid, (1-hydroxyethylidene)bis-, sodium salt	9.76	670,556	5.00	0.65	8.38E-03
Antiscalant and Biocide (NALCO Trasar Trac101)	7632-00-0	Sodium nitrite	10.76	44,756	30.0	0.26	3.36E-03
	7631-95-0	Sodium molybdate	10.76	44,756	5.0	0.04	5.59E-04
	Proprietary[1]	Substiituted triazole	-	-	1.0	-	-

1. CAS not listed on manufacturer SDS.
2. Total PM emissions as a result of each additive are estimated by multiplying the ratio of the additive concentration to the total TDS concentration by the total estimated TDS emissions.
3. TDS is speciated to the extent possible based on known additives. Constituents present in municipal water resulting in TDS emissions are unknown.

Table 20-4. Cooling Tower Particulate Matter Potential to Emit

Pollutant	Emissions (Per Unit)				Total Emissions
	CUB Cooling Tower		Gas Yard Cooling Tower		
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(tpy)
TDS[1]	0.02	0.07	0.02	0.07	15.48
PM_{10}[2]	0.01	0.05	0.01	0.05	11.82
$PM_{2.5}$[2]	4.07E-05	1.78E-04	4.09E-05	1.79E-04	0.04

1. Estimated Solids in Cooling Water, TDS = 1200 ppm

Water Density = 8.34 lb/gal

2. The percentage of PM_{10} and $PM_{2.5}$ emissions of TDS is based on cooling tower data compiled by Environmental Canada: https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/report/sector-specific-tools-calculate-emissions/wet-cooling-tower-particulate-guide.html

Conversions

1 year = 8,760 hours

Micron - Clay, NY Fabs 1 & 2
Greenhouse Gas Global Warming Potentials

Table 25-1: Greenhouse Gas Global Warming Potentials

CAS	GHG Name	HFC/PFC Number	Molecular Formula	GWP (20-yr)	GWP (100-yr)
124-38-9	Carbon dioxide	--	CO2	1	1
74-82-8	Methane	--	CH4	84	28
10024-97-2	Nitrous oxide	--	N2O	264	265
75-10-5	Difluoromethane	HFC-32	CH2F2	2,430	677
593-53-3	Fluoromethane	HFC-41	CH3F	427	116
75-73-0	Tetrafluoromethane	PFC-14	CF4	4,880	6,630
76-16-4	Hexafluoroethane	PFC-116	C2F6	8,210	11,100
75-46-7	Trifluoromethane	HFC-23	CHF3	10,800	12,400
115-25-3	Octafluorocyclobutane	PFC-318	C4F8	7,110	9,540
685-63-2	Hexafluorobutadiene	--	C4F6	1	1
7783-54-2	Nitrogen trifluoride	--	NF3	12,800	16,100
2551-62-4	Sulfur hexafluoride	--	SF6	17,500	23,500

[redacted]

Table 25-2: 2024 Upstream Natural Gas CO2e Emission Factors

GHG	g/MMBtu	lb/MMBtu
CO2e	40,877	90.12
CO2	12,549	27.67
CH4	337	0.74
N2O	0.14	0.00

1. Per Appendix of 2024 NYS Statewide GHG Emissions Report

Table 25-3: 2024 Upstream Diesel CO2e Emission Factors

GHG	g/MMBtu	lb/MMBtu
CO2e	23,540	51.90
CO2	13,634	30.06
CH4	117	0.26
N2O	0.25	0.00

1. Per Appendix of 2024 NYS Statewide GHG Emissions Report

Micron - Clay, NY Fabs 1 & 2
1-FUGEM and 2-FUGEM
Roadway Emission Calculations

Table 26-1: Roadway Emission Calculations

Material Hauled	Estimated Round Trip Distance Traveled	Silt Loading[1]	Estimated Truck Weight When Empty	Material Phase	Specific Gravity[2]	Liquid Density[3]	Estimated Load Weight	Truck Weight Loaded	Avg. Empty & Loaded Weight	Material Throughput		Pickup / Delivery Trips	Total Mileage	TSP EF[4,5,6]	PM_{10} EF[4,5,6]	$PM_{2.5}$ EF[4,5,6]	TSP Emissions	PM_{10} Emissions	$PM_{2.5}$ Emissions
	(mi)	(g/m^2)	(Tons)			(g/cm^3)	(Tons)	(Tons)	(Tons)	(Tons/yr)	(gal/yr)	(#/yr)	(Mi/yr)	lb/VMT	lb/VMT	lb/VMT	(Ton/yr)	(Ton/yr)	(Ton/yr)
Solid Chemicals to WWT																			
Lime (Calcium hydroxide) to WWT1	0.5	1.5	20	Solid			5	25	22.5	6250		1250	606	0.34	0.07	0.02	0.10	0.02	5.01E-03
Lime (Calcium hydroxide) to WWT2	1.7	1.5	20	Solid			5	25	22.5	6250		1250	2069	0.34	0.07	0.02	0.35	0.07	0.02
Process Bulk Chemicals to HPM1 North																			
Hydrogen Peroxide 31%	1.5	1.5	20	Liquid		1.13	23.63	43.63	31.81		2,275,593	455	689.6	0.48	0.10	0.02	0.17	0.03	8.11E-03
Sulfuric Acid 96%	1.5	1.5	20	Liquid		1.84	38.29	58.29	39.15		1,326,958	265.4	402.1	0.59	0.12	0.03	0.12	0.02	5.84E-03
Hydrofluoric Acid 49%	1.5	1.5	20	Liquid		1.20	24.99	44.99	32.50		727,263	145.5	220.4	0.49	0.10	0.02	0.05	0.01	2.65E-03
Hydrofluoric Acid 100:1	1.5	1.5	20	Liquid		1.02	21.28	41.28	30.64		2,190,000	438.0	663.6	0.46	0.09	0.02	0.15	0.03	7.51E-03
Aqueous Ammonia 29%	1.5	1.5	20	Liquid		0.89	18.61	38.61	29.30		385,805	77.2	116.9	0.44	0.09	0.02	0.03	5.15E-03	1.26E-03
Tetramethyl Ammonium Hydroxide (TMAH) 25%	1.5	1.5	20	Liquid		1.02	21.20	41.20	30.60		291,453	58.3	88.3	0.46	0.09	0.02	0.02	4.07E-03	9.98E-04
Diluted Tetramethyl Ammonium Hydroxide with Surfactant (2.38%)	1.5	1.5	20	Liquid		1.02	21.20	41.20	30.60		27,558	5.5	8.4	0.46	0.09	0.02	1.92E-03	3.85E-04	9.44E-05
[redacted]	1.5	1.5	20	Liquid		1.02	21.20	41.20	30.60		1,045,725	209.1	316.9	0.46	0.09	0.02	0.07	0.01	3.58E-03
Isopropyl Alcohol	1.5	1.5	20	Liquid	0.79		16.46	36.46	28.23		1,682,468	336.5	509.8	0.42	0.08	0.02	0.11	0.02	5.31E-03
Propylene Glycol Methyl Ether Acetate	1.5	1.5	20	Liquid		0.97	20.24	40.24	30.12		375,950	75.2	113.9	0.45	0.09	0.02	0.03	5.16E-03	1.27E-03
Industrial Grade Sulfuric Acid 93%	1.5	1.5	20	Liquid		1.84	38.29	58.29	39.15		964	1.0	1.5	0.59	0.12	0.03	4.49E-04	8.97E-05	2.20E-05
NaOH 50%	1.5	1.5	20	Liquid		1.52	31.71	51.71	35.85		2,602,370	520.5	788.6	0.54	0.11	0.03	0.21	0.04	0.01
Argon	1.5	1.5	23.5	Gas	1.38		5.28	28.78	26.14	1216		230.5	349.2	0.39	0.08	0.02	0.07	0.01	3.36E-03
Hydrogen chloride	1.5	1.5	23.5	Gas	1.27		4.85	28.35	25.93	4.5		0.9	1.4	0.39	0.08	0.02	2.72E-04	5.43E-05	1.33E-05
Ammonia	1.5	1.5	23.5	Gas	0.60		2.28	25.78	24.64	55.7		24.4	36.9	0.37	0.07	0.02	6.82E-03	1.36E-03	3.35E-04
Carbon dioxide	1.5	1.5	23.5	Gas	1.53		5.85	29.35	26.43	505		86.3	130.7	0.40	0.08	0.02	0.03	5.18E-03	1.27E-03
Nitrogen trifluoride	1.5	1.5	23.5	Gas	2.46		9.41	32.91	28.20	141		15.0	22.8	0.42	0.08	0.02	4.82E-03	9.65E-04	2.37E-04
Nitrous oxide	1.5	1.5	23.5	Gas	1.53		5.85	29.35	26.43	197		33.6	50.9	0.40	0.08	0.02	0.01	2.02E-03	4.96E-04
Tetrafluoromethane	1.5	1.5	23.5	Gas	3.04		11.63	35.13	29.31	49.0		4.2	6.4	0.44	0.09	0.02	1.41E-03	2.81E-04	6.90E-05
Hydrogen	1.5	1.5	23.5	Gas	0.07		0.27	23.77	23.63	35.5		133.6	202.5	0.35	0.07	0.02	0.04	7.17E-03	1.76E-03
Helium	1.5	1.5	23.5	Gas	0.14		0.52	24.02	23.76	35.3		67.5	102.3	0.36	0.07	0.02	0.02	3.64E-03	8.94E-04
Silane	1.5	1.5	23.5	Gas	1.11		4.25	27.75	25.62	11.5		2.7	4.1	0.38	0.08	0.02	7.92E-04	1.58E-04	3.89E-05
Chlorine	1.5	1.5	23.5	Gas	2.49		9.52	33.02	28.26	9.9		1.0	1.6	0.42	0.08	0.02	3.34E-04	6.67E-05	1.64E-05
Process Bulk Chemicals to HPM1 South																			
Hydrogen Peroxide 31%	0.9	1.5	20	Liquid		1.13	23.63	43.63	31.81		2,275,593	455.1	415.5	0.48	0.10	0.02	0.10	0.02	4.89E-03
Sulfuric Acid 96%	0.9	1.5	20	Liquid		1.84	38.29	58.29	39.15		1,326,958	265.4	242.3	0.59	0.12	0.03	0.07	0.01	3.52E-03
Hydrofluoric Acid 49%	0.9	1.5	20	Liquid		1.20	24.99	44.99	32.50		727,263	145.5	132.8	0.49	0.10	0.02	0.03	6.50E-03	1.60E-03
Hydrofluoric Acid 100:1	0.9	1.5	20	Liquid		1.02	21.28	41.28	30.64		2,190,000	438.0	399.8	0.46	0.09	0.02	0.09	0.02	4.53E-03
Aqueous Ammonia 29%	0.9	1.5	20	Liquid		0.89	18.61	38.61	29.30		385,805	77.2	70.4	0.44	0.09	0.02	0.02	3.10E-03	7.62E-04
Tetramethyl Ammonium Hydroxide (TMAH) 25%	0.9	1.5	20	Liquid		1.02	21.20	41.20	30.60		291,453	58.3	53.2	0.46	0.09	0.02	0.01	2.45E-03	6.02E-04
Diluted Tetramethyl Ammonium Hydroxide with Surfactant (2.38%)	0.9	1.5	20	Liquid		1.02	21.20	41.20	30.60		27,558	5.5	5.0	0.46	0.09	0.02	1.16E-03	2.32E-04	5.69E-05
[redacted]	0.9	1.5	20	Liquid		1.02	21.20	41.20	30.60		1,045,725	209.1	190.9	0.46	0.09	0.02	0.04	8.79E-03	2.16E-03
Isopropyl Alcohol	0.9	1.5	20	Liquid	0.79		16.46	36.46	28.23		1,682,468	336.5	307.2	0.42	0.08	0.02	0.07	0.01	3.20E-03
Propylene Glycol Methyl Ether Acetate	0.9	1.5	20	Liquid		0.97	20.24	40.24	30.12		375,950	75.2	68.6	0.45	0.09	0.02	0.02	3.11E-03	7.64E-04
Industrial Grade Sulfuric Acid 93%	0.9	1.5	20	Liquid		1.84	38.29	58.29	39.15		964	1.0	0.9	0.59	0.12	0.03	2.70E-04	5.41E-05	1.33E-05
NaOH 50%	0.9	1.5	20	Liquid		1.52	31.71	51.71	35.85		2,602,370	520.5	475.1	0.54	0.11	0.03	0.13	0.03	6.31E-03
Argon	0.9	1.5	23.5	Gas	1.38		5.28	28.78	26.14	1216		230.5	210.4	0.39	0.08	0.02	0.04	8.25E-03	2.03E-03
Hydrogen chloride	0.9	1.5	23.5	Gas	1.27		4.85	28.35	25.93	4		0.9	0.8	0.39	0.08	0.02	1.64E-04	3.27E-05	8.03E-06
Ammonia	0.9	1.5	23.5	Gas	0.60		2.28	25.78	24.64	56		24.4	22.3	0.37	0.07	0.02	4.11E-03	8.22E-04	2.02E-04
Carbon dioxide	0.9	1.5	23.5	Gas	1.53		5.85	29.35	26.43	505		86.3	78.8	0.40	0.08	0.02	0.02	3.12E-03	7.67E-04
Nitrogen trifluoride	0.9	1.5	23.5	Gas	2.46		9.41	32.91	28.20	141		15.0	13.7	0.42	0.08	0.02	2.91E-03	5.81E-04	1.43E-04
Nitrous oxide	0.9	1.5	23.5	Gas	1.53		5.85	29.35	26.43	197		33.6	30.7	0.40	0.08	0.02	6.08E-03	1.22E-03	2.99E-04
Tetrafluoromethane	0.9	1.5	23.5	Gas	3.04		11.63	35.13	29.31	49.0		4.2	3.8	0.44	0.09	0.02	8.47E-04	1.69E-04	4.16E-05
Hydrogen	0.9	1.5	23.5	Gas	0.07		0.27	23.77	23.63	35.5		133.6	122.0	0.35	0.07	0.02	0.02	4.32E-03	1.06E-03
Helium	0.9	1.5	23.5	Gas	0.14		0.52	24.02	23.76	35.3		67.5	61.6	0.36	0.07	0.02	0.01	2.19E-03	5.38E-04
Silane	0.9	1.5	23.5	Gas	1.11		4.25	27.75	25.62	11.5		2.7	2.5	0.38	0.08	0.02	4.77E-04	9.54E-05	2.34E-05
Chlorine	0.9	1.5	23.5	Gas	2.49		9.52	33.02	28.26	9.9		1.0	0.9	0.42	0.08	0.02	2.01E-04	4.02E-05	9.87E-06

Table 26-1: Roadway Emission Calculations

Material Hauled	Estimated Round Trip Distance Traveled	Silt Loading[1]	Estimated Truck Weight When Empty	Material Phase	Specific Gravity[2]	Liquid Density[3]	Estimated Load Weight	Truck Weight Loaded	Avg. Empty & Loaded Weight	Material Throughput		Pickup / Delivery Trips	Total Mileage	TSP EF[4,5,6]	PM_{10} EF[4,5,6]	$PM_{2.5}$ EF[4,5,6]	TSP Emissions	PM_{10} Emissions	$PM_{2.5}$ Emissions
	(mi)	(g/m^2)	(Tons)			(g/cm^3)	(Tons)	(Tons)	(Tons)	(Tons/yr)	(gal/yr)	(#/yr)	(Mi/yr)	lb/VMT	lb/VMT	lb/VMT	(Ton/yr)	(Ton/yr)	(Ton/yr)
Process Bulk Chemicals to HPM2 North																			
Hydrogen Peroxide 31%	1.6	1.5	20	Liquid		1.13	23.63	43.63	31.81		2,275,593	455.1	732.7	0.48	0.10	0.02	0.18	0.04	8.62E-03
Sulfuric Acid 96%	1.6	1.5	20	Liquid		1.84	38.29	58.29	39.15		1,326,958	265.4	427.2	0.59	0.12	0.03	0.13	0.03	6.21E-03
Hydrofluoric Acid 49%	1.6	1.5	20	Liquid		1.20	24.99	44.99	32.50		727,263	145.5	234.2	0.49	0.10	0.02	0.06	0.01	2.81E-03
Hydrofluoric Acid 100:1	1.6	1.5	20	Liquid		1.02	21.28	41.28	30.64		2,190,000	438.0	705.1	0.46	0.09	0.02	0.16	0.03	7.98E-03
Aqueous Ammonia 29%	1.6	1.5	20	Liquid		0.89	18.61	38.61	29.30		385,805	77.2	124.2	0.44	0.09	0.02	0.03	5.47E-03	1.34E-03
Tetramethyl Ammonium Hydroxide (TMAH) 25%	1.6	1.5	20	Liquid		1.02	21.20	41.20	30.60		291,453	58.3	93.8	0.46	0.09	0.02	0.02	4.32E-03	1.06E-03
Diluted Tetramethyl Ammonium Hydroxide with Surfactant (2.38%)	1.6	1.5	20	Liquid		1.02	21.20	41.20	30.60		27,558	5.5	8.9	0.46	0.09	0.02	2.04E-03	4.09E-04	1.00E-04
[redacted]	1.6	1.5	20	Liquid		1.02	21.20	41.20	30.60		1,045,725	209.1	336.7	0.46	0.09	0.02	0.08	0.02	3.81E-03
Isopropyl Alcohol	1.6	1.5	20	Liquid	0.79		16.46	36.46	28.23		1,682,468	336.5	541.7	0.42	0.08	0.02	0.11	0.02	5.64E-03
Propylene Glycol Methyl Ether Acetate	1.6	1.5	20	Liquid		0.97	20.24	40.24	30.12		375,950	75.2	121.0	0.45	0.09	0.02	0.03	5.49E-03	1.35E-03
Industrial Grade Sulfuric Acid 93%	1.6	1.5	20	Liquid		1.84	38.29	58.29	39.15		964	1.0	1.6	0.59	0.12	0.03	4.77E-04	9.53E-05	2.34E-05
NaOH 50%	1.6	1.5	20	Liquid		1.52	31.71	51.71	35.85		2,602,370	520.5	837.9	0.54	0.11	0.03	0.23	0.05	0.01
Argon	1.6	1.5	23.5	Gas	1.38		5.28	28.78	26.14	1216		230.5	366.6	0.39	0.08	0.02	0.07	0.01	3.53E-03
Hydrogen chloride	1.6	1.5	23.5	Gas	1.27		4.85	28.35	25.93	4		0.9	1.5	0.39	0.08	0.02	2.85E-04	5.70E-05	1.40E-05
Ammonia	1.6	1.5	23.5	Gas	0.60		2.28	25.78	24.64	56		24.4	38.8	0.37	0.07	0.02	7.16E-03	1.43E-03	3.52E-04
Carbon dioxide	1.6	1.5	23.5	Gas	1.53		5.85	29.35	26.43	505		86.3	137.2	0.40	0.08	0.02	0.03	5.44E-03	1.34E-03
Nitrogen trifluoride	1.6	1.5	23.5	Gas	2.46		9.41	32.91	28.20	141		15.0	23.9	0.42	0.08	0.02	5.06E-03	1.01E-03	2.49E-04
Nitrous oxide	1.6	1.5	23.5	Gas	1.53		5.85	29.35	26.43	197		33.6	53.5	0.40	0.08	0.02	0.01	2.12E-03	5.20E-04
Tetrafluoromethane	1.6	1.5	23.5	Gas	3.04		11.63	35.13	29.31	49		4.2	6.7	0.44	0.09	0.02	1.48E-03	2.95E-04	7.25E-05
Hydrogen	1.6	1.5	23.5	Gas	0.07		0.27	23.77	23.63	36		133.6	212.6	0.35	0.07	0.02	0.04	7.52E-03	1.85E-03
Helium	1.6	1.5	23.5	Gas	0.14		0.52	24.02	23.76	35		67.5	107.4	0.36	0.07	0.02	0.02	3.82E-03	9.38E-04
Silane	1.6	1.5	23.5	Gas	1.11		4.25	27.75	25.62	12		2.7	4.3	0.38	0.08	0.02	8.31E-04	1.66E-04	4.08E-05
Chlorine	1.6	1.5	23.5	Gas	2.49		9.52	33.02	28.26	10		1.0	1.6	0.42	0.08	0.02	3.50E-04	7.01E-05	1.72E-05
Process Bulk Chemicals to HPM2 South																			
Hydrogen Peroxide 31%	1.0	1.5	20	Liquid		1.13	23.63	43.63	31.81		2,275,593	455.1	458.6	0.48	0.10	0.02	0.11	0.02	5.39E-03
Sulfuric Acid 96%	1.0	1.5	20	Liquid		1.84	38.29	58.29	39.15		1,326,958	265.4	267.4	0.59	0.12	0.03	0.08	0.02	3.89E-03
Hydrofluoric Acid 49%	1.0	1.5	20	Liquid		1.20	24.99	44.99	32.50		727,263	145.5	146.6	0.49	0.10	0.02	0.04	7.18E-03	1.76E-03
Hydrofluoric Acid 100:1	1.0	1.5	20	Liquid		1.02	21.28	41.28	30.64		2,190,000	438.0	441.3	0.46	0.09	0.02	0.10	0.02	5.00E-03
Aqueous Ammonia 29%	1.0	1.5	20	Liquid		0.89	18.61	38.61	29.30		385,805	77.2	77.7	0.44	0.09	0.02	0.02	3.43E-03	8.41E-04
Tetramethyl Ammonium Hydroxide (TMAH) 25%	1.0	1.5	20	Liquid		1.02	21.20	41.20	30.60		291,453	58.3	58.7	0.46	0.09	0.02	0.01	2.70E-03	6.64E-04
	1.0	1.5	20	Liquid		1.02	21.20	41.20	30.60		27,558	5.5	5.6	0.46	0.09	0.02	1.28E-03	2.56E-04	6.28E-05
[redacted]	1.0	1.5	20	Liquid		1.02	21.20	41.20	30.60		1,045,725	209.1	210.7	0.46	0.09	0.02	0.05	9.71E-03	2.38E-03
Isopropyl Alcohol	1.0	1.5	20	Liquid	0.79		16.46	36.46	28.23		1,682,468	336.5	339.0	0.42	0.08	0.02	0.07	0.01	3.53E-03
Propylene Glycol Methyl Ether Acetate	1.0	1.5	20	Liquid		0.97	20.24	40.24	30.12		375,950	75.2	75.8	0.45	0.09	0.02	0.02	3.43E-03	8.43E-04
Industrial Grade Sulfuric Acid 93%	1.0	1.5	20	Liquid		1.84	38.29	58.29	39.15		964	1.0	1.0	0.59	0.12	0.03	2.98E-04	5.97E-05	1.46E-05
NaOH 50%	1.0	1.5	20	Liquid		1.52	31.71	51.71	35.85		2,602,370	520.5	524.4	0.54	0.11	0.03	0.14	0.03	6.97E-03
Argon	1.0	1.5	23.5	Gas	1.38		5.28	28.78	26.14	1216		230.5	232.2	0.39	0.08	0.02	0.05	9.11E-03	2.24E-03
Hydrogen chloride	1.0	1.5	23.5	Gas	1.27		4.85	28.35	25.93	4		0.9	0.9	0.39	0.08	0.02	1.81E-04	3.61E-05	8.86E-06
Ammonia	1.0	1.5	23.5	Gas	0.60		2.28	25.78	24.64	56		24.4	24.6	0.37	0.07	0.02	4.54E-03	9.07E-04	2.23E-04
Carbon dioxide	1.0	1.5	23.5	Gas	1.53		5.85	29.35	26.43	505		86.3	86.9	0.40	0.08	0.02	0.02	3.45E-03	8.46E-04
Nitrogen trifluoride	1.0	1.5	23.5	Gas	2.46		9.41	32.91	28.20	141		15.0	15.1	0.42	0.08	0.02	3.21E-03	6.41E-04	1.57E-04
Nitrous oxide	1.0	1.5	23.5	Gas	1.53		5.85	29.35	26.43	197		33.6	33.9	0.40	0.08	0.02	6.71E-03	1.34E-03	3.30E-04
Tetrafluoromethane	1.0	1.5	23.5	Gas	3.04		11.63	35.13	29.31	49.0		4.2	4.2	0.44	0.09	0.02	9.35E-04	1.87E-04	4.59E-05
Hydrogen	1.0	1.5	23.5	Gas	0.07		0.27	23.77	23.63	35.5		133.6	134.7	0.35	0.07	0.02	0.02	4.77E-03	1.17E-03
Helium	1.0	1.5	23.5	Gas	0.14		0.52	24.02	23.76	35.3		67.5	68.0	0.36	0.07	0.02	0.01	2.42E-03	5.94E-04
Silane	1.0	1.5	23.5	Gas	1.11		4.25	27.75	25.62	11.5		2.7	2.7	0.38	0.08	0.02	5.26E-04	1.05E-04	2.58E-05
Chlorine	1.0	1.5	23.5	Gas	2.49		9.52	33.02	28.26	9.9		1.0	1.0	0.42	0.08	0.02	2.22E-04	4.44E-05	1.09E-05
Industrial Bulk Chemicals to WWT1																			
Industrial Grade Sulfuric Acid 96%	0.5	1.5	20	Liquid		1.87	39.07	59.07	39.54		2,826,940	565.4	274.1	0.60	0.12	0.03	0.08	0.02	4.02E-03
Ferric Chloride	0.5	1.5	20	Liquid		1.49	31.12	51.12	35.56		328,500	65.7	31.9	0.54	0.11	0.03	8.55E-03	1.71E-03	4.20E-04
Industrial Grade Sodium Hydroxide 50%	0.5	1.5	20	Liquid		1.53	31.82	51.82	35.91		208,050	41.6	20.2	0.54	0.11	0.03	5.47E-03	1.09E-03	2.69E-04
Hydrochloric Acid, 36%	0.5	1.5	20	Liquid		1.16	24.18	44.18	32.09		412,450	82.5	40.0	0.48	0.10	0.02	9.67E-03	1.93E-03	4.75E-04
Sodium Hypochlorite, 12%	0.5	1.5	20	Liquid		1.21	25.24	45.24	32.62		250,025	50.0	24.2	0.49	0.10	0.02	5.96E-03	1.19E-03	2.93E-04
Sodium Bisulfite	0.5	1.5	20	Liquid		1.48	30.87	50.87	35.44		18,250	3.7	1.8	0.53	0.11	0.03	4.73E-04	9.47E-05	2.32E-05
Calcium Chloride 35%	0.5	1.5	20	Liquid		1.34	27.90	47.90	33.95		3,473,470	694.7	347.3	0.51	0.10	0.03	0.09	0.02	4.37E-03
Aluminium Sulfate, 8%	0.5	1.5	20	Liquid		1.34	27.90	47.90	33.95		230,680	46.1	22.4	0.51	0.10	0.03	5.73E-03	1.15E-03	2.81E-04
Catalase	0.5	1.5	20	Liquid	1.25		26.08	46.08	33.04		87,600	17.5	8.8	0.50	0.10	0.02	2.18E-03	4.36E-04	1.07E-04
Aluminium Chlorohydrate, 23%	0.5	1.5	20	Liquid		1.35	28.16	48.16	34.08		211,475	42.3	20.5	0.51	0.10	0.03	5.27E-03	1.05E-03	2.59E-04
Waste Materials from HPM1(N)/WWT1																			
Waste Sulfuric Acid (W-H2SO4), up to 98%	1.5	1.5	20	Liquid	1.84		38.31	58.31	39.15		2,025,750	405.2	613.9	0.59	0.12	0.03	0.18	0.04	8.92E-03
Waste Phosphoric Acid (W-H3PO4), up to 85%	0.5	1.5	20	Liquid		1.83	38.26	58.26	39.13		259,150	51.8	25.1	0.59	0.12	0.03	7.44E-03	1.49E-03	3.65E-04
Waste Concentrated HF (W-CHF), up to 49%	0.5	1.5	20	Liquid	1.20		24.99	44.99	32.50		1,719,150	343.8	166.7	0.49	0.10	0.02	0.04	8.16E-03	2.00E-03
Waste Nitric Acid (W-HNO3), up to 30%	0.5	1.5	20	Liquid		1.50	31.29	51.29	35.65		273,750	54.8	26.5	0.54	0.11	0.03	7.14E-03	1.43E-03	3.51E-04
Waste Copper Sulfate (W-CuSO4), up to 15%	0.5	1.5	20	Liquid		1.02	21.28	41.28	30.64		32,850	6.6	3.2	0.46	0.09	0.02	7.35E-04	1.47E-04	3.61E-05
Waste Dilute Sulfuric Peroxide (W-DSP), 9% H2SO4	0.5	1.5	20	Liquid	1.06		22.10	42.10	31.05		164,250	32.9	15.9	0.47	0.09	0.02	3.72E-03	7.45E-04	1.83E-04
Waste Concentrated IPA (W-IPA)	0.8	1.5	20	Liquid	0.79		16.46	36.46	28.23		2,390,750	478.2	366.9	0.42	0.08	0.02	0.08	0.02	3.82E-03
Waste Photo Solvent 1 (W-PS1) - Photoresist / PGMEA	0.8	1.5	20	Liquid		0.97	20.24	40.24	30.12		1,726,450	345.3	265.0	0.45	0.09	0.02	0.06	0.01	2.95E-03
Waste Photo Solvent 2 (W-PS2) - Photoresist	0.8	1.5	20	Liquid		0.97	20.24	40.24	30.12		138,700	27.7	21.3	0.45	0.09	0.02	4.82E-03	9.65E-04	2.37E-04
Industrial Bulk Chemicals to WWT2																			
Industrial Grade Sulfuric Acid 96%	1.7	1.5	20	Liquid		1.87	39.07	59.07	39.54		2,826,940	565.4	935.9	0.60	0.12	0.03	0.28	0.06	0.01
Ferric Chloride	1.7	1.5	20	Liquid		1.49	31.12	51.12	35.56		328,500	65.7	108.8	0.54	0.11	0.03	0.03	5.84E-03	1.43E-03
Industrial Grade Sodium Hydroxide 50%	1.7	1.5	20	Liquid		1.53	31.82	51.82	35.91		208,050	41.6	68.9	0.54	0.11	0.03	0.02	3.73E-03	9.17E-04
Hydrochloric Acid, 36%	1.7	1.5	20	Liquid		1.16	24.18	44.18	32.09		412,450	82.5	136.5	0.48	0.10	0.02	0.03	6.60E-03	1.62E-03
Sodium Hypochlorite, 12%	1.7	1.5	20	Liquid		1.21	25.24	45.24	32.62		250,025	50.0	82.8	0.49	0.10	0.02	0.02	4.07E-03	9.99E-04
Sodium Bisulfite	1.7	1.5	20	Liquid		1.48	30.87	50.87	35.44		18,250	3.7	6.0	0.53	0.11	0.03	1.62E-03	3.23E-04	7.93E-05
Calcium Chloride 35%	1.7	1.5	20	Liquid		1.34	27.90	47.90	33.95		3,473,470	694.7	1149.9	0.51	0.10	0.03	0.29	0.06	0.01
Aluminium Sulfate, 8%	1.7	1.5	20	Liquid		1.34	27.90	47.90	33.95		230,680	46.1	76.4	0.51	0.10	0.03	0.02	3.91E-03	9.60E-04
Catalase	1.7	1.5	20	Liquid	1.25		26.08	46.08	33.04		87,600	17.5	29.0	0.50	0.10	0.02	7.22E-03	1.44E-03	3.55E-04
Aluminium Chlorohydrate, 23%	1.7	1.5	20	Liquid		1.35	28.16	48.16	34.08		211,475	42.3	70.0	0.51	0.10	0.03	0.02	3.60E-03	8.83E-04
Waste Materials from HPM2(N)/WWT2																			
Waste Sulfuric Acid (W-H2SO4), up to 98%	1.6	1.5	20	Liquid	1.84		38.31	58.31	39.15		2,025,750	405.2	652.2	0.59	0.12	0.03	0.19	0.04	9.48E-03
Waste Phosphoric Acid (W-H3PO4), up to 85%	1.7	1.5	20	Liquid		1.83	38.26	58.26	39.13		259,150	51.8	85.8	0.59	0.12	0.03	0.03	5.08E-03	1.25E-03
Waste Concentrated HF (W-CHF), up to 49%	1.7	1.5	20	Liquid	1.20		24.99	44.99	32.50		1,719,150	343.8	569.1	0.49	0.10	0.02	0.14	0.03	6.84E-03
Waste Nitric Acid (W-HNO3), up to 30%	1.7	1.5	20	Liquid		1.50	31.29	51.29	35.65		273,750	54.8	90.6	0.54	0.11	0.03	0.02	4.88E-03	1.20E-03
Waste Copper Sulfate (W-CuSO4), up to 15%	1.7	1.5	20	Liquid		1.02	21.28	41.28	30.64		32,850	6.6	10.9	0.46	0.09	0.02	2.51E-03	5.02E-04	1.23E-04
Waste Dilute Sulfuric Peroxide (W-DSP), 9% H2SO4	1.7	1.5	20	Liquid	1.06		22.10	42.10	31.05		164,250	32.9	54.4	0.47	0.09	0.02	0.01	2.54E-03	6.24E-04
Waste Concentrated IPA (W-IPA)	1.2	1.5	20	Liquid	0.79		16.46	36.46	28.23		2,390,750	478.2	573.8	0.42	0.08	0.02	0.12	0.02	5.97E-03
Waste Photo Solvent 1 (W-PS1) - Photoresist / PGMEA	1.2	1.5	20	Liquid		0.97	20.24	40.24	30.12		1,726,450	345.3	414.3	0.45	0.09	0.02	0.09	0.02	4.61E-03
Waste Photo Solvent 2 (W-PS2) - Photoresist	1.2	1.5	20	Liquid		0.97	20.24	40.24	30.12		138,700	27.7	33.3	0.45	0.09	0.02	7.54E-03	1.51E-03	3.70E-04
Industrial Bulk Chemicals to BIO 1																			
Sodium Hydroxide, 50%	2.5	1.5	20	Liquid		1.53	31.82	51.82	35.91		505,385	101.1	256.9	0.54	0.11	0.03	0.07	0.01	3.42E-03
Sulfuric Acid, 70%	2.5	1.5	20	Liquid		1.61	33.59	53.59	36.79		7,721	1.5	3.9	0.56	0.11	0.03	1.09E-03	2.18E-04	5.35E-05
Sodium Bisulfite, 25%	2.5	1.5	20	Liquid		1.48	30.87	50.87	35.44		5,019	1.0	2.6	0.53	0.11	0.03	6.82E-04	1.36E-04	3.35E-05

Table 26-1: Roadway Emission Calculations

Material Hauled	Estimated Round Trip Distance Traveled	Silt Loading[1]	Estimated Truck Weight When Empty	Material Phase	Specific Gravity[2]	Liquid Density[3]	Estimated Load Weight	Truck Weight Loaded	Avg. Empty & Loaded Weight	Material Throughput		Pickup / Delivery Trips	Total Mileage	TSP $EF^{4,5,6}$	PM_{10} $EF^{4,5,6}$	$PM_{2.5}$ $EF^{4,5,6}$	TSP Emissions	PM_{10} Emissions	$PM_{2.5}$ Emissions
	(mi)	(g/m^2)	(Tons)			(g/cm^3)	(Tons)	(Tons)	(Tons)	(Tons/yr)	(gal/yr)	(#/yr)	(Mi/yr)	lb/VMT	lb/VMT	lb/VMT	(Ton/yr)	(Ton/yr)	(Ton/yr)
Phosphoric Acid, 85%	2.5	1.5	20	Liquid		1.87	39.01	59.01	39.51		36,500	7.3	18.6	0.60	0.12	0.03	5.54E-03	1.11E-03	2.72E-04
Citric Acid, 50%	2.5	1.5	20	Liquid		1.24	25.87	45.87	32.93		13,321	2.7	6.8	0.50	0.10	0.02	1.68E-03	3.36E-04	8.25E-05
Sodium Hypochlorite, 12%	2.5	1.5	20	Liquid		1.21	25.24	45.24	32.62		365,007	73.0	185.5	0.49	0.10	0.02	0.05	9.12E-03	2.24E-03
Industrial Bulk Chemicals to BIO 2																			
Sodium Hydroxide, 50%	2.5	1.5	20	Liquid		1.53	31.82	51.82	35.91		505,385	101.1	256.9	0.54	0.11	0.03	0.07	0.01	3.42E-03
Sulfuric Acid, 70%	2.5	1.5	20	Liquid		1.61	33.59	53.59	36.79		7,721	1.5	3.9	0.56	0.11	0.03	1.09E-03	2.18E-04	5.35E-05
Sodium Bisulfite, 25%	2.5	1.5	20	Liquid		1.48	30.87	50.87	35.44		5,019	1.0	2.6	0.53	0.11	0.03	6.82E-04	1.36E-04	3.35E-05
Phosphoric Acid, 85%	2.5	1.5	20	Liquid		1.87	39.01	59.01	39.51		36,500	7.3	18.6	0.60	0.12	0.03	5.54E-03	1.11E-03	2.72E-04
Citric Acid, 50%	2.5	1.5	20	Liquid		1.24	25.87	45.87	32.93		13,321	2.7	6.8	0.50	0.10	0.02	1.68E-03	3.36E-04	8.25E-05
Sodium Hypochlorite, 12%	2.5	1.5	20	Liquid		1.21	25.24	45.24	32.62		365,007	73.0	185.5	0.49	0.10	0.02	0.05	9.12E-03	2.24E-03
Industrial Bulk Chemicals to CUB 1																			
Sodium Hypochlorite, 12%	0.6	1.5	20	Liquid		1.21	25.24	45.24	32.62		10,460	2.1	1.2	0.49	0.10	0.02	2.92E-04	5.84E-05	1.43E-05
Sulfuric Acid, 70%	0.6	1.5	20	Liquid		1.61	33.59	53.59	36.79		52,160	10.4	5.9	0.56	0.11	0.03	1.65E-03	3.29E-04	8.09E-05
Biocide (NALCO 77352NA)	0.6	1.5	20	Liquid		1.02	21.28	41.28	30.64		17,560	3.5	2.0	0.46	0.09	0.02	4.60E-04	9.20E-05	2.26E-05
Corrosion Inhibitor	0.6	1.5	20	Liquid		1.11	23.07	43.07	31.54		34,360	6.9	3.9	0.47	0.09	0.02	9.27E-04	1.85E-04	4.55E-05
Antiscalant and Biocide (NALCO Trasar Trac101)	0.6	1.5	20	Liquid		1.29	26.91	46.91	33.46		2,080	0.4	0.2	0.50	0.10	0.02	5.96E-05	1.19E-05	2.93E-06
Industrial Bulk Chemicals to CUB 2																			
Sodium Hypochlorite, 12%	1.9	1.5	20	Liquid		1.21	25.24	45.24	32.62		10,460	2.1	3.9	0.49	0.10	0.02	9.65E-04	1.93E-04	4.74E-05
Sulfuric Acid, 70%	1.9	1.5	20	Liquid		1.61	33.59	53.59	36.79		52,160	10.4	19.6	0.56	0.11	0.03	5.44E-03	1.09E-03	2.67E-04
Biocide (NALCO 77352NA)	1.9	1.5	20	Liquid		1.02	21.28	41.28	30.64		17,560	3.5	6.6	0.46	0.09	0.02	1.52E-03	3.04E-04	7.46E-05
Corrosion Inhibitor	1.9	1.5	20	Liquid		1.11	23.07	43.07	31.54		34,360	6.9	12.9	0.47	0.09	0.02	3.06E-03	6.12E-04	1.50E-04
Antiscalant and Biocide (NALCO Trasar Trac101)	1.9	1.5	20	Liquid		1.29	26.91	46.91	33.46		2,080	0.4	0.8	0.50	0.10	0.02	1.97E-04	3.94E-05	9.66E-06
Diesel Storage																			
ULSD Storage Tank[8]	2.0	1.5	20	Liquid		0.85	17.73	37.73	28.87		729,270	145.9	291.7	0.43	0.09	0.02	0.06	0.01	3.11E-03
																Total (lb/yr)	**6.49**	**1.30**	**0.32**

1. Silt loading values are from AP-42 Table 13.2.1-2. It is conservatively assumed that roads will have average daily traffic (ADT) of less than 500 vehicles, and that half the year is winter. The winter and non-winter factors were averaged, resulting in an average silt loading factor of 1.5 g/m^3.
2. Specific gravity and liquid density values for most materials are from Perry's Chemical Engineers' Handbook, Seventh Edition, Table 2-1 through Table 2-117. Specific gravities for liquid materials are relative to the denstity of water at STP, and for gaseous materials are relative to the density of air at STP. Specific gravities for nitrogen trifluoride, tetrafluoromethane, and silane are from Pubchem (https://pubchem.ncbi.nlm.nih.gov/)
3. Liquid density not available in Perry's are from Pubchem (https://pubchem.ncbi.nlm.nih.gov/) or SigmaAldrich (https://www.sigmaaldrich.com). Poly aluminum chloride relative density is from a representative SDS (https://nowchemwatercare.com.au/wp-content/uploads/2019/06/Poly-Aluminium-Chloride-23-SDS-July-2016.pdf).
4. Emissions based on AP-42 Section 13.2.1 (01/11), Equation (2).

E = [k * (sL)^0.91 * (W)^1.02] * (1 - P/4N)

where

E = emission factor, lb/VMT
k = particle size multiplier
sL = road surface silt loading, g/m^2
W = average vehicle weight, tons
P = number of days with >= 0.01 in precipitation
N = number of days in the averaging period (365)

5. Particle Size Multiplier (k) values are from AP-42 Table 13.2.1-1.
6. Number of days with precipitation estimated from AP-42 Section 13.2.1 (01/11), Figure 13.2.1-2.
7. Transportation is modeled for all liquid chemistries.
8. The round trip distance travelled by diesel trucks for has been conservatively assumed to be 2 miles since the location of the tanks is uncertain.

Constants

Water Density =	8.345	lb/gal
Air Density =	0.0765	lb/ft^3 at STP
Liquid Delivery Tanker Volume =	5,000	gal
Gas Delivery Tanker Volume =	100,000	ft^3
1 gallon =	3,785	cm^3
1 mile =	5,280	ft
k (PM-30) =	0.011	lb/VMT
k (PM-10) =	0.0022	lb/VMT
k (PM-2.5) =	0.00054	lb/VMT
P =	170	days

Micron - Clay, NY Fabs 1 & 2
1-FUGEM and 2-FUGEM
Sulfur Hexafluoride (SF_6) Emissions from Circuit Breakers and other Gas Insulated Equipment

Table 28-1: Sulfur Hexafluoride (SF6) Leak Emissions

Pollutant	Total Usage in Ion Implant Tools (lb/yr)	Total Usage in Circuit Breakers, etc. (lb/yr)	Estimated Max Annual SF_6 Circuit Breaker Leak Rate (%/yr)	Potential Leak Emissions	
				(lb/yr)	(tpy)
SF_6	600	80,196	0.5%	1,001	0.50
CO_2e - 20-yr[2]	-	-	-	17,517,132	8,759
CO_2e - 100-yr[3]	-	-	-	23,523,006	11,762

1. Leak rates based on manufacturer guarantee.
2. 20-yr global warming potentials per 6 NYCRR Part 496.
3. 100-yr global warming potential per IPCC AR5.

Micron - Clay, NY Fabs 1 & 2
1-HPMCU and 2-HPMCU
Spin On Dielectric (SOD) Waste Treatment Emissions

Table 30-1: SOD Waste and Processing Chemical Usage

Mixture	SOD Waste Generated (lb/yr)
SOD Waste	24,714
Rinse Solvent	273,307
Reactant	16,009
Total SOD Waste	314,030

Table 30-2: Individual Chemical Emissions

Mixture	Primary Chemical					Emission Chemical			Process Emission Factor	Emission Chemical Classifications									Pre-Control Emissions	RCTO DRE	Annual Emissions from Lab (lb/yr)
	CAS #	Chemical Name	Molecular Formula	Weight % of Mixture[1]	Usage (lb/yr)	CAS #	Emission Chemical	Molecular Formula	(lb emitted / lb used)	VOC	PM	NO_X	CO	SO_2	HAP	GHG	HTAC	Fluorides	(lb/yr)		
SOD Waste	90387-00-1	Polysilazane	Varies	4%	903	90387-00-1	Polysilazane	Varies	0	X									0	0%	0
SOD Waste	90387-00-1	Polysilazane	Varies	4%	903	7803-62-5	Silane	SiH4	0										0	100%	0
SOD Waste	90387-00-1	Polysilazane	Varies	4%	903	7631-86-9	Silicon dioxide	SiO2	2.15		X								1,939	0%	1,939
SOD Waste	90387-00-1	Polysilazane	Varies	4%	903	7664-41-7	Ammonia	NH3	1.22										1,099	90%	110
SOD Waste	90387-00-1	Polysilazane	Varies	4%	903	10102-44-0	Nitrogen dioxide	NO2	3.29			X							2,969	0%	2,969
SOD Waste	142-96-1	Dibutyl Ether	$C_8H_{18}O$	98%	24,263	142-96-1	Dibutyl Ether	C8H18O	0.2	X									4,853	90%	485
SOD Waste	142-96-1	Dibutyl Ether	$C_8H_{18}O$	98%	24,263	124-38-9	Carbon dioxide	CO2	0.54							X			13,119	0%	13,119
Rinse Solvent	91-20-3	Naphthalene	$C_{10}H_8$	8%	21,865	91-20-3	Naphthalene	C10H8	0.05	X					X				1,093	90%	109
Rinse Solvent	91-20-3	Naphthalene	$C_{10}H_8$	8%	21,865	124-38-9	Carbon dioxide	CO2	0.17							X			3,754	0%	3,754
Rinse Solvent	95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	C_9H_{12}	10%	27,331	95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	C9H12	0.20	X									5,466	90%	547
Rinse Solvent	95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	C_9H_{12}	4%	10,932	124-38-9	Carbon dioxide	CO2	0.66							X			7,206	0%	7,206
Rinse Solvent	64742-94-5	Solvent naphtha (petroleum), heavy arom.	Varies	100%	273,307	64742-94-5	Solvent naphtha (petroleum), heavy arom.	Varies	0.2	X					X				54,661	90%	5,466
Rinse Solvent	64742-94-5	Solvent naphtha (petroleum), heavy arom.	Varies	100%	273,307	124-38-9	Carbon dioxide	CO2	0.41							X			112,765	0%	112,765
Reactant	64-17-5	Ethanol	C_2H_6O	71%	11,398	64-17-5	Ethanol	C2H6O	1	X									11,398	90%	1,140
Reactant	64-17-5	Ethanol	C_2H_6O	71%	11,398	124-38-9	Carbon dioxide	CO2	1.91							X			21,777	0%	21,777
Reactant	1310-58-3	Potassium Hydroxide	KOH	10%	1,601	1310-58-3	Potassium Hydroxide	KOH	0										0	0%	0

1. The total of this column for all components in each mixture may exceed 100% due to variable composition.

Conversions

1 gal = 3785 cm^3
1 gram = 2.205E-03 lbs

Table 30-3: Emissions per Exhaust Type

CAS	Emission Chemical Name	Exhaust Type[1,2]	Annual Pre-Control Emissions (lb/yr)	Average Hourly Pre-Control Emissions (lb/hr)	Variance Factor to Account for Hourly Operational Differences[3]	Emission Rate Potential per HPM Building[4] (lb/hr)	RCTO DRE	Annual Potential Emissions (lb/yr)	Number of Operational Stacks	Maximum Hourly Emissions Per Stack (lb/hr/stack)	Average Hourly Emissions Per Stack (lb/hr/stack)
7631-86-9	Silicon dioxide	RCTO Burner Exhaust	1,939	2.21E-01	2400%	1.38	0%	1,939	12	4.61E-01	1.84E-02
7664-41-7	Ammonia	Solvent Exhaust	1,044	1.19E-01	2400%	7.45E-01	-	104.4	12	2.48E-02	9.93E-04
7664-41-7	Ammonia	RCTO Burner Exhaust	55.0	6.27E-03	2400%	3.92E-02	90%	5.50	12	1.31E-03	5.23E-05
10102-44-0	Nitrogen dioxide	RCTO Burner Exhaust	2,969	3.39E-01	2400%	2.12	0%	2,969	12	7.06E-01	2.82E-02
142-96-1	Dibutyl Ether	Solvent Exhaust	4,610	5.26E-01	2400%	3.29	-	461.0	12	1.10E-01	4.39E-03
142-96-1	Dibutyl Ether	RCTO Burner Exhaust	242.6	2.77E-02	2400%	1.73E-01	90%	24.3	12	5.77E-03	2.31E-04
124-38-9	Carbon dioxide	RCTO Burner Exhaust	158,620	18.1	2400%	113.2	0%	158,620	12	37.7	1.51E+00
91-20-3	Naphthalene	Solvent Exhaust	1,039	1.19E-01	2400%	7.41E-01	-	103.9	12	2.47E-02	9.88E-04
91-20-3	Naphthalene	RCTO Burner Exhaust	54.7	6.24E-03	2400%	3.90E-02	90%	5.47	12	1.30E-03	5.20E-05
95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	Solvent Exhaust	5,193	5.93E-01	2400%	3.70	-	519.3	12	1.23E-01	4.94E-03
95-63-6	TMB (1,2,4-TMB and 1,3,5-TMB)	RCTO Burner Exhaust	273.3	3.12E-02	2400%	1.95E-01	90%	27.3	12	6.50E-03	2.60E-04
64742-94-5	Solvent naphtha (petroleum), heavy arom.	Solvent Exhaust	51,928	5.93	2400%	37.0	-	5,193	12	1.23E+00	4.94E-02
64742-94-5	Solvent naphtha (petroleum), heavy arom.	RCTO Burner Exhaust	2,733	3.12E-01	2400%	1.95	90%	273.3	12	6.50E-02	2.60E-03
64-17-5	Ethanol	Solvent Exhaust	10,828	1.24	2400%	7.73	-	1,083	12	2.58E-01	1.03E-02
64-17-5	Ethanol	RCTO Burner Exhaust	569.9	6.51E-02	2400%	4.07E-01	90%	57.0	12	1.36E-02	5.42E-04

1. 95% of total VOC emissions are emitted through the Solvent Exhaust
2. 5% of total VOC emissions are emitted through the RCTO Burner Exhaust. 100% of thermal oxidation byproducts are emitted through the RCTO burner exhaust.
3. The SOD waste treatment process will occur intermittently. Maximum hourly emission rates are based on the treatment process occuring for one hour each day.
4. There are two proposed separate HPM buildings per fab, a "north" and "south" HPM.

Conversions

1 gal = 3785 cm^3
1 gram = 2.205E-03 lbs

Micron - Clay, NY Fabs 1 & 2
1-FABOP and 2-FABOP
Regenerative Catalytic System (RCS) Combustion Emissions

Table 31-1. RCS Specifications and Inventory

Equipment Description[1]	Equipment Count	Burner Rating (MMBtu/hr)
Regenerative Catalytic System - Process FA1 and FA2	20	0.6

1. Exhaust from the outlet of each RCS, including emissions from natural gas combustion, will pass through fab acid exhausts.

Table 31-2. RCS Criteria Pollutant and GHG Potential to Emit

Pollutant	Emission Factor[1,2,3] (lb/MMscf)	Potential to Emit (per Unit)		Potential to Emit (All Units)	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM (Total)	7.6	4.47E-03	0.02	0.09	0.39
PM_{10}	7.6	4.47E-03	0.02	0.09	0.39
$PM_{2.5}$	7.6	4.47E-03	0.02	0.09	0.39
SO_2	0.6	3.53E-04	1.55E-03	0.01	0.03
CO	420	0.25	1.08	4.94	21.6
NO_x	100	0.06	0.26	1.18	5.15
VOC	5.5	3.24E-03	0.01	0.06	0.28
Lead	0.0005	2.94E-07	1.29E-06	5.88E-06	2.58E-05
CO_2	120,000	70.6	309.2	1,412	6,184
CH_4	2.3	1.35E-03	0.01	0.03	0.12
N_2O	2.2	1.29E-03	0.01	0.03	0.11
CO_2e - 20-yr[4]	-	71.0	311.2	1,421	6,223
CO_2e - 100-yr[5]	-	71.0	310.8	1,419	6,217
Upstream CO_2e[6]	91,921	54.1	236.8	1,081	4,737
Upstream CO_2[6]	28,219	16.6	72.7	332.0	1,454
Upstream CH_4[6]	758	0.45	1.95	8.92	39.0
Upstream N_2O[6]	0.31	1.85E-04	8.11E-04	3.70E-03	0.02

1. Emission Factors from AP-42 Section 1.4 Table 1.4-1 and 1.4-2 for Small Boilers.
2. Per AP-42 Section 1.4 Table 1.4-2, PM (total) = PM_{10} = $PM_{2.5}$.
3. AP-42 emission factor for CO from NG combustion multiplied by safety factor of 5 to account for emissions as a result of partial oxidation of process chemicals.
4. 20-yr Global warming potentials per 6 NYCRR Part 496.
5. 100-yr Global warming potentials per 40 CFR Part 98, Table A-1 (*Global Warming Potentials*).
6. Upstream GHG emission factors per Appendix of 2024 NYS Statewide GHG Emissions Report:

CO_2e:	40,877	g/MMBtu
CO_2:	12,549	g/MMBtu
CH_4:	337	g/MMBtu
N_2O:	0.14	g/MMBtu

Table 31-3. RCS HAP Potential to Emit

Pollutant	HAP?	Emission Factor[1]	Potential to Emit (per Unit)		Potential to Emit (Total per Stack)	
		(lb/MMscf)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Benzene	Yes	2.10E-03	1.24E-06	5.41E-06	2.47E-05	1.08E-04
Formaldehyde	Yes	7.50E-02	4.41E-05	1.93E-04	8.82E-04	3.86E-03
Toluene	Yes	3.40E-03	2.00E-06	8.76E-06	4.00E-05	1.75E-04
2-Methylnaphthalene	Yes	2.40E-05	1.41E-08	6.18E-08	2.82E-07	1.24E-06
3-Methylchloranthrene	Yes	1.80E-06	1.06E-09	4.64E-09	2.12E-08	9.28E-08
7,12-Dimethylbenz(a)anthracene	Yes	1.60E-05	9.41E-09	4.12E-08	1.88E-07	8.24E-07
Acenaphthylene	Yes	1.80E-06	1.06E-09	4.64E-09	2.12E-08	9.28E-08
Benzo(a)pyrene	Yes	1.20E-06	7.06E-10	3.09E-09	1.41E-08	6.18E-08
Benzo(b)fluoranthene	Yes	1.80E-06	1.06E-09	4.64E-09	2.12E-08	9.28E-08
Benzo(k)fluoranthene	Yes	1.80E-06	1.06E-09	4.64E-09	2.12E-08	9.28E-08
Dibenzo(a,h)anthracene	Yes	1.20E-06	7.06E-10	3.09E-09	1.41E-08	6.18E-08
Dichlorobenzene	Yes	1.20E-03	7.06E-07	3.09E-06	1.41E-05	6.18E-05
Hexane	Yes	1.80E+00	1.06E-03	4.64E-03	0.02	0.09
Naphthalene	Yes	6.10E-04	3.59E-07	1.57E-06	7.18E-06	3.14E-05
Acenaphthene	Yes	1.80E-06	1.06E-09	4.64E-09	2.12E-08	9.28E-08
Anthracene	Yes	2.40E-06	1.41E-09	6.18E-09	2.82E-08	1.24E-07
Benzo(a)anthracene	Yes	1.80E-06	1.06E-09	4.64E-09	2.12E-08	9.28E-08
Benzo(g,h,i)perylene	Yes	1.20E-06	7.06E-10	3.09E-09	1.41E-08	6.18E-08
Chrysene	Yes	1.80E-06	1.06E-09	4.64E-09	2.12E-08	9.28E-08
Fluoranthene	Yes	3.00E-06	1.76E-09	7.73E-09	3.53E-08	1.55E-07
Fluorene	Yes	2.80E-06	1.65E-09	7.21E-09	3.29E-08	1.44E-07
Indeno(1,2,3-cd)pyrene	Yes	1.80E-06	1.06E-09	4.64E-09	2.12E-08	9.28E-08
Phenanthrene	Yes	1.70E-05	1.00E-08	4.38E-08	2.00E-07	8.76E-07
Pyrene	Yes	5.00E-06	2.94E-09	1.29E-08	5.88E-08	2.58E-07
Arsenic	Yes	2.00E-04	1.18E-07	5.15E-07	2.35E-06	1.03E-05
Beryllium	Yes	1.20E-05	7.06E-09	3.09E-08	1.41E-07	6.18E-07
Cadmium	Yes	1.10E-03	6.47E-07	2.83E-06	1.29E-05	5.67E-05
Chromium	Yes	1.40E-03	8.24E-07	3.61E-06	1.65E-05	7.21E-05
Cobalt	Yes	8.40E-05	4.94E-08	2.16E-07	9.88E-07	4.33E-06
Lead	Yes	5.00E-04	2.94E-07	1.29E-06	5.88E-06	2.58E-05
Manganese	Yes	3.80E-04	2.24E-07	9.79E-07	4.47E-06	1.96E-05
Mercury	Yes	2.60E-04	1.53E-07	6.70E-07	3.06E-06	1.34E-05
Nickel	Yes	2.10E-03	1.24E-06	5.41E-06	2.47E-05	1.08E-04
Selenium	Yes	2.40E-05	1.41E-08	6.18E-08	2.82E-07	1.24E-06
		Total HAP PTE	**1.11E-03**	**4.87E-03**	**2.22E-02**	**9.73E-02**

1. Emission factors are from AP-42, Section 1.4, Tables 1.4-3 and 1.4-4.

Conversions

1 lb =	453.59	g
1 scf NG =	1,020	BTU - Average heat content of NG from AP-42 1.4.1.
1 year =	8,760	hours

Micron - Clay, NY Fabs 1 & 2
1-CMPOP and 2-CMBOP
Diesel Fire Pump Combustion Emissions

Table 32-1. Diesel Fire Pump Engine Information

Equipment Description	Annual Operating Hours Limit (hrs/yr/engine)	Engine Full Load	Engine Power
		HP	kW
Diesel Fire Pump Engine	500	250	186

1. This diesel fire pump engine is a backup to an electric fire pump. It will only run in the event of a fire during a loss of power. It will be tested weekly.

Table 32-2. Diesel Fire Pump Engine Criteria Pollutant and GHG Potential to Emit

Pollutant	Tier 3 Exhaust Emission Standards[1,2]	AP-42 Emission Factors[3]	GHG Emission Factors[4]	Potential to Emit	
	(g/kW-hr)	(lb/HP-hr)	(kg/MMBtu)	(lb/hr)	(tpy)
PM (Total)	0.200	-	-	0.08	0.02
PM_{10}	0.200	-	-	0.08	0.02
$PM_{2.5}$	0.200	-	-	0.08	0.02
SO_2	-	2.05E-03	-	0.51	0.13
CO	3.5	-	-	1.44	0.36
NO_x	4.0	-	-	1.64	0.41
VOC	4.0	-	-	1.64	0.41
CO_2	-	-	73.96	103.8	25.9
CH_4	-	-	0.0030	4.21E-03	1.05E-03
N_2O	-	-	0.00060	8.42E-04	2.10E-04
CO_2e - 20-yr[5]	-	-	-	104.4	26.1
CO_2e - 100-yr[6]	-	-	-	104.1	26.0
Upstream CO_2e[7]	-	-	23.54	33.0	8.26
Upstream CO_2[7]	-	-	13.63	19.1	4.78
Upstream CH_4[7]	-	-	0.12	0.16	0.04
Upstream N_2O[7]	-	-	2.50E-04	3.51E-04	8.77E-05

1. Tier 3 emission factors for all pollutants besides SO_2 are from Table 1 of 40 CFR Part 1039 Subpart B - Emission Standards and Related Requirements.
2. $PM_{2.5}$ and PM_{10} emission factors conservatively assumed to be equal to that of PM (total).
3. SO_2 emission factor is based on AP-42 Section 3.3, Table 3.3-1.
4. CO_2, N_2O and CH_4 emission factors based on 40 CFR Part 98 Table C-1 and C-2 Default diesel emissions factors.
5. 20-yr Global warming potentials per 6 NYCRR Part 496.
6. 100-yr Global warming potentials per 40 CFR Part 98, Table A-1 (*Global Warming Potentials*).
7. Upstream GHG emission factors per Appendix of 2024 NYS Statewide GHG Emissions Report:

CO_2e:	23,540	g/MMBtu
CO_2:	13,634	g/MMBtu
CH_4:	117	g/MMBtu
N_2O:	0.25	g/MMBtu

Table 32-3. Diesel Fire Pump Engine HAP Potential to Emit

Pollutant	HAP?	Emission Factor[1] (lb/MMBtu)	Potential to Emit (lb/hr)	(tpy)
Benzene	Yes	9.33E-04	5.94E-04	1.48E-04
Toluene	Yes	4.09E-04	2.60E-04	6.51E-05
Xylenes	Yes	2.85E-04	1.81E-04	4.54E-05
1,3 Butadiene	Yes	3.91E-05	2.49E-05	6.22E-06
Formaldehyde	Yes	1.18E-03	7.51E-04	1.88E-04
Acetaldehyde	Yes	7.67E-04	4.88E-04	1.22E-04
Acrolein	Yes	9.25E-05	5.89E-05	1.47E-05
Total PAH	Yes	1.68E-04	1.07E-04	2.67E-05
		Total HAP PTE	**2.47E-03**	**6.16E-04**

1. Emissions are calculated based on emission factors for diesel engines per AP-42 Section 3.3, Table 3.3-2.

Conversions

1 lb =	453.59	g
1 year (Emergency Operation) =	500	hr
Energy Conversion Factor:	392.75	bhp-hr/MMBtu (mechanical) in AP-42 Appendix A
15 ppm S =	0.0015	wt% S
Hoursepower (mechanical) =	0.74558	Kilowatts
Diesel Usage Conversion Factor:	0.138	MMBtu/gal

APPENDIX H. NITROGEN OXIDES BACT/LAER ANALYSIS

This appendix presents the best available control technology (BACT) and lowest achievable emissions rate (LAER) determinations for control of nitrogen oxide (NO_X) emissions from the proposed emission sources at the Proposed Air Permit Project. Micron has reviewed the RACT/BACT/LAER Clearinghouse (RBLC), documentation from the Bay Area Air Quality Management District (BAAQMD), and relevant semiconductor fab permits to identify appropriate control technologies and/or limits for emission source categories. The analysis to determine BACT/LAER described in Section 5.4 of the Micron Clay Air Permit Application, and the sources of information for both BACT and LAER are very similar. The most significant difference between the two is that BACT allows for a determination of economic feasibility for an identified control technology whereas LAER does not. Because of this, it is generally accepted that LAER is more stringent than BACT and satisfies BACT requirements. Therefore, the analysis to select BACT and LAER is similar, except for economic feasibility considerations, and the process is combined in this appendix.

As the add-on control technologies and other control mechanisms are similar for many of the sources that Micron operates, types of control technologies identified are summarized in Section 1.1 of this appendix. Not all technologies are applicable to all emission sources, and as such, source-specific considerations for each source category are discussed in the subsequent sections.

Emission sources evaluated in this BACT/LAER analysis include:

- Natural gas-fired boilers;
- Natural gas-fired water bath vaporizers;
- Diesel-fired emergency generator engines;
- Diesel-fired emergency fire pump engine; and
- Semiconductor process tools and other processes and support operations that emit NO_X.

1.1 Available Technology Summary

The technologies identified to mitigate NO_X emissions are described in the following subsections.

1.1.1 Tier 4 Compliant Emergency Generator Engines

Engines meeting Tier 4 emissions standards are designed with a focus on reducing emissions, including NO_X, to meet stringent environmental and regulatory standards. These engines utilize various engineering and technological advancements to minimize NO_X emissions while maintaining performance and efficiency.

1.1.2 Good Combustion and Maintenance Practices for Fuel-Fired Equipment

Good combustion and maintenance practices are essential for operating fuel-fired equipment efficiently and effectively while minimizing NO_X emissions. For this source category, good combustion practices are generally considered to be implementing the manufacturer's recommendations, which may include a combination of the following:

- Optimizing the air-fuel ratio;

- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Minimizing engine idle time at startup;
- Conducting operator training; and
- Conducting periodic maintenance.

The specific practices available for each source category are discussed in the subsequent sections.

1.1.3 Low-NO_X Burners and Ultra-Low-NO_X Burners

Low-NO_X burners (LNBs) and ultra-low-NO_X burners (ULNBs) are advanced combustion technologies that significantly reduce NO_X emissions during combustion. LNBs achieve this by employing staged combustion and controlling flame shape and intensity. This process results in a cooler flame temperature which reduces NO_X formation.[1]

1.1.4 Flue Gas Recirculation

Flue gas recirculation (FGR) controls NO_X emissions by reintroducing a portion of the exhaust gases back into the combustion process. FGR systems reduce NO_X emissions by diluting the inlet air to reduce combustion temperature and lowering oxygen concentration in the flame zone, limiting the formation of thermal NO_X.[2]

1.1.5 Selective Catalytic Reduction

Selective Catalytic Reduction (SCR) reduces NO_X emissions by injecting ammonia into the exhaust stream upstream of a catalyst bed. The ammonia reacts with the NO_X over the catalyst to convert nitrogen oxide (NO) or nitrogen dioxide (NO_2) into diatomic nitrogen (N_2) and water vapor.[3] The catalyst serves to reduce the temperature required for the reduction reaction to occur.

1.1.6 Selective Non-Catalytic Reduction

Selective non-catalytic reduction (SNCR) is an emissions control technique used to reduce NO_X emissions in combustion processes. Unlike SCR, SNCR does not use a catalyst. Instead, SNCR introduces a reducing agent, typically an ammonia or urea solution, directly into the combustion flue gas. When the reducing agent mixes with the hot exhaust gases, a chemical reaction occurs, resulting in the conversion of NO_X into N_2.

---

[1] AP-42 Vol. I, Chapter 1.4 - Natural Gas Combustion.

[2] AP-42 Vol. I, Chapter 1.4 - Natural Gas Combustion.

[3] Ibid. Selective Catalytic Reduction Air Pollution Control Fact Sheet, EPA-452-F-03-032.

1.1.7 Turbocharger

Turbochargers are generally used by internal combustion engines and function by using exhaust gas to spin a turbine that is attached to a second turbine that compresses the air to increase the air flow rate into the engine, improving the combustion of fuel.[4]

1.1.8 Intercooler/Aftercooler

Intercooler and aftercooler systems generally apply to internal combustion engines. An intercooler cools compressed air from the turbocharger before it enters the engine's combustion chamber, allowing for increased density of air and more oxygen in the combustion chamber. The aftercooler cools hot gases after the combustion process before they enter the turbocharger to prevent overheating. Collectively, the primary purpose of these devices is to promote more complete combustion.[5]

1.1.9 Operating Limitations

Limiting the hours of operation for engines, water bath vaporizers, and boilers reduces NO_X emissions by decreasing the overall time the equipment runs and consumes fuel.

1.1.10 Wet Scrubbing of NO_2

Micron is aware of wet scrubbing technology that is potentially capable of removing NO_2 from the vapor phase. To accomplish this, NO generated from oxidation in the process tools and/or process equipment exhaust conditioners (PEECs) must first be oxidized into NO_2 through reaction with an oxidizing agent.

1.1.11 Control Technologies Not Evaluated

Some control technologies have been omitted from the BACT and LAER evaluation due to various considerations. These control technologies, and the reasons for their omission, are summarized in Table 1-1.

Table 1-1. Summary of Control Technologies Not Evaluated

Emission Source Category	Technology	Reasoning
All Source Categories	Use of Alternate Fuels	The use of different fuel or raw materials that would redefine the Proposed Air Permit Project are out of the scope of BACT and LAER evaluations. Where different fuel specifications within the fuel type (i.e., use of ULSD) are feasible for the project, they have been identified above in Section 1.1 and are evaluated in the sections following this table.
Water Bath Vaporizers	SCR	The use of SCR as a method of controlling NO_X emissions from natural gas-fired water bath vaporizers have not been demonstrated and are not evaluated further for this source.

[4] AP-42 Vol. I, Chapter 3.3: Gasoline And Diesel Industrial Engines.

[5] Ibid.

Emission Source Category	Technology	Reasoning
Natural Gas-Fired Boilers and Water Bath Vaporizers	SNCR	The use of SNCR as a method of controlling NO_X emissions from small natural gas-fired boilers or water bath vaporizers has not been demonstrated at a commercial scale and was not identified in the sources listed in the introduction to this Appendix.
Diesel-Fired Emergency Generator Engines and Diesel-Fired Emergency Fire Pump Engine	Use of ULSD	The fuel sulfur content does not reduce NO_X emissions for diesel-fired engines.[6]
	Oxy-fuel Combustion	The use of oxy-fuel combustion as a method of controlling NO_X emissions from small diesel-fired generators has not been demonstrated and was not identified in the sources listed in the introduction to this Appendix.
Semiconductor Process Tools and PEECs	LNBs / ULNBs	LNBs and ULNBs are not manufactured and incorporated into PEECs in semiconductor manufacturing. These PEECs typically have a heat input rating of less than 0.2 MMBtu/hr.
	SCR	There has been no documented use of SCR as a method used to reduce NO_X emissions from semiconductor process tools and PEECs.
	SNCR	There has been no documented use of SNCR as a method used to reduce NO_X emissions from semiconductor process tools and PEECs.
	FGR	There has been no documented use of FGR as a method used to reduce NO_X emissions emitted from semiconductor process tools and PEECs.
	Oxy-fuel Combustion	There has been no documented use of oxy-fuel combustion as a method used to reduce NO_X emissions emitted from PEECs in semiconductor manufacturing.

1.2 Natural Gas-Fired Boilers

Natural gas-fired boilers are heating systems used to generate hot water or steam for maintaining precise temperature control for various stages of production, ensuring the efficient operation of machinery. Micron is proposing to use efficient units that are specifically designed to meet the Proposed Air Permit Project's thermal requirements while minimizing energy consumption and emissions.

The BACT and LAER analysis for NO_X emissions from natural gas-fired boilers is presented in this section.

1.2.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing NO_X emissions from the proposed natural gas-fired boilers:

[6] AP-42 Vol. I, Chapter 3.3: Gasoline And Diesel Industrial Engines.

- Good combustion and maintenance practices;
- The use of LNBs and ULNBs;
- Integrated FGR;
- SCR;
- Oxy-fuel combustion; and
- Operating hour limitations.

In addition to identifying specific control technologies, Micron has identified potentially relevant numerical emission limits that could be considered BACT and LAER for natural gas-fired boilers. Proposed BACT and LAER emission limits are discussed further in Step 4.

1.2.2 Step 2. Eliminate Technically Infeasible Options

Micron has evaluated the use of oxy-fuel combustion at the Proposed Air Permit Project. Oxy-fuel combustion burners and equipment are not available from manufacturers for the requisite equipment capacities and ratings needed for the boilers at the Proposed Air Permit Project. Additionally, the high purity oxygen required for oxy-fuel combustion requires more complex oxygen generation and separation processes upstream, and therefore results in higher energy consumption. Based on this review, oxy-fuel combustion is more suitable for coal-fired, industrial-grade boilers, rather than natural gas fire-tube boilers in the Proposed Air Permit Project. Therefore, oxy-fuel combustion is not technically feasible for the Proposed Air Permit Project.

1.2.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to select BACT and LAER.

1.2.4 Step 4. Select BACT and LAER

Micron intends to purchase natural gas-fired boilers designed to meet a NO_X emission limit of 9 parts per million by volume on a dry basis (ppmvd) at 3% oxygen (O_2) as BACT and LAER. This is the lowest emission limitation identified as BACT and LAER based on the RBLC search conducted. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results. Micron will also implement the manufacturer's recommendations for good combustion and maintenance practices including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes utilizing engines with LNBs, ULNBs, integrated FGR, and/or SCR as needed to meet the proposed limit, and an operating limit of 6,000 hours per year for each boiler.

A BACT or LAER limit must not be higher than an applicable New Source Performance Standard (NSPS) emission limit. The boilers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for NO_X for natural gas-fired steam generating units.

1.3 Natural Gas-Fired Water Bath Vaporizers

This Permit Application 2 separates "natural gas-fired combustion equipment" into boilers and water bath vaporizers. Natural gas-fired water bath vaporizers are used in the semiconductor industry to provide a reliable and efficient source of high-purity nitrogen gas. These water bath vaporizers use natural gas to heat water that is used to vaporize liquified nitrogen used in semiconductor manufacturing.

The BACT and LAER analysis for NO_X emissions from natural gas-fired water bath vaporizers is presented in this section.

1.3.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing NO_X emissions from the proposed natural gas-fired water bath vaporizers:

- Good combustion and maintenance practices;
- The use of LNBs and ULNBs;
- Integrated FGR;
- Oxy-fuel combustion; and
- Operating hours limitations.

In addition to identifying specific control technologies, Micron has identified potentially relevant numerical emission limits that could be considered BACT and LAER for natural gas-fired water bath vaporizers. Proposed BACT and LAER emission limits are discussed further in Step 4.

1.3.2 Step 2. Eliminate Technically Infeasible Options

Micron has evaluated the use of oxy-fuel combustion at the Proposed Air Permit Project. Oxy-fuel combustion burners and equipment are not available from manufacturers for the requisite equipment capacities and ratings needed for the water bath vaporizers at the Proposed Air Permit Project. Additionally, the high purity oxygen required for oxy-fuel combustion requires more complex oxygen generation and separation processes upstream, and therefore results in higher energy consumption. Therefore oxy-fuel combustion is not technically feasible for the Proposed Air Permit Project.

1.3.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to select BACT and LAER.

1.3.4 Step 4. Select BACT and LAER

Micron intends to purchase natural gas-fired water bath vaporizers designed to meet a NO_X emission limit of 50 pounds per million standard cubic feet (lb/MMscf) as BACT and LAER. This is the lowest emission limitation identified as BACT and LAER based on the RBLC search conducted. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results. Micron is aware of one other semiconductor fab found in the RBLC search conducted (Intel Ohio, RBLC ID OH-0387) with a proposed BACT emission limit for water bath vaporizers of 0.011 lb/MMBtu (approximately 11.2 lb/MMscf). At the time of this Proposed Air Permit Project, the Intel Ohio fab is still in the construction phase and the proposed emission rates have not been demonstrated in practice. Micron reached out to multiple vendors during the design process and the proposed 50 lb/MMscf is the lowest emission rate guaranteed by a potential vendor. For this reason, the lower rate has been excluded from this assessment.

Micron will implement the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes utilizing water bath vaporizers with LNBs, ULNBs, and/or integrated FGR as needed to meet the proposed limit, and an operating limit of 8,000 hours per year for all water bath vaporizers combined, with no more than four units operating at a time.

Note that the emission limit identified is different than Permit Application 1 due to the separation of "natural gas-fired combustion equipment" into boilers and water bath vaporizers.

A BACT or LAER limit must not be higher than an applicable New Source Performance Standard (NSPS) emission limit. The water bath vaporizers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for NO_X for natural gas-fired steam generating units.

1.4 Diesel-Fired Emergency Generator Engines

The Proposed Air Permit Project will utilize diesel-fired emergency generator engines to ensure that critical life safety and process safety systems receive uninterrupted power during power outages. These units will not be designed to run manufacturing operations during major electrical outages and instead will allow equipment and processes to shut down gradually as necessary, protecting sensitive manufacturing operations, preventing unsafe conditions from forming in the fabs, reducing emissions of process gases directly to the atmosphere, and protecting employee safety.

1.4.1 Step 1. Identify All Control Technologies

Diesel-fired emergency generator engine technology and associated emission standard requirements are well known and are considered by many regulatory entities to meet BACT and LAER. These standards are based on the engine's maximum power capacity and the year in which the engine was manufactured. Currently, the EPA has implemented the Tier 4 Final emission standards for non-road diesel engines, which set stringent limits for newly manufactured units.[7] EPA has also set limitations for stationary internal combustion engines under 40 CFR Part 60 Subpart IIII (NSPS Subpart IIII), "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." For engines with certain power capacity and manufacture years, NSPS Subpart IIII references the engine standards established for nonroad engines under 40 CFR 1039.

In addition, the following control methods have been identified for reducing NO_X emissions from the proposed diesel-fired emergency generator engines:

- Good combustion and maintenance practices; and
- Operating hour limitations.

1.4.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 for diesel-fired emergency generator engines are technically feasible.

1.4.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 4, Micron is proposing to use all identified control technologies to achieve BACT and LAER. As a result, ranking the remaining control technologies is unnecessary, and the next step is to select BACT and LAER.

1.4.4 Step 4. Select BACT and LAER

The following control technologies are proposed to achieve BACT and LAER for diesel-fired emergency generator engines:

- Purchase of an engine compliant with emission standards;
- Good combustion and maintenance practices, including a combination of the following:
  - Minimizing engine idle time at startup;
  - Optimizing the air-fuel ratio;
  - Maintaining proper insulation;
  - Establishing proper combustion zone temperature control;
  - Conducting operator training; and
  - Conducting periodic maintenance
- Operating hour limitations.

---

[7] 40 CFR 1039.101

A BACT or LAER limit must not be higher than an applicable NSPS emission limit. The diesel-fired generators will be affected facilities under 40 CFR Part 60 Subpart IIII (NSPS Subpart IIII), "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." NSPS Subpart IIII provides NO_X emission standards for various engine power and displacement categories. However, these emission standards are less stringent than the Tier 4 Final emission standards.

Therefore, Micron is proposing the Tier 4 Final emission standards outlined in Table 1-2 as the BACT and LAER NO_X limit for diesel-fired emergency generator engines and will procure engines for the Proposed Air Permit Project that meet these standards. Control technologies to achieve Tier 4 Final emission standards may vary depending on the engine manufacturer and may include the use of SCR, turbochargers, intercoolers and/or aftercoolers, where that technology is available and appropriate. In addition, Micron proposes an operating hours limit of 100 hours per year for each engine.

Table 1-2. 40 CFR §1039.101
Tier 4 Final Exhaust Emission Standards After the 2014 Model Year, g/kW-hr

Maximum Engine Power	Application	NOx Emission Standard	NOx + NMHC Emission Standard
kW <19	All	--	7.5
19 ≤ kW <56	All	--	4.7
56 ≤ kW <130	All	0.40	--
130 ≤ kW ≤560	All	0.40	--
kW >560	Generator Sets	0.67	--
	All Except Generator Sets	3.5	--

1.5 Diesel-Fired Emergency Fire Pump Engines

The Proposed Air Permit Project will include one diesel-fired emergency fire pump engine to provide a reliable power source in the event of a fire occurring during a power outage when the electric fire pump would not be available.

1.5.1 Step 1. Identify All Control Technologies

Diesel-fired emergency fire pump engine technology and associated emission standard requirements are well known and are considered by many regulatory entities to meet BACT and LAER. These standards are based on the fire pump engine's maximum power capacity and the year in which the engine was manufactured. EPA has set limitations for stationary internal combustion engines, including fire pump engines, under NSPS Subpart IIII, "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." The EPA has also implemented Tier emission standards (Tier 1 – Tier 4 Final) for non-road diesel engines, which set stringent limits for newly manufactured units. Based on the RBLC search conducted, as well as input from Micron's equipment vendors, Tier 4 compliant fire pump engines are not available. As such, the most stringent emission standards are Tier 3, which align with NSPS IIII requirements for the proposed fire pump engine for NO_X.

In addition, the following control methods have been identified for reducing NO_X emissions from the proposed diesel-fired emergency fire pump engine:

- Good combustion and maintenance practices; and
- Operating hours limitations.

1.5.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 for the diesel-fired emergency fire pump engine are technically feasible.

1.5.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 4, Micron is proposing to use all identified control technologies to achieve BACT and LAER. As a result, ranking the remaining control technologies is unnecessary.

1.5.4 Step 4. Select LAER and BACT

The following control technologies are proposed to achieve BACT and LAER for the diesel-fired emergency fire pump engine:

- The purchase of an engine compliant with emission standards;
- Good combustion and maintenance practices, including a combination of the following:
  - Minimizing engine's idle time at startup;
  - Optimizing the air-fuel ratio;
  - Maintaining proper insulation;
  - Establishing proper combustion zone temperature control;
  - Conducting operator training; and
  - Conducting periodic maintenance; and
- Operating hour limitations.

A BACT or LAER limit must not be higher than an applicable NSPS emission limit. The diesel-fired emergency fire pump engine will be an affected facility under NSPS Subpart IIII. NSPS Subpart IIII provides NO_X emission standards for various engine power and displacement categories. For the capacity of the proposed diesel-fired emergency fire pump engine, NSPS IIII emission standards align with Tier 3 emission standards.

Therefore, Micron is proposing compliance with the NSPS IIII and Tier 3 emission standard (which is inclusive of NO_X and NMHC) of 3.0 grams per brake horsepower-hour (g/bhp-hr) for the diesel-fired emergency fire pump engine. Control technologies to achieve this emission standards may vary depending on the engine manufacturer and may include the use of SCR, turbochargers, intercoolers and/or aftercoolers, where that technology is available and appropriate. In addition, Micron proposes an operating hours limit of 500 hours per year.

1.6 Semiconductor Process Tools and PEECs

Micron is proposing to install semiconductor process equipment, or "tools", as discussed within the Micron Clay Air Permit Application. Nitrogen oxides are generated through the operation of the semiconductor process tools as a reaction byproduct of nitrogen-containing raw materials. In addition, management of nitrogen-containing materials in PEECs generates NO_X, as does natural gas combustion within those units. NO_X generated through the semiconductor process tools and PEECs will be exhausted through the wet scrubbers. Refer to the process flow diagrams in Appendix E for additional details.

1.6.1 Step 1. Identify All Control Technologies

A review of the EPA's RBLC database did not identify any entries of semiconductor facilities that utilize add-on control devices to abate NO_X emissions that are generated from semiconductor process tools.

Micron also reviewed relevant semiconductor air permits to evaluate if any control technologies are currently being utilized to abate NO_X emissions from semiconductor process tools. During the review of these permits, it was determined that no add-on control devices are currently installed to abate such NO_X emissions.

Good combustion and maintenance practices for PEECs is the only method that has been identified for reducing NO_X emissions from the semiconductor process tools.

Micron has identified wet scrubbing of NO_2 as an additional NO_X control technology that was not present in the RBLC database analysis. This technology is evaluated as part of this analysis.

1.6.2 Step 2. Eliminate Technically Infeasible Options

All control technologies identified in Step 1 for semiconductor process tools are technically feasible and can be used in combination. Therefore, the next step is to rank remaining control technologies by control effectiveness.

1.6.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are technically feasible and can be used in combination, ranking the remaining control technologies is unnecessary. Therefore, the next step is to select BACT and LAER.

1.6.4 Step 4. Select BACT and LAER

Based on the analysis presented above, Micron is proposing to achieve BACT and LAER for NO_X emitted from semiconductor process tools by using good combustion and maintenance practices for PEECs, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

Additionally, Micron proposes wet scrubbing of NO_2 as part of the CVD exhaust centralized wet scrubbers. NOx generated as a result of reactions between process gases in tools, or due to oxidation in PEECs, will be routed to the CVD exhaust. The ionizing wet scrubbers (IWS) proposed for the CVD exhaust will incorporate oxidation of NO into NO_2 and wet scrubbing of NO_2 in addition to control of other contaminants as outlined in this application and Permit Application 1.

Given the diverse processes and complexity of semiconductor manufacturing, Micron is proposing to comply with good combustion and maintenance practices as a work practice standard to achieve BACT and LAER for NO_X emitted from semiconductor process equipment in lieu of a formal limit. Since wet scrubbing of NO_2 has not been historically identified as BACT/LAER for semiconductor manufacturing, there is no precedent for potential limits within the industry; however, Micron is proposing showing compliance for fab CVD exhaust by meeting either (i) 13.1 lb/hr per Fab or (ii) 90% DRE with an inlet concentration of 4.6 ppm_v.

Attachment 1
RACT/BACT/LAER Clearinghouse Search Results

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/9/2015	PACKAGE BOILER	13.31	LOW NOX BURNER FLUE GAS RECIRCULATION GCP	30	PPMVD
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/9/2015	2 CALP Line Boilers	13.31	LOW NOX BURNER FLUE GAS RECIRCULATION (FGR) GOOD COMBUSTION PRACTICES (GCP)	30	PPMVD
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	2/14/2019	SN-233 Galvanizing Line Boilers	13.31	Low Nox Burners	0.1	LB/MMBTU
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	9/1/2021	SN-202, 203, 204 Pickle Line Boilers	13.31	Low NOx burners	0.035	LB/MMBTU
*IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	1/11/2024	Auxiliary Boiler (AB-3)	13.31	Low NOx burners and Good Combustion Practices	35	LB/MMSCF
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	4/19/2021	Pickle Line #2 Boiler #1 & #2 (EP 21-04 & EP 21-05)	13.31	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. Equipped with low-NOx burners.	50	LB/MMSCF
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	4/8/2014	AUXILLARY BOILER	13.31	EXCLUSIVE USE OF PIPELINE QUALITY NATURAL GAS AND GOOD COMBUSTION PRACTICES	0.01	LB/MMBTU
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	AUXILIARY BOILER	13.31	EXCLUSIVE USE OF PIPELINE QUALITY NATURAL GAS, ULTRA LOW-NOX BURNERS, AND GOOD COMBUSTION PRACTICES	0.01	LB/MMBTU

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MI-0420	DTE GAS COMPANY--MILFORD COMPRESSOR STATION	MI	185-15	6/3/2016	FGAUXBOILERS	13.31	Ultra low NOx burners and good combustion practices.	14	PPMVOL
MI-0426	DTE GAS COMPANY - MILFORD COMPRESSOR STATION	MI	185-15A	3/24/2017	FGAUXBOILERS (6 auxiliary boilers EUAUXBOIL2A, EUAUXBOIL3A, EUAUXBOIL2B, EUAUXBOIL3B, EUAUXBOIL2C, EUAUXBOIL3C)	13.31	Ultra-low NOx burners and good combustion practices.	20	PPM AT 3% O2
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	8/25/2015	Auxiliary Boiler (B001)	13.31	Flue gas recirculation (FGR) and low NOx burner	0.68	LB/H
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	9/7/2017	Auxiliary Boiler (B001)	13.31	Flue gas recirculation (FGR), low NOx burner	0.76	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	9/27/2017	Auxiliary Boiler (B001)	13.31	low NOX burners and flue gas recirculation	0.76	LB/H
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/7/2017	Auxiliary Boiler (B001)	13.31	Flue gas recirculation and low NOX burner	0.29	LB/H
OH-0377	HARRISON POWER	OH	P0122266	4/19/2018	Auxiliary Boiler (B001)	13.31	Good combustion practices and low NOx burner	1.56	LB/H
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	2/6/2019	Startup boiler (B001)	13.31	Low-NOX burners, good combustion practices and the use of natural gas	0.634	LB/H

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0387	INTEL OHIO SITE	OH	P0132323	9/20/2022	29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	13.31	Ultra-low NOX burners, good combustion practices, and the use of natural gas	9.74	T/YR
OR-0050	TROUTDALE ENERGY CENTER, LLC	OR	26-0235	3/5/2014	Auxiliary boiler	13.31	Utilize Low-NOx burners and FGR.	0.035	LB/MMBTU
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Auxiliary Boiler	13.31	SCR and ultra low NOx burners, Fired only on natural gas supplied by a public utility.	0.006	LB/MMBTU
*PA-0316	RENOVO ENERGY CENTER, LLC	PA	18-00033A	1/26/2018	Auxiliary Boiler	13.31	Ultra-low NOx burners and flue gas re-circulation operated in accordance with the manufacturer's specifications and good operating practices	0.011	LB
TX-0772	PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT)	TX	118901, GHGPSDTX108 AND PSDTX1	11/6/2015	Commercial/Institutional-Size Boilers/Furnaces	13.31	Not Specified	0.1	LB/MMBTU
WI-0283	AFE, INC. LCM PLANT	WI	17-JJW-207	4/24/2018	B01-B12, Boilers	13.31	Ultra-low NOx Burners, Flue Gas Recirculation and Good Combustion Practices	0.0105	LB/MMBTU
WI-0284	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-017	4/24/2018	B13-B24 & B25-B36 Natural Gas-Fired Boilers	13.31	Ultra-Low NOx Burners, Flue Gas Recirculation, and Good Combustion Practices.	0.0105	LB/MMBTU

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
WI-0306	WPL- RIVERSIDE ENERGY CENTER	WI	19-POY-212	2/28/2020	Temporary Boiler (B98A)	13.31	Low NOx burners, flue gas recirculation, shall be operated for no more than 500 hours, and shall combust only pipeline quality natural gas.	0.04	LB/MMBTU
WY-0075	CHEYENNE PRAIRIE GENERATING STATION	WY	MD-16173	7/16/2014	Auxiliary Boiler	13.31	Ultra low NOx burners and flue gas recirculation	0.0175	LB/MMBTU
SC-0183	NUCOR STEEL - BERKELEY	SC	0420-0060-DX	5/4/2018	Pickle Line Equipment (pickle line no. 3 boilers)	19.6	Use of Low NOX Burners and Good Combustion Practices	50	LB/MMSCF

Process IDs: --
Other Search Criteria: Process Name Contains "Vaporizer"
Process Description: Natural Gas-fired Water Bath Vaporizers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered for Fuel Type as "Natural Gas" or Equivalent

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
*AR-0180	HYBAR LLC	AR	2470-AOP-R0	4/28/2023	Air Separation Plant Water Vaporizer	81.29	Low NOX burners, combustion of clean fuel, and good combustion practices	0.1	LB/MMBTU
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	7/23/2020	EP 13-01 - Water Bath Vaporizer	19.9	Low-Nox Burners (Designed to maintain 0.05 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan.	50	LB/MMSCF
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	4/19/2021	Air Separation Unit Water Bath Vaporizer (2 indirect burners) (EP 23-01)	19.6	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. Equipped with low-NOx burners.	50	LB/MMSCF
OH-0387	INTEL OHIO SITE	OH	P0132323	9/20/2022	45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	13.31	Ultra-low NOX burners, good combustion practices, and the use of natural gas	2.59	T/YR
*WV-0034	WEST VIRGINIA STEEL MILL	WV	R14-0039	5/5/2022	Water Bath Vaporizer	81.29	LNB Good Combustion Practices	1.08	LB/HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
AK-0082	POINT THOMSON PRODUCTION FACILITY	AK	AQ1201CPT03	1/23/2015	Emergency Camp Generators	17.11	Not Specified	4.8	GRAMS/HP-H
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	6/30/2017	Black Start and Emergency Internal Combustion Engines	17.11	Good Combustion Practices	8	G/KW-HR
AL-0301	NUCOR STEEL TUSCALOOSA, INC.	AL	413-0033-X014 - X020	7/22/2014	Diesel fired Emergency Generator	17.11	Not Specified	0.015	LB/HP-H
AR-0177	NUCOR STEEL ARKANSAS	AR	1139-AOP-R27	11/21/2022	SN-230 Galvanizing Line No, 2 Emergency Generator	17.11	Not Specified	5.6	G/KW-HR
*AR-0180	HYBAR LLC	AR	2470-AOP-R0	4/28/2023	Emergency Generators	17.11	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.9	G/BHP-HR
FL-0347	ANADARKO PETROLEUM CORPORATION - EGOM	FL	OCS-EPA-R4015	9/16/2014	Emergency Diesel Engine	17.11	Use of good combustion practices based on the most recent manufacturer's specifications issued for engines and with turbocharger, aftercooler, and high injection pressure	--	--
FL-0367	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-001-AC	7/27/2018	1,500 kW Emergency Diesel Generator	17.11	Operate and maintain the engine according to the manufacturer's written instructions	6.4	G/KW-HOUR
FL-0371	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-003-AC (PSD-FL-444A)	6/7/2021	1,500 kW Emergency Diesel Generator	17.11	Not Specified	6.4	G/KW-HOUR
IL-0114	CRONUS CHEMICALS, LLC	IL	13060007	9/5/2014	Emergency Generator	17.11	Tier IV standards for non-road engines at 40 CFR 1039.102, Table 7.	0.67	G/KW-H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
*IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Emergency Generator Engine	17.11	Not Specified	6.4	G/KW-HR
IN-0173	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	6/4/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES	4.46	G/BHP-H
IN-0180	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	6/4/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES	4.46	G/B-HP-H
IN-0263	MIDWEST FERTILIZER COMPANY LLC	IN	129-36943-00059	3/23/2017	EMERGENCY GENERATORS (EU014A AND EU-014B)	17.11	GOOD COMBUSTION PRACTICES	4.42	G/HP-H EACH
IN-0317	RIVERVIEW ENERGY CORPORATION	IN	T147-39554-00065	6/11/2019	Emergency generator EU-6006	17.11	Tier II diesel engine	6.4	G/KWH
IN-0324	MIDWEST FERTILIZER COMPANY LLC	IN	129-44510-00059	5/6/2022	emergency generator EU 014a	17.11	Not Specified	4.42	G/HP-HR
IN-0359	NUCOR STEEL	IN	107-45480-00038	3/30/2023	Emergency Generator (CC-GEN1)	17.11	certified engine	4.8	G/HP-HR
*IN-0365	MAPLE CREEK ENERGY LLC	IN	T153-45909-00056	6/19/2023	Emergency generator	17.11	Not Specified	4.8	G/HP-HR
*IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	1/11/2024	Emergency Generator (400 kW)	17.11	Good Combustion Practices and meeting NSPS Subpart IIII requirements.	2.29	G/HP-HR
*IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	1/11/2024	Emergency Generator (1000 kW)	17.11	Good Combustion Practices and meeting NSPS Subpart IIII requirements.	3.81	G/HP-HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
*IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	1/11/2024	Emergency Generator (2000 kW)	17.11	Good Combustion Practices and meeting NSPS Subpart IIII requirements.	3.81	G/HP-HR
*IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	1/11/2024	Ammonia Plant Emergency Generator	17.11	Good Combustion Practices and meeting NSPS Subpart IIII requirements.	4.8	G/HP-HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	7/23/2020	EP 10-02 - North Water System Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	4.77	G/HP-HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	7/23/2020	EP 10-03 - South Water System Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	4.77	G/HP-HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	7/23/2020	EP 10-07 - Air Separation Plant Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	4.77	G/HP-HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	7/23/2020	EP 10-01 - Caster Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	4.77	G/HP-HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	4/19/2021	New Pumphouse (XB13) Emergency Generator #1 (EP 08-05)	17.11	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	--	--
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	4/19/2021	Tunnel Furnace Emergency Generator (EP 08-06)	17.11	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	--	--
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	4/19/2021	Caster B Emergency Generator (EP 08-07)	17.11	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	--	--
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	4/19/2021	Air Separation Unit Emergency Generator (EP 08-08)	17.11	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	--	--

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0288	LAKE CHARLES CHEMICAL COMPLEX	LA	PSD-LA-778	5/23/2014	Emergency Diesel Generators (EQT 629, 639, 838, 966, & 1264)	17.11	Comply with 40 CFR 60 Subpart IIII; operate the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	27.37	LB/HR
LA-0292	HOLBROOK COMPRESSOR STATION	LA	PSD-LA-769(M-1)	1/22/2016	Emergency Generators No. 1 & No. 2	17.11	Good equipment design, proper combustion techniques, use of low sulfur fuel, and compliance with 40 CFR 60 Subpart IIII	14.16	LB/HR
LA-0296	LAKE CHARLES CHEMICAL COMPLEX LDPE UNIT	LA	PSD-LA-779	5/23/2014	Emergency Diesel Generators (EQTs 622, 671, 773, 850, 994, 995, 996, 1033, 1077, 1105, & 1202)	17.11	Compliance with 40 CFR 60 Subpart IIII; operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage.	27.37	LB/HR
LA-0305	LAKE CHARLES METHANOL FACILITY	LA	PSD-LA-803(M1)	6/30/2016	Diesel Engines (Emergency)	17.11	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	6/4/2015	Emergency Generator Engines	17.11	Complying with 40 CFR 60 Subpart IIII	6.4	G/KW-HR
*LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	6/30/2017	DEG1-13 - Diesel Fired Emergency Generator Engine (EQT0012)	17.11	Compliance with NSPS Subpart IIII	19.23	LB/HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	8/31/2016	SCPS Emergency Diesel Generator 1	17.11	Compliance with NESHAP 40 CFR 63 Subpart ZZZZ and NSPS 40 CFR 60 Subpart IIII, and good combustion practices (use of ultra-low sulfur diesel fuel).	27.34	LB/H
*LA-0315	G2G PLANT	LA	PSD-LA-781	5/23/2014	Emergency Diesel Generator 1	17.11	Compliance with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	52.58	LB/H
*LA-0315	G2G PLANT	LA	PSD-LA-781	5/23/2014	Emergency Diesel Generator 2	17.11	Compliance with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	52.58	LB/H
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	2/17/2017	emergency generator engines (6 units)	17.11	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0317	METHANEX - GEISMAR METHANOL PLANT	LA	PSD-LA-761(M4)	12/22/2016	Emergency Generator Engines (4 units)	17.11	complying with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	--	--
*LA-0324	COMMONWEALTH LNG FACILITY	LA	PSD-LA-841	3/28/2023	Generator Engines (EQT0016)	17.11	Compliance with 40 CFR 60 Subpart IIII and operating engines per manufacturers' instructions and written procedures designed to maximize combustion efficiency and minimize fuel usage.	8.46	G/KW-HR
LA-0331	CALCASIEU PASS LNG PROJECT	LA	PDS-LA-805	9/21/2018	Large Emergency Engines (>50kW)	17.11	Good Combustion and Operating Practices	5.6	G/KW-H
LA-0350	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-744(M2)	3/28/2018	emergency generators (3 units) EQT0039, EQT0040, EQT0041	17.11	Comply with 40 CFR 60 Subpart IIII	--	--

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0364	FG LA COMPLEX	LA	PSD-LA-812	1/6/2020	Emergency Generator Diesel Engines	17.11	Compliance with the limitations imposed by 40 CFR 63 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	--	--
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	6/3/2022	Emergency Diesel Generator Engine	17.11	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and use of ultra-low sulfur diesel fuel.	4.8	G/HP-HR
*LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	06-22 - AO-5 Emergency Generator	17.11	Use of good combustion practices and compliance with NSPS Subpart IIII	4.24	LB/HR
*LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	53-22 - PAO Emergency Generator	17.11	Use of good combustion practices, compliance with NSPS Subpart IIII	4.24	LB/HR
*LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	EGEN - Plant Emergency Generator	17.11	Compliance with 40 CFR 60 Subpart IIII	38.24	LB/HR
*LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	E. GEN 01 - Generac SD 2000	17.11	Compliance with the requirements of 40 CFR 60 Subpart IIII	28.48	LB/HR
*LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	E. GEN 02 - Generac SD 2000	17.11	Compliance with the requirements of 40 CFR 60 Subpart IIII	28.48	LB/HR
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	1/30/2014	Emergency Engine/Generator	17.11	Not Specified	4.8	GM/BHP-H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
MD-0043	PERRYMAN GENERATING STATION	MD	PSC CASE NO. 9136	7/1/2014	EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES, LIMITED HOURS OF OPERATION, AND EXCLUSIVE USE OF ULSD	4.8	G/HP-H
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	6/9/2014	EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES AND DESIGNED TO ACHIEVE EMISSION LIMIT	4.8	G/HP-H
MI-0418	WARREN TECHNICAL CENTER	MI	160-11B	1/14/2015	FG-BACKUPGENS (Nine (9) DRUPS Emergency Engines)	17.11	No add-on controls, but injection timing retardation (ITR) is good design. Engines are tuned for low-NOx operation versus low CO operation.	8	G/KW-H
MI-0418	WARREN TECHNICAL CENTER	MI	160-11B	1/14/2015	Four (4) emergency engines in FG-BACKUPGENS	17.11	No add-on controls, but injection timing retardation (ITR) is good design. Engines are tuned for low-NOx operation versus low CO operation.	7.13	G/KW-H
MI-0421	GRAYLING PARTICLEBOARD	MI	59-16	8/26/2016	Emergency Diesel Generator Engine (EUEMRGRICE in FGRICE)	17.11	Certified engines, limited operating hours.	22.6	LB/H
MI-0423	INDECK NILES, LLC	MI	75-16	1/4/2017	EUEMENGINE (Diesel fuel emergency engine)	17.11	Good combustion practices and meeting NSPS IIII requirements.	6.4	G/KW-H
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	5/9/2017	EUEMRGRICE1 in FGRICE (Emergency diesel generator engine)	17.11	Certified engines, limited operating hours.	21.2	LB/H
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	5/9/2017	EUEMRGRICE2 in FGRICE (Emergency Diesel Generator Engine)	17.11	Certified engines, limited operating hours	4.4	LB/H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	6/29/2018	EUEMENGINE (North Plant): Emergency Engine	17.11	Good combustion practices and meeting NSPS Subpart IIII requirements.	6.4	G/KW-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	6/29/2018	EUEMENGINE (South Plant): Emergency Engine	17.11	Good combustion practices and meeting NSPS IIII requirements.	6.4	G/KW-H
MI-0434	FLAT ROCK ASSEMBLY PLANT	MI	122-17	3/22/2018	EUENGINE01 through EUENGINE08	17.11	Good combustion practices.	6.4	G/KW-H
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	7/16/2018	EUEMENGINE: Emergency engine	17.11	State of the art combustion design.	6.4	G/KW-H
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD1--A 1500 HP diesel fueled emergency engine	17.11	Good combustion practices and will be NSPS compliant.	6.4	G/KW-H
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD2--A 6000 HP diesel fuel fired emergency engine	17.11	Good combustion practices and will be NSPS compliant.	6.4	G/KW-H
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	8/21/2019	FGEMENGINE	17.11	Not Specified	5.3	G/HP-H
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE1 in FGRICE)	17.11	Certified engines, limited operating hours	21.2	LB/H
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE2 in FGRICE)	17.11	Certified Engines, Limited Operating Hours	4.4	LB/H
MI-0451	MEC NORTH, LLC	MI	167-17B	6/23/2022	EUEMENGINE (North Plant): Emergency engine	17.11	Good combustion practices and meeting NSPS Subpart IIII requirements.	6.4	G/KW-H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
MI-0452	MEC SOUTH, LLC	MI	168-17B	6/23/2022	EUEMENGINE (South Plant): Emergency engine	17.11	Good Combustion Practices and meeting NSPS Subpart IIII requirements	6.4	G/KW-H
MI-0454	LBWL-ERICKSON STATION	MI	74-18D	12/20/2022	EUEMGD	17.11	Good combustion practices and will be NSPS compliant.	6.4	G/KW-H
NJ-0084	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068/BOP150001	3/10/2016	Diesel Fired Emergency Generator	17.11	use of ultra low sulfur diesel a clean burning fuel.	42.3	LB/H
OH-0363	NTE OHIO, LLC	OH	P0116610	11/5/2014	Emergency generator (P002)	17.11	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	29.01	LB/H
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	8/25/2015	Emergency generator (P003)	17.11	State-of-the-art combustion design	21.6	LB/H
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	9/23/2016	Emergency generator (P003)	17.11	State-of-the-art combustion design	27.18	LB/H
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	4/19/2017	Emergency Generator (P009)	17.11	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	5.5	LB/H
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	9/7/2017	Emergency generator (P003)	17.11	State-of-the-art combustion design	16.07	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	9/27/2017	Emergency generator (P003)	17.11	State-of-the-art combustion design	16.1	LB/H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Generators (2 identical, P004 and P005)	17.11	Certified to the meet the emissions standards in 40 CFR 89.112 and 89.113 pursuant to 40 CFR 60.4205(b) and 60.4202(a)(2). Good combustion practices per the manufacturer's operating manual.	23.21	LB/H
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/7/2017	Emergency Diesel Generator Engine (P001)	17.11	Good combustion design	24.71	LB/H
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	2/9/2018	Emergency diesel-fired generator (P007)	17.11	Comply with NSPS 40 CFR 60 Subpart IIII	28.2	LB/H
OH-0377	HARRISON POWER	OH	P0122266	4/19/2018	Emergency Diesel Generator (P003)	17.11	Good combustion practices (ULSD) and compliance with 40 CFR Part 60, Subpart IIII	19.68	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Emergency Diesel-fired Generator Engine (P007)	17.11	certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual	37.41	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	1,000 kW Emergency Generators (P008 - P010)	17.11	certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual	14.96	LB/H
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	2/6/2019	Emergency Generators (P005 and P006)	17.11	Tier IV engine Tier IV NSPS standards certified by engine manufacturer.	3.45	LB/H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0387	INTEL OHIO SITE	OH	P0132323	9/20/2022	5,051 bhp (3,768 kWm) Diesel-Fired Emergency Generators: P001 through P046	17.11	Certified to meet Tier 2 standards and good combustion practices	6.4	G/KW-H
PA-0310	CPV FAIRVIEW ENERGY CENTER	PA	11-00536A	9/2/2016	Emergency Generator Engines	17.11	Not Specified	4.8	G/BHP-HR
PA-0311	MOXIE FREEDOM GENERATION PLANT	PA	40-00129A	9/1/2015	Emergency Generator	17.11	Not Specified	4.93	G/HP-HR
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	4/10/2014	Emergency Diesel Generator	17.11	Not Specified	2.85	G/B-HP-H
TX-0728	PEONY CHEMICAL MANUFACTURING FACILITY	TX	118239, N200	4/1/2015	Emergency Diesel Generator	17.11	Minimized hours of operations Tier II engine	0.0218	G/HP HR
VA-0325	GREENSVILLE POWER STATION	VA	52525	6/17/2016	DIESEL-FIRED EMERGENCY GENERATOR 3000 kW (1)	17.11	Good Combustion Practices/Maintenance	6.4	G/KW
WI-0284	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-017	4/24/2018	Diesel-Fired Emergency Generators	17.11	The Use of Ultra-Low Sulfur Fuel and Good Combustion Practices	5.36	G/KWH
WI-0286	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-022	4/24/2018	P42 -Diesel Fired Emergency Generator	17.11	Good Combustion Practices, The Use of an Engine Turbocharger and Aftercooler.	5.36	G/KWH

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	9/1/2020	Emergency Diesel Generator (P07)	17.11	Operation limited to 500 hours/year and operate and maintain according to the manufacturer's recommendations.	4.8	G/HP-H
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Emergency Generator	17.11	Not Specified	--	--
WV-0027	INWOOD	WV	R14-0015M	9/15/2017	Emergency Generator - ESDG14	17.11	Engine Design	4.77	G/HP-HR
*WV-0033	MAIDSVILLE	WV	R14-0038	1/5/2022	Emergency Generator	17.11	Combustion Control (retarded timing and/or lean burn)	24.6	LB/HR
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	3/17/2021	Emergency Engines	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	4.86	G/KW-HR
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	1/31/2022	Emergency Engines	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.9	G/BHP-HR
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	DIESEL-FIRED AUXILIARY (EMERGENCY) ENGINES (TWO)	17.21	EXCLUSIVE USE OF ULTRA LOW SULFUR FUEL AND GOOD COMBUSTION PRACTICES	6.4	G/KW-H
MI-0434	FLAT ROCK ASSEMBLY PLANT	MI	122-17	3/22/2018	EULIFESAFETYENG - One diesel-fueled emergency engine/generator	17.21	Good combustion practices.	4	G/KW-H

Process IDs: 99.011, 99.006
Other Search Criteria: –
Process Description: Semiconductor Manufacturing
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/17/2025
Notes & Filtering: Filtered for Process ID and Process Name

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0387	INTEL OHIO SITE	OH	P0132323	9/20/2022	Semiconductor Fabrication: P179 through P182	99.011	Not Specified	--	--
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P12, P22, P18, P19, P28, P29 Organic Stripping Systems, Array/Color Filter and Cell Processes	99.006	Regenerative Thermal Oxidizer	0.04	LB/MMBTU
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P15 & P25 VOC System Array Process	99.006	Use of Ultra-low NOx Burners & Flue Gas Recirculation	2.64	LB/MMBTU
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P13 & P23 Chemical Vapor Deposition System Array Process	99.006	Combustor, Baghouse and Wet Scrubber in series	95	% CONTROL
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P14 & P24 Dry Etching System Array Process	99.006	Combustor and Wet Scrubber in series	0.04	LB/MMBTU

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
AK-0083	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT06	01/06/2015	Diesel Fired Well Pump	17.21	Limited Operation of 168 hr/yr.	4.41	LB/MMBTU
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Fire Pump Diesel Internal Combustion Engines	17.21	Good Combustion Practices	3.7	G/KW-HR
AK-0085	GAS TREATMENT PLANT	AK	AQ1524CPT01	08/13/2020	Three (3) Firewater Pump Engines and two (2) Emergency Diesel Generators	17.21	Good combustion practices, limit operation to 500 hours per year per engine	3.6	G/HP-HR
AK-0086	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT07	03/26/2021	Diesel Fired Well Pump	17.21	Good Combustion Practices and Limited Use	4.41	LB/MMBTU
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Water Pumps	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	14.06	G/BHP-HR
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Emergency Water Pumps	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	14.06	G/BHP-HR
FL-0354	LAUDERDALE PLANT	FL	0110037-013-AC	08/25/2015	Emergency fire pump engine, 300 HP	17.21	Low-emitting fuel and certified engine	4	G / KWH
FL-0367	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-001-AC	07/27/2018	Emergency Fire Pump Engine (347 HP)	17.21	Operate and maintain the engine according to the manufacturer's written instructions	4	G/KW-HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
FL-0371	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-003-AC (PSD-FL-444A)	06/07/2021	Emergency Fire Pump Engine (347 HP)	17.21	Not Specified	4	G/KW-HOUR
IL-0129	CPV THREE RIVERS ENERGY CENTER	IL	16060032	07/30/2018	Firewater Pump Engine	17.21	Not Specified	---	---
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Firewater Pump Engine	17.21	Not Specified	4	G/KW-HR
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Fire Water Pump Engine	17.21	Not Specified	4	GRAMS
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Firewater Pump Engine	17.21	Not Specified	4	G/KW-HR
KS-0030	MID-KANSAS ELECTRIC COMPANY, LLC - RUBART STATION	KS	C-13309	03/31/2016	Compression ignition RICE emergency fire pump	17.21	Not Specified	3	G/HP-HR
LA-0301	LAKE CHARLES CHEMICAL COMPLEX ETHYLENE 2 UNIT	LA	PSD-LA-779	05/23/2014	Firewater Pump Nos. 1-3 (EQTs 997, 998, & 999)	17.21	Compliance with 40 CFR 60 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage	3.21	LB/HR
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Firewater Pump Engines	17.21	Complying with 40 CFR 60 Subpart IIII	3	G/BHP-HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Firewater Pump 1	17.21	Compliance with NESHAP 40 CFR 63 Subpart ZZZZ and NSPS 40 CFR 60 Subpart IIII, and good combustion practices (use of ultra-low sulfur diesel fuel).	1.87	LB/H
LA-0314	INDORAMA LAKE CHARLES FACILITY	LA	PSD-LA-813	08/03/2016	Diesel Firewater pump engines (6 units)	17.21	complying with 40 CFR 63 subpart ZZZZ	---	---
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	firewater pump engines (8 units)	17.21	Complying with 40 CFR 60 Subpart IIII	---	---
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39A	17.21	Good combustion practices and NSPS IIII	4	G/KW-H
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39B	17.21	Good combustion practices and NSPS Subpart IIII	4	G/KW-H
LA-0370	WASHINGTON PARISH ENERGY CENTER	LA	PSD-LA-829(M-1)	04/27/2020	Emergency Fire Pump Engine (EQT0021, ENG-1)	17.21	The use of low sulfur fuels and compliance with 40 CFR 60 Subpart IIII	1.15	LB/HR
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Fired Water Pump Engine	17.21	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and use of ultra-low sulfur diesel fuel.	3	G/HP-HR
LA-0397	WESTLAKE ETHYLENE PLANT	LA	PSD-LA-813(M3)	04/29/2022	Emergency Generators and Fire Water Pumps (EQT0027 - EQT0032, EQT0044, EQT0045)	17.21	Compliance with applicable requirements of 40 CFR 60 Subpart IIII	---	---

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-01 - Firewater Pump Engine No. 1	17.21	Compliance with 40 CFR 60 Subpart IIII	3.96	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-02 - Firewater Pump Engine No. 2	17.21	Compliance with 40 CFR 60 Subpart IIII	3.96	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-03 - Firewater Pump Engine No. 3	17.21	Compliance with the requirements of 40 CFR 60 Subpart IIII	1.49	LB/HR
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	01/30/2014	Fire Pump Engine	17.21	Not Specified	3	GM/BHP-H
MD-0041	CPV ST. CHARLES	MD	PSC CASE NO. 9280	04/23/2014	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	EXCLUSIVE USE OF ULSD FUEL, GOOD COMBUSTION PRACTICES, AND LIMITING THE HOURS OF OPERATION	3	G/HP-H
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	LIMITED OPERATING HOURS, USE OF ULTRA- LOW SULFUR FUEL AND GOOD COMBUSTION PRACTICES	3	G/HP-H
MD-0043	PERRYMAN GENERATING STATION	MD	PSC CASE NO. 9136	07/01/2014	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	GOOD COMBUSTION PRACTICES, LIMITED HOURS OF OPERATION, AND EXCLUSIVE USE OF ULSD	3	G/HP-H
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	06/09/2014	5 EMERGENCY FIRE WATER PUMP ENGINES	17.21	GOOD COMBUSTION PRACTICES AND DESIGNED TO ACHIEVE EMISSION LIMIT	3	G/HP-H
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	EXCLUSIVE USE OF ULTRA LOW SULFUR FUEL AND GOOD COMBUSTION PRACTICES	4	G/KW-H
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	DIESEL-FIRED FIRE PUMP ENGINE	17.21	EXCLUSIVE USE OF ULTRA LOW SULFUR DIESEL FUEL AND GOOD COMBUSTION PRACTICES	4	G/KW-H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices and meeting NSPS Subpart IIII requirements.	3	G/BHP-H
MI-0424	HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	MI	107-13C	12/05/2016	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices.	3	G/HP-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (South Plant): Fire pump engine	17.21	Good combustion practices and meeting NSPS Subpart IIII requirements.	3	G/BHP-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (North Plant): Fire pump engine	17.21	Good combustion practices and meeting NSPS Subpart IIII requirements.	3	G/BHP-H
MI-0434	FLAT ROCK ASSEMBLY PLANT	MI	122-17	03/22/2018	EUFIREPUMPENGS (2 emergency fire pump engines)	17.21	Good combustion practices.	3	G/B-HP-H
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUFPENGINE: Fire pump engine	17.21	State of the art combustion design.	4	G/KW-H
MI-0445	INDECK NILES, LLC	MI	75-16B	11/26/2019	EUFPENGINE (Emergency engine-diesel fire pump	17.21	Good Combustion Practices and meeting NSPS Subpart IIII requirements	3	G/BHP-H
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUFPENGINE (North Plant): Fire Pump Engine	17.21	Good combustion practices and meeting NSPS Subpart IIII requirements.	3	G/B-HP-H
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUFPENGINE (South Plant): Fire pump engine	17.21	Good Combustion Practices and meeting NSPS Subpart IIII requirements	3	G/B-HP-H
NJ-0081	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068 -(BOP120002)	03/07/2014	Emergency diesel fire pump	17.21	Not Specified	1.75	LB/H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
NJ-0084	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068/BOP150001	03/10/2016	Emergency Diesel Fire Pump	17.21	use of ULSD a clean burning fuel, and limited hours of operation	1.7	LB/H
NJ-0085	MIDDLESEX ENERGY CENTER, LLC	NJ	19149/PCP150001	07/19/2016	EMERGENCY DIESEL FIRE PUMP	17.21	Use of Ultra Low Sulfur Diesel (ULSD) Oil a clean burning fuel and limited hours of operation	2.05	LB/H
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Emergency Fire Pump Engine (P003)	17.21	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	1.72	LB/H
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	0.81	LB/H
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	1.79	LB/H
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Fire Pump Diesel Engine (P008)	17.21	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	0.3	LB/H
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	1.97	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	1.97	LB/H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Fire Pump (P006)	17.21	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII. Good combustion practices per the manufacturer's operating manual	2.7	LB/H
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Emergency diesel-fueled fire pump (P006)	17.21	Comply with NSPS 40 CFR 60 Subpart IIII	1.6	LB/H
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Fire Pump (P004)	17.21	Good combustion practices (ULSD) and compliance with 40 CFR Part 60, Subpart IIII	2.12	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Firewater Pumps (P005 and P006)	17.21	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII and employ good combustion practices per the manufacturer's operating manual	2.64	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	275 hp (205 kW) Diesel-Fired Emergency Fire Pump Engine	17.21	Certified to meet the standards in Table 4 of 40 CFR Part 60, Subpart IIII and good combustion practices	4	G/KW-H
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Fire pump engine	17.21	Not Specified	3	GM/HP-HR
PA-0310	CPV FAIRVIEW ENERGY CENTER	PA	11-00536A	09/02/2016	Emergency Fire Pump Engine	17.21	Not Specified	3	G/BHP-HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Fire Pump	17.21	Not Specified	2.85	G/B-HP-H
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED WATER PUMP 376 bph (1)	17.21	Good Combustion Practices/Maintenance	---	---
VA-0328	C4GT, LLC	VA	52588	04/26/2018	Emergency Fire Water Pump	17.21	Good combustion practices and the use of ultra low sulfur diesel (S15 ULSD) fuel oil with a maximum sulfur content of 15 ppmw.	3	G/HP-HR
WI-0263	WISCONSIN POWER & LIGHT - NEENAH GENERATING STATION	WI	14-DMM-200	02/15/2016	Fire pump (process P05)	17.21	Good combustion practices, use diesel fuel, and operate <500 hr/yr	---	---
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Fire Pump (P06)	17.21	Operation limited to 500 hours/year and shall be operated and maintained according to the manufacturer's recommendations.	3	G/HP-H
WI-0302	WPL- RIVERSIDE ENERGY CENTER	WI	19-DMM-153	02/28/2020	Diesel-Fired Fire Pump Engine (P04)	17.21	Only use diesel fuel oil with a sulfur content of no greater than 0.0015% by weight	3.64	LB/H
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Fire Pump Engine	17.21	Not Specified	---	---

Attachment 2
Bay Area Air Quality Management District Summary

Source Type	Classification	Primary Fuel	Reference [a]	Date of Reference	BACT Determination		Typical Technology	
					Feasible /Cost Effective	Achieved in Practice	Feasible/ Cost Effective	Achieved in Practice
Diesel-Fired Emergency Engine	> 50 BHP and < 1000 BHP Output	Diesel	BAAQMD	12/22/2020	Not Specified	CARB ATCM standard for NO_x at applicable horsepower rating (see attached Table 1).	Not Specified	Any engine certified or verified to achieve the applicable standard.
Diesel-Fired Emergency Engine	> 1000 BHP Output	Diesel	BAAQMD	12/22/2020	Not Specified	0.5 g/bhp-hr	Not Specified	Any engine certified or verified to achieve the applicable standard.

Notes:
a. Data sources include:
BAAQMD - Bay Area Air Quality Management District (https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook);

Attachment 3
Semiconductor Permit Review Summary

Source Type	Permit Emission Unit Description	Permittee	State	Permit ID	Issue Date	Pollutant	Control Technology	Permit Limit
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	NOx	Low NOx burners on RCTOs Wet Scrubbers (for acid and NH3) Good Combustion Practices (Trimix System catalyst zones operating between 500-600 degrees F)	212.7 tons per rolling, 12-month period RCTO average emissions shall not exceed 0.96 lb NOx per hour; Combined NOx emssions from scrubbers shall not exceed 39.9 lb/hr; NOx < 0.34 lb/hr for each trimix system
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	NOx	Low NOx burners on RCTOs Wet Scrubbers (for acid and NH3) Good Combustion Practices (Trimix System catalyst zones operating between 500-600 degrees F)	212.7 tons per rolling, 12-month period RCTO average emissions shall not exceed 0.96 lb NOx per hour; Combined NOx emssions from scrubbers shall not exceed 39.9 lb/hr; NOx < 0.34 lb/hr for each trimix system
Semiconductor Process Tool Emissions	Semiconductor Fab Process Tools	Intel Corp	OR	34-2681-ST-01	1/22/2016	NOx	Good Work Practices	---
Semiconductor Process Tool Emissions	Semiconductor Fab Tool Processes	TSMC Arizona Corporation	AZ	P0008497	11/4/2022	NOx	Good Combustion Practices in POU Abatement Devices	---

APPENDIX J. CARBON MONOXIDE BACT ANALYSIS

This appendix presents the best available control technology (BACT) determinations for the control of carbon monoxide (CO) emissions from the proposed emission sources at the Proposed Air Permit Project. Micron has reviewed the RACT/BACT/LAER Clearinghouse (RBLC), documentation from the Bay Area Air Quality Management Districts (BAAQMD), and relevant semiconductor fab permits to identify appropriate technologies and/or limits for emission source categories. Additional details of the full search are provided in Section 5.4 of the Micron Clay Air Permit Application. As the add-on control technologies and other control mechanisms are similar for many of the sources that Micron operates, types of control technologies identified are summarized in Section 1.1 of this appendix. Not all technologies are applicable to all emission sources, and as such, source-specific considerations for each source category are discussed in the subsequent sections.

Emission sources evaluated in this BACT analysis include:

- Natural gas-fired boilers;
- Natural gas-fired water bath vaporizers;
- Diesel-fired emergency generator engines;
- Diesel-fired emergency fire pump engine; and
- Semiconductor process tools and other process and support operations that emit CO.

1.1 Available Technology Summary

The technologies identified to mitigate CO emissions are described in the following subsections.

1.1.1 Tier 4 Compliant Emergency Generator Engines

Engines meeting Tier 4 emissions standards are designed with a focus on reducing emissions, including CO, to meet stringent environmental and regulatory standards. These engines utilize various engineering and technological advancements to minimize CO emissions while maintaining performance and efficiency.

1.1.2 Good Combustion and Maintenance Practices for Fuel-Fired Equipment

Good combustion and maintenance practices are essential for operating fuel-fired equipment efficiently and effectively while minimizing CO emissions. For this source category, good combustion practices are generally considered to be implementing the manufacturer's recommendations, which may include a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Minimizing engine idle time at startup;
- Conducting operator training; and
- Conducting periodic maintenance.

The specific practices available for each source category are discussed in the subsequent sections.

1.1.3 Use of Ultra-Low-Sulfur Diesel for Emergency Generator Engines

The utilization of ultra-low-sulfur diesel (ULSD) in diesel fuel-fired equipment results in lower CO emissions by promoting cleaner combustion and more efficient utilization of fuel.[1]

1.1.4 Oxidation Catalyst, Catalytic Controls, or Catalytic Oxidation Systems

Catalytic oxidation (also known as catalytic controls or catalytic incineration) can be used to oxidize an oxidizable compound in an air stream, including CO. As such, the use of catalytic oxidation is an effective method for reducing CO emissions. In this CO BACT selection analysis, the catalysts evaluated are specifically designed to facilitate the chemical conversion of CO into CO_2.[2]

1.1.5 Operating Limitations

Limiting the hours of operation for engines, water bath vaporizers, and boilers reduces CO emissions by decreasing the overall time the equipment runs and consumes fuel.

1.1.6 Control Technologies Not Evaluated

Some control technologies have been omitted from the BACT evaluation due to various considerations. These control technologies, and the reasons for their omission, are summarized in Table 1-1.

Table 1-1. Summary of Control Technologies Not Evaluated

Emission Source Category	Technology	Reasoning
All Source Categories	Use of Alternate Fuels	The use of different fuel or raw material that would redefine the Proposed Air Permit Project are out of the scope of BACT evaluations. Where different fuel specifications within the fuel type (i.e., use of ULSD) are feasible for the project, they have been identified above in Section 1.1 and are evaluated in the sections following this table.
Natural Gas-Fired Boilers and Water Bath Vaporizers	Economizer	Economizers are only mentioned once in the RBLC for a boiler that is significantly larger than the boilers at the Proposed Air Permit Project. Further, the primary purpose of economizers is to improve fuel efficiency and not to control CO emissions.
	Insulation	Insulation is considered part of "Good Combustion and Maintenance Practices" and is thus not evaluated as a separate control technology.

[1] *Nationwide Emission Benefits of a Low Sulfur Diesel Fuel*, Air Improvement Resource, Inc., March 3, 1999.

[2] EPA Cost reports and Guidance for Air Pollution Regulations, Section 3 – VOC Controls, Chapter 2 - Incinerators and Oxidizers", U.S. Environmental Protection Agency, EPA-450/3-79-006.

Emission Source Category	Technology	Reasoning
Natural Gas-Fired Boilers and Water Bath Vaporizers	Oxygen Trim Control Systems	Oxygen trim control systems reduce CO emissions by continuously adjusting the air-to-fuel ratio in combustion systems based on real-time measurements of oxygen levels, ensuring optimal combustion efficiency and minimizing the production of CO. Oxygen trim control systems are considered part of "Good Combustion and Maintenance Practices" as a part of optimizing the air-fuel ratio and thus are not evaluated as a separate control technology.
Diesel-Fired Emergency Generator Engines and Diesel-Fired Emergency Fire Pump Engine	Turbocharger	EPA documentation suggests that turbocharging does not impact CO emissions for diesel-fired engines.[3]
	Intercooler/Aftercooler Systems	EPA documentation suggests that intercoolers and aftercoolers do not impact CO emissions for diesel-fired engines.[4]

1.2 Natural Gas-Fired Boilers

Natural gas-fired boilers are heating systems used to generate hot water or steam for maintaining precise temperature control for various stages of production, ensuring the efficient operation of machinery. Micron is proposing to use efficient units that are specifically designed to meet the Proposed Air Permit Project's thermal requirements while minimizing energy consumption and emissions.

The BACT analysis for CO emissions from natural gas-fired boilers is presented in this section.

1.2.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing CO emissions from the proposed natural gas-fired boilers:

- Good combustion and maintenance practices;
- Oxidation catalysts; and
- Operating hour limitations.

In addition to identifying specific control technologies, Micron has identified potentially relevant numerical emission limits that could be considered BACT for natural gas-fired boilers. Proposed BACT emission limits are discussed further in Step 5.

1.2.2 Step 2. Eliminate Technically Infeasible Options

For oxidation catalysts to be effective, waste gases must be heated by auxiliary burners to approximately 600 to 800°F before entering the catalyst bed. The maximum design exhaust temperature of the catalyst is typically 1,000 – 1,250°F.[5] Since the typical exhaust temperature of natural gas-fired boilers is between 350 – 500°F, which is below the operating range for an oxidation catalyst, additional auxiliary fuel would be

[3] AP-42 Vol. I, Chapter 3.3: Gasoline And Diesel Industrial Engines.

[4] Ibid.

[5] EPA Air Pollution Control Technology Fact Sheet for Catalytic Incinerators (EPA-452/F-03-018).

required to heat the stream to the required temperature, creating additional combustion emissions. Therefore, the use of an oxidation catalyst is not considered feasible.

1.2.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.2.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.2.5 Step 5. Select BACT

Micron intends to purchase natural gas-fired boilers designed to meet a CO emission limit of 50 parts per million by volume on a dry basis (ppmvd) at 3% oxygen (O_2). This is the lowest emission limitation identified as BACT based on the RBLC search conducted. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results. Micron will also implement the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 6,000 hours per year for each boiler.

A BACT limit must not be higher than an applicable New Source Performance Standard (NSPS) emission limit. The boilers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for CO for natural gas-fired steam generating units.

1.3 Natural Gas-Fired Water Bath Vaporizers

This Permit Application 2 separates "natural gas-fired combustion equipment" into boilers and water bath vaporizers. Natural gas-fired water bath vaporizers are used in the semiconductor industry to provide a reliable and efficient source of high-purity nitrogen gas. These water bath vaporizers use natural gas to heat water that is used to vaporize liquified nitrogen used in semiconductor manufacturing.

The BACT analysis for CO emissions from natural gas-fired water bath vaporizers is presented in this section.

1.3.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing CO emissions from the proposed natural gas-fired water bath vaporizers:

- Good combustion and maintenance practices;
- Oxidation Catalysts; and
- Operating hour limitations.

In addition to identifying specific control technologies, Micron has identified potentially relevant numerical emission limits that could be considered BACT for natural gas-fired water bath vaporizers. Proposed BACT emission limits are discussed further in Step 5.

1.3.2 Step 2. Eliminate Technically Infeasible Options

For oxidation catalysts to be effective, waste gases must be heated by auxiliary burners to approximately 600 to 800 °F before entering the catalyst bed. The maximum design exhaust temperature of the catalyst is typically 1,000 – 1,250 °F.[6] This is outside of the range of the proposed natural gas-fired water bath vaporizers, and, therefore, additional auxiliary fuel would be required to heat the stream to the required temperature, creating additional combustion emissions. Additionally, there are no instances of oxidation catalysts being used in practice to control CO emissions from water bath vaporizers of any size based on a search of the RBLC. Therefore, the use of an oxidation catalyst is not considered feasible.

1.3.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.3.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.3.5 Step 5. Select BACT

Micron intends to purchase natural gas-fired water bath vaporizers designed to meet a CO emission limit of 84 pounds per standard cubic feet (lb/MMscf). This is the lowest emission limitation identified as BACT based on the RBLC search conducted. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results. Micron is aware of one other semiconductor fab found in the RBLC search conducted (Intel Ohio, RBLC ID OH-0387) with proposed a BACT emission limit for water bath vaporizers of 0.037 lb/MMBtu (approximately 37.7 lb/MMscf). At the time of this Proposed Air Permit Project, the Intel Ohio fab is still in the construction phase and the proposed emission rate has not been demonstrated in practice. Micron reached out to multiple vendors during the design process and the proposed 84 lb/MMscf reflects the lowest emission rate guaranteed by a potential vendor. For this reason, the lower emission rate has been excluded from this assessment.

Micron will also implement the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;

[6] EPA Air Pollution Control Technology Fact Sheet for Catalytic Incinerators (EPA-452/F-03-018).

- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 8,000 hours per year for all water bath vaporizers combined, with no more than four units operating at a time.

Note that the emission limit identified is different than Permit Application 1 due to the separation of "natural gas-fired combustion equipment" into boilers and water bath vaporizers.

A BACT limit must not be higher than an applicable New Source Performance Standard (NSPS) emission limit. The water bath vaporizers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for CO for natural gas-fired steam generating units.

1.4 Diesel-Fired Emergency Generator Engines

The Proposed Air Permit Project will utilize diesel-fired emergency generator engines to ensure that critical life safety and process safety systems receive uninterrupted power during power outages. These units will not be designed to run manufacturing operations during major electrical outages and instead will allow equipment and processes to shut down gradually as necessary, protecting sensitive manufacturing operations, preventing unsafe conditions from forming in the fabs, reducing emissions of process gases directly to the atmosphere, and protecting employee safety.

1.4.1 Step 1. Identify All Control Technologies

Diesel-fired emergency generator engine technology and associated emission standard requirements are well known and are considered by many regulatory entities to meet BACT. These standards are based on the engine's maximum power capacity and the year in which the engine was manufactured. Currently, the EPA has implemented the Tier 4 Final emission standards for non-road diesel engines, which set stringent limits for newly manufactured units.[7] EPA has also set limitations for stationary internal combustion engines under 40 CFR Part 60 Subpart IIII (NSPS Subpart IIII), "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." For engines with certain power capacity and manufacture year, NSPS Subpart IIII references the engine standards established for nonroad engines under 40 CFR 1039.

In addition, the following control methods have been identified for reducing CO emissions from the proposed diesel-fired emergency generator engines:

- Good combustion and maintenance practices;
- Operating hour limitations; and
- Use of ULSD.

[7] 40 CFR 1039.101

1.4.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 for diesel-fired emergency generator engines are technically feasible.

1.4.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.4.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.4.5 Step 5. Select BACT

The following control technologies are proposed to achieve BACT for diesel-fired emergency generator engines:

- The purchase of an engine compliant with emission standards;
- Good combustion and maintenance practices, including a combination of the following:
  - Minimizing engine's idle time at startup;
  - Optimizing the air-fuel ratio;
  - Maintaining proper insulation;
  - Establishing proper combustion zone temperature control;
  - Conducting operator training; and
  - Conducting periodic maintenance
- Operating hour limitations; and
- The firing of ULSD.

A BACT limit must not be higher than an applicable NSPS emission limit. The diesel-fired generators will be affected facilities under 40 CFR Part 60 Subpart IIII (NSPS Subpart IIII), "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." NSPS Subpart IIII provides CO emission standards for various engine power and displacement categories. However, these emission standards are less stringent than the Tier 4 Final emission standards.

Therefore, Micron is proposing the Tier 4 Final emission standards outlined in Table 1-2 as the BACT CO limit for diesel-fired emergency generator engines and will procure new engines for the Proposed Air Permit Project that meet these standards. Control technologies to achieve Tier 4 Final emission standards may vary depending on the engine manufacturer and may include the use of catalytic oxidation where that technology is available and appropriate. In addition, Micron will fire only ULSD in the diesel-fired emergency generator engines and proposes an operating hours limit of 100 hours per year for each engine.

Table 1-2. 40 CFR §1039.101
Tier 4 Final Exhaust Emission Standards After the 2014 Model Year

Maximum Engine Power	Application	CO Emission Standard g/kW-hr (g/bhp-hr)
kW < 19	All	6.6
19 ≤ kW < 56	All	5.0
56 ≤ kW < 130	All	5.0
130 ≤ kW ≤ 560	All	3.5
	Generator Sets	3.5
kW > 560	All Except Generator Sets	3.5

1.5 Diesel-Fired Emergency Fire Pump Engine

The Proposed Air Permit Project will include one diesel-fired emergency fire pump engine to provide a reliable power source in the event of a fire occurring during a power outage when the electric fire pump would not be available.

1.5.1 Step 1. Identify All Control Technologies

Diesel-fired emergency fire pump engine technology and associated emission standard requirements are well known and are considered by many regulatory entities to meet BACT. These standards are based on the fire pump engine's maximum power capacity and the year in which the engine was manufactured. EPA has set limitations for stationary internal combustion engines, including fire pump engines, under NSPS Subpart IIII. The EPA has also implemented Tier emission standards (Tier 1 – Tier 4 Final) for non-road diesel engines, which set stringent limits for newly manufactured units. Based on the RBLC search conducted, as well as input from Micron's equipment vendors, Tier 4 compliant fire pump engines are not available. As such, the most stringent emission standards are Tier 3, which align with NSPS IIII emission standards for the proposed fire pump engine for CO.

In addition, the following control methods have been identified for reducing CO emissions from the proposed diesel-fired emergency fire pump engine:

- Good combustion and maintenance practices;
- Operating hours limitations; and
- Use of ULSD.

1.5.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 for the diesel-fired emergency fire pump engine are technically feasible.

1.5.3 Step 3. Rank Remaining Control Technologies by Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.5.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.5.5 Step 5. Select BACT

The following control technologies are proposed to achieve BACT for the diesel-fired emergency fire pump engine:

- The purchase of an engine compliant with emission standards;
- Good combustion and maintenance practices, including a combination of the following:
  - Minimizing engine's idle time at startup;
  - Optimizing the air-fuel ratio;
  - Maintaining proper insulation;
  - Establishing proper combustion zone temperature control;
  - Conducting operator training; and
  - Conducting periodic maintenance
- The use of ULSD; and
- Operating hour limitations.

A BACT limit must not be higher than an applicable NSPS emission limit. The diesel-fired emergency fire pump engine will be an affected facility under NSPS Subpart IIII. NSPS Subpart IIII provides CO emission standards for various engine power and displacement categories. For the capacity of the proposed diesel-fired emergency fire pump engine, NSPS IIII emission standards align with Tier 3 emission standards.

Therefore, Micron is proposing compliance with the NSPS IIII and Tier 3 emission standard of 2.6 grams per brake horsepower-hour (g/bhp-hr) as the BACT CO limit for the diesel-fired emergency fire pump engine. Control technologies to achieve this emission standard may vary depending on the engine manufacturer and may include the use of catalytic oxidation where that technology is available and appropriate. In addition, Micron will fire only ULSD in the diesel-fired emergency fire pump engine and proposes an operating hours limit of 500 hours per year.

1.6 Semiconductor Process Tools and PEECs

Micron is proposing to install semiconductor process equipment, or "tools", as discussed within the Micron Clay Air Permit Application. Carbon monoxide is emitted through the operation of the semiconductor process tools as a result of use as a process material and as a reaction byproduct of carbon-containing raw materials. In addition, management of carbon-containing materials in process equipment exhaust conditioners (PEECs) generates CO, as does natural gas combustion within those units.[8] CO generated through the semiconductor process tools and PEECs will be exhausted through wet scrubbers. Refer to the process flow diagrams in Appendix E for additional details.

[8] This discussion does not include Point of Use (POU) control devices, since POUs are being permitted as control devices and not process equipment.

1.6.1 Step 1. Identify All Control Technologies

A review of the EPA's RBLC database did not identify any entries of semiconductor facilities that utilize add-on control devices to abate CO emissions that are generated from semiconductor process tools.

Micron also reviewed relevant semiconductor air permits to evaluate if any control technologies are currently being utilized to abate CO emissions from semiconductor process tools. During the review of these permits, it was determined that no add-on control devices are currently installed to abate such CO emissions.

Good combustion and maintenance practices for PEECs is the only method that has been identified for reducing CO emissions from the semiconductor process tools.

1.6.2 Step 2. Eliminate Technically Infeasible Options

The only control technology identified in Step 1 for semiconductor process tools is technically feasible.

1.6.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

Since the use of good combustion and maintenance practices is the only identified control option, ranking the remaining control technologies by control effectiveness is unnecessary. Therefore, the next step is to evaluate the most effective controls.

1.6.4 Step 4. Evaluate the Most Effective Controls and Document

Since the use of good combustion and maintenance practices is the only identified control option, evaluating the most effective controls is unnecessary. Therefore, the next step is to select BACT.

1.6.5 Step 5. Select BACT

Based on the analysis presented above, Micron is proposing to achieve BACT for CO emitted from semiconductor process tools by using good combustion and maintenance practices for PEECs, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

Given the diverse processes and complexity of semiconductor manufacturing, Micron is proposing to comply with good combustion and maintenance practices as a work practice standard to achieve BACT for CO emitted from semiconductor process equipment. Micron is proposing showing compliance for CO emitted from the plasma etch process by meeting either (i) maximum of 0.03 lbs CO per hour per Fab or (ii) maximum of 184.2 lbs CO per year per Fab, measured at the Fab Acid exhaust.

Attachment 1
RACT/BACT/LAER Clearinghouse Search Results

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/09/2015	PACKAGE BOILER	13.31	GCP	0.08	LB/MMBTU
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/09/2015	2 CALP LINE BOILERS	13.31	GCP	0.08	LB/MMBTU
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	02/14/2019	SN-233 Galvanizing Line Boilers	13.31	Good combustion practices	0.084	LB/MMBTU
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-202, 203, 204 Pickle Line Boilers	13.31	Good Combustion Practice	0.084	LB/MMBTU
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Pickle Line #2 Boiler #1 & #2 (EP 21-04 & EP 21-05)	13.31	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84	LB/MMSCF
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	AUXILLARY BOILER	13.31	EXCLUSIVE USE OF PIPELINE QUALITY NATURAL GAS AND GOOD COMBUSTION PRACTICES	0.036	LB/MMBTU

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	AUXILIARY BOILER	13.31	Good Combustion Practice	0.037	LB/MMBTU
MI-0420	DTE GAS COMPANY--MILFORD COMPRESSOR STATION	MI	185-15	06/03/2016	FGAUXBOILERS	13.31	Good combustion practices and clean burn fuel (pipeline quality natural gas)	0.08	LB/MMBTU
MI-0426	DTE GAS COMPANY - MILFORD COMPRESSOR STATION	MI	185-15A	03/24/2017	FGAUXBOILERS (6 auxiliary boilers EUAUXBOIL2A, EUAUXBOIL3A, EUAUXBOIL2B, EUAUXBOIL3B, EUAUXBOIL2C, EUAUXBOIL3C)	13.31	Good combustion practices and clean burn fuel (pipeline quality natural gas).	84	LB/MMSCF
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Auxiliary Boiler (B001)	13.31	Good combustion controls	1.87	LB/H
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Auxiliary Boiler (B001)	13.31	Good combustion controls	2.08	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Auxiliary Boiler (B001)	13.31	good combustion controls	2.08	LB/H

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Auxiliary Boiler (B001)	13.31	Good combustion controls	0.99	LB/H
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Auxiliary Boiler (B001)	13.31	Good combustion practices	1.67	LB/H
OH-0383	PETMIN USA INCORPORATED	OH	P0127678	07/17/2020	Startup boiler (B001)	13.31	good combustion practices and the use of natural gas	1.25	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	13.31	Good combustion practices and the use of natural gas	33	T/YR
OK-0168	SEMINOLE GNRTNG STA	OK	2010-594-C(M-2)PSD	05/05/2015	NATURAL GAS-FIRED BOILER (100MMBTUH)	13.31	NO CONTROLS FEASIBLE;GOOD COMBUSTION PRACTICES	0.0075	LB/MMBTU
OR-0050	TROUTDALE ENERGY CENTER, LLC	OR	26-0235	03/05/2014	Auxiliary boiler	13.31	Utilize Low-NOx burners and FGR.	0.04	LB/MMBTU
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Auxillary Boiler	13.31	Not Specified	0.037	LB/MMBTU
PA-0316	RENOVO ENERGY CENTER, LLC	PA	18-00033A	01/26/2018	Auxiliary Boiler	13.31	Not Specified	0.036	LB
SC-0192	CANFOR SOUTHERN PINE - CONWAY MILL	SC	1340-0029-CI	05/21/2019	Boiler No. 2	13.31	Work Practice Standards	0.0375	LB/MMBTU

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
TX-0772	PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT)	TX	118901, GHGPSDTX108 AND PSDTX1	11/06/2015	Commercial/Institutional-Size Boilers/Furnaces	13.31	Good combustion practice to ensure complete combustion.	50	PPMVD @ 3% O2
WI-0306	WPL- RIVERSIDE ENERGY CENTER	WI	19-POY-212	02/28/2020	Temporary Boiler (B98A)	13.31	Shall be operated for no more than 500 hours and combust only pipeline quality natural gas.	0.04	LB/MMBTU
WY-0075	CHEYENNE PRAIRIE GENERATING STATION	WY	MD-16173	07/16/2014	Auxiliary Boiler	13.31	good combustion	0.0375	LB/MMBTU
SC-0183	NUCOR STEEL - BERKELEY	SC	0420-0060-DX	05/04/2018	Pickle Line Equipment (pickle line no. 3 boilers)	19.6	Good Combustion Practices	84	LB/MMSCF

Process IDs: --
Other Search Criteria: Process Name Contains "Vaporizer"
Process Description: Natural Gas-fired Water Bath Vaporizers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered for Fuel Type as "Natural Gas" or Equivalent

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Air Separation Plant Water Vaporizer	81.29	Combustion of natural gas and good combustion practices	0.0824	LB/MMBTU
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 13-01 - Water Bath Vaporizer	19.9	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan	84	LB/MMSCF
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Unit Water Bath Vaporizer (2 indirect burners) (EP 23-01)	19.6	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84	LB/MMSCF
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	13.31	Good combustion practices and the use of natural gas	8.76	T/YR
WV-0034	WEST VIRGINIA STEEL MILL	WV	R14-0039	05/05/2022	Water Bath Vaporizer	81.29	Good Combustion Practices	0.91	LB/HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
AK-0082	POINT THOMSON PRODUCTION FACILITY	AK	AQ1201CPT03	01/23/2015	Emergency Camp Generators	17.11	Not Specified	2.6	GRAMS/HP-H
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Black Start and Emergency Internal Cumbustion Engines	17.11	Good Combustion Practices	4.38	G/KW-HR
AL-0301	NUCOR STEEL TUSCALOOSA, INC.	AL	413-0033-X014 - X020	07/22/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	Not Specified	0.0055	LB/HP-H
AR-0177	NUCOR STEEL ARKANSAS	AR	1139-AOP-R27	11/21/2022	SN-230 Galvanizing Line No, 2 Emergency Generator	17.11	Not Specified	3.5	G/KW-HR
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Emergency Generators	17.11	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.9	G/BHP-HR
FL-0346	LAUDERDALE PLANT	FL	0110037-011-AC	04/22/2014	Four 3100 kW black start emergency generators	17.11	Good combustion practice	3.5	GRAMS PER KW-HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
FL-0347	ANADARKO PETROLEUM CORPORATION - EGOM	FL	OCS-EPA-R4015	09/16/2014	Emergency Diesel Engine	17.11	Use of good combustion practices based on the most recent manufacturer's specifications issued for engines and with turbocharger, aftercooler, and high injection pressure	--	--
FL-0356	OKEECHOBEE CLEAN ENERGY CENTER	FL	0930117-001-AC	03/09/2016	Three 3300-kW ULSD emergency generators	17.11	Use of clean engine	3.5	G / KW-HR
FL-0363	DANIA BEACH ENERGY CENTER	FL	0110037-017-AC	12/04/2017	Two 3300 kW emergency generators	17.11	Certified engine	3.5	GRAMS PER KWH
FL-0367	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-001-AC	07/27/2018	1,500 kW Emergency Diesel Generator	17.11	Operate and maintain the engine according to the manufacturer's written instructions	3.5	G/KW-HOUR
FL-0371	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-003-AC (PSD-FL-444A)	06/07/2021	1,500 kW Emergency Diesel Generator	17.11	Not Specified	3.5	G/KW-HOUR
IL-0114	CRONUS CHEMICALS, LLC	IL	13060007	09/05/2014	Emergency Generator	17.11	Tier IV standards for non-road engines at 40 CFR 1039.102, Table 7.	3.5	G/KW-H
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Emergency Engine	17.11	Not Specified	3.5	G/KW-HR
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Emergency Engines	17.11	Not Specified	3.5	GRAMS

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Emergency Generator Engine	17.11	Not Specified	3.5	G/KW-HR
IN-0173	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES	2.61	G/BHP-H
IN-0180	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES	2.61	G/B-HP-H
IN-0263	MIDWEST FERTILIZER COMPANY LLC	IN	129-36943-00059	03/23/2017	EMERGENCY GENERATORS (EU014A AND EU-014B)	17.11	GOOD COMBUSTION PRACTICES	2.61	G/HP-H EACH
IN-0317	RIVERVIEW ENERGY CORPORATION	IN	T147-39554-00065	06/11/2019	Emergency generator EU-6006	17.11	Tier II diesel engine	3.5	G/KWH
IN-0324	MIDWEST FERTILIZER COMPANY LLC	IN	129-44510-00059	05/06/2022	emergency generator EU 014a	17.11	Not Specified	2.61	G/HP-HR
IN-0359	NUCOR STEEL	IN	107-45480-00038	03/30/2023	Emergency Generator (CC-GEN1)	17.11	oxidation catalyst and certified engine	2.61	G/HP-HR
IN-0365	MAPLE CREEK ENERGY LLC	IN	T153-45909-00056	06/19/2023	Emergency generator	17.11	Not Specified	2.6	G/HP-HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
KY-0109	FRITZ WINTER NORTH AMERICA, LP	KY	V-16-022 R1	10/24/2016	Emergency Generators #1, #2, & #3 (EU72, EU73, & EU74)	17.11	The permittee shall prepare and maintain for EU72, EU73, and EU74, within 90 days of startup, a good combustion and operation practices plan (GCOP) that defines, measures and verifies the use of operational and design practices determined as BACT for minimizing CO, VOC, PM, PM10, and PM2.5 emissions. Any revisions requested by the Division shall be made and the plan shall be maintained on site. The permittee shall operate according to the provisions of this plan at all times, including periods of startup, shutdown, and malfunction. The plan shall be incorporated into the plant standard operating procedures (SOP) and shall be made available for the Division's inspection. The plan shall include, but not be limited to: i. A list of combustion optimization practices and a means of verifying the practices have occurred. ii. A list of combustion and operation practices to be used to lower energy consumption and a means of verifying the practices have occurred. iii. A list of the design choices determined to be BACT and verification that designs were implemented in the final construction.	2.6	G/HP-HR (EU72 &EU73)
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-02 - North Water System Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61	G/HP-HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-03 - South Water System Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61	G/HP-HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-07 - Air Separation Plant Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61	G/HP-HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-01 - Caster Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61	G/HP-HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	New Pumphouse (XB13) Emergency Generator #1 (EP 08-05)	17.11	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	--	--
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Tunnel Furnace Emergency Generator (EP 08-06)	17.11	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	--	--
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Caster B Emergency Generator (EP 08-07)	17.11	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	--	--
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Unit Emergency Generator (EP 08-08)	17.11	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	--	--

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0288	LAKE CHARLES CHEMICAL COMPLEX	LA	PSD-LA-778	05/23/2014	Emergency Diesel Generators (EQT 629, 639, 838, 966, & 1264)	17.11	Comply with 40 CFR 60 Subpart IIII; operate the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	15.43	LB/HR
LA-0296	LAKE CHARLES CHEMICAL COMPLEX LDPE UNIT	LA	PSD-LA-779	05/23/2014	Emergency Diesel Generators (EQTs 622, 671, 773, 850, 994, 995, 996, 1033, 1077, 1105, & 1202)	17.11	Compliance with 40 CFR 60 Subpart IIII; operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage.	15.43	LB/HR
LA-0305	LAKE CHARLES METHANOL FACILITY	LA	PSD-LA-803(M1)	06/30/2016	Diesel Engines (Emergency)	17.11	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Emergency Generator Engines	17.11	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	06/30/2017	DEG1-13 - Diesel Fired Emergency Generator Engine (EQT0012)	17.11	Compliance with NSPS Subpart IIII	0.51	LB/HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Generator 1	17.11	Compliance with NESHAP 40 CFR 63 Subpart ZZZZ and NSPS 40 CFR 60 Subpart IIII, and good combustion practices (use of ultra-low sulfur diesel fuel).	14.81	LB/H
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 1	17.11	Compliance with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	30.86	LB/H
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 2	17.11	Compliance with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	30.86	LB/H
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	emergency generator engines (6 units)	17.11	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0317	METHANEX - GEISMAR METHANOL PLANT	LA	PSD-LA-761(M4)	12/22/2016	Emergency Generator Engines (4 units)	17.11	complying with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	--	--
LA-0331	CALCASIEU PASS LNG PROJECT	LA	PDS-LA-805	09/21/2018	Large Emergency Engines (>50kW)	17.11	Good Combustion and Operating Practices.	3.5	G/KW-H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0364	FG LA COMPLEX	LA	PSD-LA-812	01/06/2020	Emergency Generator Diesel Engines	17.11	Compliance with the limitations imposed by 40 CFR 63 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	--	--
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Generator Engine	17.11	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	2.6	G/HP-HR
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	06-22 - AO-5 Emergency Generator	17.11	Use of good combustion practices and compliance with NSPS Subpart IIII	3.81	LB/HR
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	53-22 - PAO Emergency Generator	17.11	Use of good combustion practices, compliance with NSPS Subpart IIII	3.81	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	EGEN - Plant Emergency Generator	17.11	Compliance with 40 CFR 60 Subpart IIII	20.91	LB/HR
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	01/30/2014	Emergency Engine/Generator	17.11	Not Specified	2.6	GM/BHP-H
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	EMERGENCY GENERATOR 1	17.11	USE OF ULSD FUEL, GOOD COMBUSTION PRACTICES AND HOURS OF OPERATION LIMITED TO 100 HOURS PER YEAR	2.6	G/HP-H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	06/09/2014	EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES AND DESIGNED TO MEET EMISSION LIMIT	2.6	G/HP-H
MI-0421	GRAYLING PARTICLEBOARD	MI	59-16	08/26/2016	Emergency Diesel Generator Engine (EUEMRGRICE in FGRICE)	17.11	Good design and combustion practices.	3.5	G/KW-H
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUEMENGINE (Diesel fuel emergency engine)	17.11	Good combustion practices and meeting NSPS Subpart IIII requirements.	3.5	G/KW-H
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	05/09/2017	EUEMRGRICE1 in FGRICE (Emergency diesel generator engine)	17.11	Good design and combustion practices.	3.5	G/KW-H
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	05/09/2017	EUEMRGRICE2 in FGRICE (Emergency Diesel Generator Engine)	17.11	Good design and combustion practices.	3.5	G/KW-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (North Plant): Emergency Engine	17.11	Good combustion practices and meeting NSPS Subpart IIII requirements.	3.5	G/KW-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (South Plant): Emergency Engine	17.11	Good combustion practices and meeting NSPS IIII requirements.	3.5	G/KW-H
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUEMENGINE: Emergency engine	17.11	State of the art combustion design.	3.5	G/KW-H
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD1--A 1500 HP diesel fueled emergency engine	17.11	Good combustion practices and will be NSPS compliant.	3.5	G/KW-H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD2--A 6000 HP diesel fuel fired emergency engine	17.11	Good combustion practices and will be NSPS compliant.	3.5	G/KW-H
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGEMENGINE	17.11	Not Specified	0.15	G/HP-H
MI-0447	LBWL--ERICKSON STATION	MI	74-18A	01/07/2021	EUEMGD--emergency engine	17.11	Good combustion practices and will be NSPS compliant.	3.5	G/KW-H
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE1 in FGRICE)	17.11	Good design and combustion practices	3.5	G/KW-H
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE2 in FGRICE)	17.11	Good Design and Combustion Practices	3.5	G/KW-H
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUEMENGINE (North Plant): Emergency engine	17.11	Good combustion practices and meeting NSPS IIII requirements.	3.5	G/KW-H
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUEMENGINE (South Plant): Emergency engine	17.11	Good Combustion Practices and meeting NSPS Subpart IIII requirements	3.5	G/KW-H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
MI-0454	LBWL-ERICKSON STATION	MI	74-18D	12/20/2022	EUEMGD	17.11	Good combustion practices and will be NSPS compliant.	3.5	G/KW-H
NJ-0084	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068/BOP150001	03/10/2016	Diesel Fired Emergency Generator	17.11	use of ultra low sulfur diesel oil a clean burning fuel	3.5	LB/H
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Emergency generator (P002)	17.11	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	8.49	LB/H
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency generator (P003)	17.11	State-of-the-art combustion design	13.5	LB/H
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency generator (P003)	17.11	State-of-the-art combustion design	16.96	LB/H
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Generator (P009)	17.11	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	28.8	LB/H
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency generator (P003)	17.11	State-of-the-art combustion design	8.8	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency generator (P003)	17.11	State-of-the-art combustion design	8.8	LB/H
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Generators (2 identical, P004 and P005)	17.11	Certified to the meet the emissions standards in 40 CFR 89.112 and 89.113 pursuant to 40 CFR 60.4205(b) and 60.4202(a)(2). Good combustion practices per the manufacturer's operating manual.	12.69	LB/H
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Emergency Diesel Generator Engine (P001)	17.11	Good combustion design	12.64	LB/H

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Emergency Diesel Fire Pump Engine (P002)	17.11	Good combustion design	4.01	LB/H
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Emergency diesel-fired generator (P007)	17.11	Comply with NSPS 40 CFR 60 Subpart IIII	15.4	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Emergency Diesel-fired Generator Engine (P007)	17.11	certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer operating manual	19.25	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	1,000 kW Emergency Generators (P008 - P010)	17.11	certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturers operating manual	7.7	LB/H
OH-0383	PETMIN USA INCORPORATED	OH	P0127678	07/17/2020	Emergency Generators (P005 and P006)	17.11	Tier IV engine Good combustion practices	--	--
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	5,051 bhp (3,768 kWm) Diesel-Fired Emergency Generators: P001 through P046	17.11	Certified to meet Tier 2 standards and good combustion practices	3.5	G/KW-H
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	2000 kW Emergency Generator	17.11	Not Specified	0.6	GM/HP-HR
PA-0310	CPV FAIRVIEW ENERGY CENTER	PA	11-00536A	09/02/2016	Emergency Generator Engines	17.11	Not Specified	2.61	G/BHP-HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
PA-0311	MOXIE FREEDOM GENERATION PLANT	PA	40-00129A	09/01/2015	Emergency Generator	17.11	Not Specified	0.26	G/HP-HR
PA-0313	FIRST QUALITY TISSUE LOCK HAVEN PLT	PA	18-00030C	07/27/2017	Emergency Generator	17.11	Not Specified	3.5	G
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Generator	17.11	Not Specified	2.6	G/BHP-H
TX-0728	PEONY CHEMICAL MANUFACTURING FACILITY	TX	118239, N200	04/01/2015	Emergency Diesel Generator	17.11	Minimized hours of operations Tier II engine	0.0126	G/HP HR
TX-0872	CONDENSATE SPLITTER FACILITY	TX	70 PSDTX1398M1 GHGPSD	10/31/2019	Emergency Generators	17.11	Limiting duration and frequency of generator use to 100 hr/yr. Good combustion practices will be used to reduce VOC including maintaining proper air-to-fuel ratio.	0.6	G/KW HR
TX-0939	ORANGE COUNTY ADVANCED POWER STATION	TX	032 PSDTX1598 GHGPSDTX	03/13/2023	EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES, LIMITED TO 100 HR/YR	0.006	LB/HP HR
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED EMERGENCY GENERATOR 3000 kW (1)	17.11	Good Combustion Practices/Maintenance	3.5	G/KW
WI-0284	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-017	04/24/2018	Diesel-Fired Emergency Generators	17.11	Good Combustion Practices	0.6	G/KWH

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2013 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
WI-0286	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-022	04/24/2018	P42 -Diesel Fired Emergency Generator	17.11	Good Combustion Practices	0.6	G/KWH
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Generator (P07)	17.11	Operation limited to 500 hours/year, and operate and maintain generator according to the manufacturer's recommendations.	2.6	G/HP-H
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Emergency Generator	17.11	Not Specified	--	--
WV-0033	MAIDSVILLE	WV	R14-0038	01/05/2022	Emergency Generator	17.11	Good Combustion Practices w/ OxCat. Applicant did not justify why an oxcat is infeasible for an emergency engine	1.94	LB/HR
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	03/17/2021	Emergency Engines	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.5	G/KW-HR
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Engines	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.9	G/BHP-HR
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	DIESEL-FIRED AUXILIARY (EMERGENCY) ENGINES (TWO)	17.21	EXCLUSIVE USE OF ULTRA LOW SULFUR FUEL AND GOOD COMBUSTION PRACTICES	3.5	G/KW-H

Process IDs: 99.011, 99.006, 99.013
Other Search Criteria: –
Process Description: Semiconductor Manufacturing
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024
Notes & Filtering: Filtered for Process ID and Process Name

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0387	INTEL OHIO SITE	OH	P0132323	9/20/2022	Semiconductor Fabrication: P179 through P182	99.011	Good combustion practices and the use of natural gas	--	--
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P12, P22, P18, P19, P28, P29 Organic Stripping Systems, Array/Color Filter and Cell Processes	99.006	Regenerative Thermal Oxidizer	0.037	LB/MMBTU
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P15 & P25 VOC System Array Process	99.006	Regenerative Thermal Oxidizer	0.0037	LB/MMBTU
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P13 & P23 Chemical Vapor Deposition System Array Process	99.006	Combustor, Baghouse and Wet Scrubber in series	0.0037	LB/MMBTU
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P14 & P24 Dry Etching System Array Process	99.006	Combustor and Wet Scrubber in series	0.37	LB/MMBTU

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
AK-0083	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT06	01/06/2015	Diesel Fired Well Pump	17.21	Limited Operation of 168 hr/yr.	0.95	LB/MMBTU
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Fire Pump Diesel Internal Combustion Engines	17.21	Good Combustion Practices	3.3	G/KW-HR
AK-0085	GAS TREATMENT PLANT	AK	AQ1524CPT01	08/13/2020	Three (3) Firewater Pump Engines and two (2) Emergency Diesel Generators	17.21	Good combustion practices, limit operation to 500 hours per year per engine	3.3	G/HP-HR
AK-0086	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT07	03/26/2021	Diesel Fired Well Pump	17.21	Good Combustion Practices and Limited Use	0.95	LB/MMBTU
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Water Pumps	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.03	G/BHP-HR
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Emergency Water Pumps	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.03	G/BHP-HR
FL-0346	LAUDERDALE PLANT	FL	0110037-011-AC	04/22/2014	Emergency fire pump engine (300 HP)	17.21	Good combustion practice.	3.5	GRAM PER KW-HR
FL-0354	LAUDERDALE PLANT	FL	0110037-013-AC	08/25/2015	Emergency fire pump engine, 300 HP	17.21	Low-emitting fuel and certified engine	3.5	G / KWH
FL-0356	OKEECHOBEE CLEAN ENERGY CENTER	FL	0930117-001-AC	03/09/2016	One 422-hp emergency fire pump engine	17.21	Use of clean engine technology	3.5	G / KW-HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
FL-0363	DANIA BEACH ENERGY CENTER	FL	0110037-017-AC	12/04/2017	Emergency Fire Pump Engine (422 hp)	17.21	Certified engine	3.5	G / KWH
FL-0367	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-001-AC	07/27/2018	Emergency Fire Pump Engine (347 HP)	17.21	Operate and maintain the engine according to the manufacturer's written instructions	3.5	G/KW-HOUR
FL-0371	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-003-AC (PSD-FL-444A)	06/07/2021	Emergency Fire Pump Engine (347 HP)	17.21	Not Specified	3.5	G/KW-HOUR
IL-0129	CPV THREE RIVERS ENERGY CENTER	IL	16060032	07/30/2018	Firewater Pump Engine	17.21	Not Specified	---	---
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Firewater Pump Engine	17.21	Not Specified	3.5	G/KW-HR
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Fire Water Pump Engine	17.21	Not Specified	3.5	GRAMS
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Firewater Pump Engine	17.21	Not Specified	3.5	G/KW-HR
LA-0301	LAKE CHARLES CHEMICAL COMPLEX ETHYLENE 2 UNIT	LA	PSD-LA-779	05/23/2014	Firewater Pump Nos. 1-3 (EQTs 997, 998, & 999)	17.21	Compliance with 40 CFR 60 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage	2.87	LB/HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0306	TOPCHEM POLLOCK, LLC	LA	PSD-LA-815	12/20/2016	Pump Engines DFP-16-1 (EQT036)	17.21	Meet NSPS Subpart IIII Limitations and Good Combustion Practices	1.55	LB/H
LA-0306	TOPCHEM POLLOCK, LLC	LA	PSD-LA-815	12/20/2016	Pump Engine DFP-16-2 (EQT037)	17.21	Meet NSPS Subpart IIII Limitations and Good Combustion Practices	1.55	LB/H
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Firewater Pump Engines	17.21	Complying with 40 CFR 60 Subpart IIII	---	---
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Firewater Pump 1	17.21	Compliance with NESHAP 40 CFR 63 Subpart ZZZZ and NSPS 40 CFR 60 Subpart IIII, and good combustion practices (use of ultra-low sulfur diesel fuel).	1.62	LB/H
LA-0314	INDORAMA LAKE CHARLES FACILITY	LA	PSD-LA-813	08/03/2016	Diesel Firewater pump engines (6 units)	17.21	complying with 40 CFR 63 subpart ZZZZ	---	---
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	firewater pump engines (8 units)	17.21	Complying with 40 CFR 60 Subpart IIII	---	---
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39A	17.21	Compliance with 40 CFR 60 Subpart IIII	3.5	---
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39B	17.21	Compliance with 40 CFR 60 Subpart IIII	3.5	---
LA-0370	WASHINGTON PARISH ENERGY CENTER	LA	PSD-LA-829(M-1)	04/27/2020	Emergency Fire Pump Engine (EQT0021, ENG-1)	17.21	The use of low sulfur fuels and compliance with 40 CFR 60 Subpart IIII	0.4	LB/HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Fired Water Pump Engine	17.21	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	2.6	G/HP-HR
LA-0397	WESTLAKE ETHYLENE PLANT	LA	PSD-LA-813(M3)	04/29/2022	Emergency Generators and Fire Water Pumps (EQT0027 - EQT0032, EQT0044, EQT0045)	17.21	Compliance with applicable requirements of 40 CFR 60 Subpart IIII	---	---
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-01 - Firewater Pump Engine No. 1	17.21	Compliance with 40 CFR 60 Subpart IIII	3.44	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-02 - Firewater Pump Engine No. 2	17.21	Compliance with 40 CFR 60 Subpart IIII	3.44	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-03 - Firewater Pump Engine No. 3	17.21	Compliance with the requirements of 40 CFR 60 Subpart IIII	0.5	LB/HR
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	01/30/2014	Fire Pump Engine	17.21	Not Specified	2.6	GM/BHP-H
MD-0041	CPV ST. CHARLES	MD	PSC CASE NO. 9280	04/23/2014	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	USE OF ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES	2.6	G/HP-H
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	USE OF ULSD FUEL, GOOD COMBUSTION PRACTICES AND HOURS OF OPERATION LIMITED TO 100 HOURS PER YEAR	2.6	G/HP-H
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	06/09/2014	5 EMERGENCY FIRE WATER PUMP ENGINES	17.21	GOOD COMBUSTION PRACTICES AND DESIGNED TO MEET EMISSION LIMIT	3	G/HP-H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	USE OF ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES	3.5	G/KW-H
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	DIESEL-FIRED FIRE PUMP ENGINE	17.21	EXCLUSIVE USE OF ULTRA LOW SULFUR DIESEL FUEL AND GOOD COMBUSTION PRACTICES	3.5	G/KW-H
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices and meeting NSPS Subpart IIII requirements.	2.6	G/BHP-H
MI-0424	HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	MI	107-13C	12/05/2016	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices.	3.7	G/HP-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (South Plant): Fire pump engine	17.21	Good combustion practices and meeting NSPS Subpart IIII requirements.	2.6	G/BPH-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (North Plant): Fire pump engine	17.21	Good combustion practices and meeting NSPS Subpart IIII requirements.	2.6	G/BHP-H
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUFPENGINE: Fire pump engine	17.21	State of the art combustion design.	3.5	G/KW-H
MI-0445	INDECK NILES, LLC	MI	75-16B	11/26/2019	EUFPENGINE (Emergency engine-diesel fire pump	17.21	Good Combustion Practices and meeting NSPS Subpart IIII requirements	2.6	G/BHP-H
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUFPENGINE (North Plant): Fire Pump Engine	17.21	Good combustion practices and meeting NSPS Subpart IIII requirements	2.6	G/B-HP-H
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUFPENGINE (South Plant): Fire pump engine	17.21	Good Combustion Practices and meeting NSPS Subpart IIII requirements	2.6	G/B-HP-H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MS-0092	EMBERCLEAR GTL MS	MS	0040-00055	05/08/2014	firewater pumps, diesel	17.21	Not Specified	---	---
NJ-0081	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068 -(BOP120002)	03/07/2014	Emergency diesel fire pump	17.21	Not Specified	0.079	LB/H
NJ-0084	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068/BOP150001	03/10/2016	Emergency Diesel Fire Pump	17.21	use of ULSD a clean burning fuel, and limited hours of operation	1.1	LB/H
NJ-0085	MIDDLESEX ENERGY CENTER, LLC	NJ	19149/PCP150001	07/19/2016	EMERGENCY DIESEL FIRE PUMP	17.21	Use of Ultra Low Sulfur Diesel (ULSD) Oil a clean burning fuel and limited hours of operation	1.87	LB/H
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Emergency Fire Pump Engine (P003)	17.21	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	0.69	LB/H
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	1.15	LB/H
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	1.79	LB/H
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Fire Pump Diesel Engine (P008)	17.21	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	2.6	LB/H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	1.73	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency fire pump engine (P004)	17.21	state of the art combustion design	1.73	LB/H
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Fire Pump (P006)	17.21	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII. Good combustion practices per the manufacturer's operating manual.	2.36	LB/H
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Emergency diesel-fueled fire pump (P006)	17.21	Comply with NSPS 40 CFR 60 Subpart IIII	1.4	LB/H
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Fire Pump (P004)	17.21	Good combustion practices (ULSD) and compliance with 40 CFR Part 60, Subpart IIII	1.83	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Firewater Pumps (P005 and P006)	17.21	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII and employ good combustion practices per the manufacturer's operating manual	2.31	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	275 hp (205 kW) Diesel-Fired Emergency Fire Pump Engine	17.21	Certified to meet the standards in Table 4 of 40 CFR Part 60, Subpart IIII and good combustion practices	3.5	G/KW-H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
PA-0310	CPV FAIRVIEW ENERGY CENTER	PA	11-00536A	09/02/2016	Emergency Fire Pump Engine	17.21	Not Specified	2.61	G/BHP-HR
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Fire Pump	17.21	Not Specified	2.6	G/B-HP-H
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED WATER PUMP 376 bhp (1)	17.21	Good Combustion Practices/Maintenance	2.6	G/HP-H
VA-0328	C4GT, LLC	VA	52588	04/26/2018	Emergency Fire Water Pump	17.21	good combustion practices and the use of ultra low sulfur diesel (S15 ULSD) fuel oil with a maximum sulfur content of 15 ppmw.	2.6	G/HP HR
WI-0263	WISCONSIN POWER & LIGHT - NEENAH GENERATING STATION	WI	14-DMM-200	02/15/2016	Fire pump (process P05)	17.21	Good combustion practices, use diesel fuel, and operate <500 hr/yr	---	---
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Fire Pump (P06)	17.21	Operation limited to 500 hours/year and shall be operated and maintained according to the manufacturer's recommendations.	2.6	G/HP-H
WI-0302	WPL- RIVERSIDE ENERGY CENTER	WI	19-DMM-153	02/28/2020	Diesel-Fired Fire Pump Engine (P04)	17.21	Good combustion practices	0.33	LB/H
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Fire Pump Engine	17.21	Not Specified	1.44	LB/H

Attachment 2
Bay Area Air Quality Management District Summary

Summary of BAAQMD BACT

Source Type	Classification	Primary Fuel	Reference [a]	Date of Reference	BACT Determination: Feasible /Cost Effective	BACT Determination: Achieved in Practice	Typical Technology: Feasible/ Cost Effective	Typical Technology: Achieved in Practice
Boiler	5 - 33.5 MMBtu/hr Heat Input	Not Specified	BAAQMD	8/4/2010	50 ppmv @ 3% O_2 Dry	50 ppmv @ 3% O_2 Dry, for Firetube Boilers 100 ppmv @ 3% O_2 Dry, for Watertube Boilers	Good Combustion Practice	Good Combustion Practice
Boiler	33.5 - 50 MMBtu/hr Heat Input	Not Specified	BAAQMD	8/4/2010	No Determination	100 ppmv @ 3% O_2 Dry	No Determination	Good Combustion Practice
Boiler	> 50 MMBtu/hr Heat Input	Not Specified	BAAQMD	8/4/2010	10 ppmv @ 3% O_2 Dry	50 ppmv @ 3% O_2 Dry	Oxidation Catalyst	Good Combustion Practice
Diesel-Fired Emergency Engine	> 50 BHP and < 1000 BHP Output	Diesel	BAAQMD	12/22/2020	Not Specified	CARB ATCM standard for CO at the applicable horsepower rating.	Not Specified	Any engine certified or verified to achieve the applicable standard.
Diesel-Fired Emergency Engine	> 1000 BHP Output	Diesel	BAAQMD	12/22/2020	Not Specified	2.6 g/bhp-hr	Not Specified	Any engine certified or verified to achieve the applicable standard.

					BACT Determination		Typical Technology	
Source Type	**Classification**	**Primary Fuel**	**Reference [a]**	**Date of Reference**	**Feasible /Cost Effective**	**Achieved in Practice**	**Feasible/ Cost Effective**	**Achieved in Practice**
Organic Liquid Storage Tank	< 20,000 Gallons	Not Applicable	BAAQMD	3/3/1995	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Organic Liquid Storage Tank	≥ 20,000 Gallons	Not Applicable	BAAQMD	3/3/1995	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process Tool Emissions	All	Not Specified	BAAQMD	6/16/1995	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process Tool Emissions	All	Not Specified	BAAQMD	10/25/1991	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process Tool Emissions	All	Not Specified	BAAQMD	1/10/1992	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Notes:
a. Data sources include:
BAAQMD - Bay Area Air Quality Management District (https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook);

Attachment 3
Semiconductor Permit Review Summary

Summary of Semiconductor Manufacturing Permits

Source Type	Permit Emission Unit Description	Permittee	State	Permit ID	Issue Date	Pollutant	Control Technology	Permit Limit
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	CO	RCTOs Wet Scrubbers	200.3 tons per rolling, 12-month period RCTO average emissions shall not exceed 0.66 lb CO per hour Combined CO emssions from scrubbers shall not exceed 39.9 lb/hr; CO < 0.16 lb/hr for each trimix system
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	CO	RCTOs Wet Scrubbers	200.3 tons per rolling, 12-month period RCTO average emissions shall not exceed 0.66 lb CO per hour Combined CO emssions from scrubbers shall not exceed 39.9 lb/hr; CO < 0.16 lb/hr for each trimix system
Semiconductor Process Tool Emissions	Semiconductor Fab Process Tools	Intel Corp	OR	34-2681-ST-01	1/22/2016	CO	Good Work Practices	---
Semiconductor Process Tool Emissions	Semiconductor Fab Tool Processes	TSMC Arizona Corporation	AZ	P0008497	11/4/2022	CO	Good Combustion Practices in POU Abatement Devices	---

APPENDIX K. PM BACT ANALYSIS

This appendix presents the best available control technology (BACT) determinations for the control of particulate matter (PM) emissions from the proposed emission sources at the Proposed Air Permit Project. Micron has reviewed the RACT/BACT/LAER Clearinghouse (RBLC), documentation from the Bay Area Air Quality Management District (BAAQMD), and relevant semiconductor fab permits to identify appropriate technologies and/or limits for emission source categories. Additional details of the full search are provided in Section 5.4 of the Micron Clay Air Permit Application. As the add-on control technologies and other control mechanisms are similar for many of the sources that Micron operates, types of control technologies identified are summarized in Section 1.1 of this appendix. Not all technologies are applicable to all emissions sources, and as such, source-specific considerations for each source category are discussed in the subsequent sections.

Emission sources evaluated in this BACT analysis include:

- Natural gas-fired boilers;
- Natural gas-fired water bath vaporizers;
- Diesel-fired emergency generator engines;
- Diesel-fired emergency fire pump engine;
- Semiconductor process tools and other process and support operations that emit PM;
- Cooling towers;
- Bulk Material Storage silos;
- Fugitive emissions from activity on roads; and
- Wastewater treatment plant.

At the time of the Permit Application 1, Micron had not undertaken detailed design for the Proposed Air Permit Project's wastewater treatment (WWTP). Based on the current WWTP design details for this Permit Application 2, the PM BACT evaluation has been completed in Section 1.10 of this appendix.

1.1 Available Technology Summary

The technologies identified to mitigate PM emissions are described in the following subsections.

1.1.1 Tier 4 Compliant Emergency Generator Engines

Engines meeting Tier 4 emission standards are designed with a focus on reducing emissions, including PM, to meet stringent environmental and regulatory standards. These engines utilize various engineering and technological advancements to minimize PM emissions while maintaining performance and efficiency.

1.1.2 Good Combustion and Maintenance Practices for Fuel-Fired Equipment

Good combustion and maintenance practices are essential for operating fuel-fired equipment efficiently and effectively while minimizing PM emissions. For this source category, good combustion practices are generally considered to be implementing the manufacturer's recommendations which may include a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Minimizing engine idle time at startup;
- Conducting operator training; and
- Conducting periodic maintenance.

The specific practices available for each source category are discussed in the subsequent sections.

1.1.3 Good Operating and Maintenance Practices for Silos

Implementing good operating and maintenance practices at bulk storage silos, including efficient loading and unloading techniques, optimizing airflow, and avoiding overfilling minimizes the release of PM, leading to cleaner air and improved environmental conditions around the silos.

1.1.4 Use of Ultra-Low-Sulfur Diesel for Emergency Generator Engines

The utilization of ultra-low-sulfur diesel (ULSD) in diesel fuel-fired equipment results in lower PM emissions by promoting cleaner combustion and more efficient utilization of fuel. Sulfur in diesel fuel forms PM during combustion; therefore, minimizing the sulfur content of the fuel through the use of ULSD decreases the amount of PM that can be formed.

1.1.5 Operating Limitations

Limiting the hours of operation for engines, water bath vaporizers, and boilers reduces PM emissions by decreasing the overall time the equipment runs and consumes fuel.

1.1.6 Diesel Particulate Filters

Diesel particulate filters (DPFs) are add-on control devices that consist of a filter positioned in the exhaust stream that can be either passive or active. Use of ULSD must be used in conjunction with DPFs.

1.1.7 Mist/Drift Eliminators

Mist eliminators prevent liquid droplets and mist containing PM from escaping both the scrubbing systems and cooling towers, which lowers PM emissions. Mist and drift eliminators are usually integral into system designs.

1.1.8 Electrostatic Precipitators

An electrostatic precipitator (ESP) is a PM control device that uses electrical forces to remove particles entrained within an exhaust stream. The entrained particles are given an electrical charge when they pass through the ESP, and the charged particles are forced to the collector surfaces (e.g., walls, plates, rods), removing them from the air stream.[1]

---

[1] Air Pollution Control Technology Fact Sheet, Wet Electrostatic Precipitator (ESP)-Wire-Plate Type, EPA-452/F-03-030

ESPs may either operate dry or wet (when utilizing water within the charging and collection section). According to EPA's Air Pollution Control Technology Fact Sheet, "Wet ESPs [WESPs] are used in situations for which dry [ESPs] are not suited, such as when the material to be collected is wet, sticky, flammable, explosive, or has a high resistivity," and they can achieve design efficiencies greater than 99% for new equipment including PM in the PM_{10} and $PM_{2.5}$ ranges. Furthermore, the same Fact Sheet indicates that WESPs are "often used to control acid mists", which makes them a technically feasible option for controlling process emissions sources for the Proposed Air Permit Project due to acid gases that are controlled by wet scrubbers contributing to PM emissions.[2]

In this appendix and the entire Micron Clay Air Permit Application, the term ESP refers to electrostatic precipitators generally (either dry or wet applications), and the term WESP refers to wet ESP applications.

A specific type of wet scrubber utilizing electrical charges to control PM is an ionizing wet scrubber (IWS). A manufacturer of IWS units that is under consideration by Micron states that control in their IWS designs is achieved when "particulate is charged and collected on ionizer plates and packing via electrostatic principles." Specifically, an IWS "[c]ombines established principles of electrostatic particle charging, image force attraction, inertial impaction, and gas absorption to collect submicron solid particles, liquid particles, and noxious and malodorous gases simultaneously" where image force attraction refers to the phenomena experienced "whenever an electrostatically charged particle comes within the boundary layer … of a neutral surface. As the charged particle comes close to the neutral surface, an electrostatic charge of opposite polarity is induced at the neutral surface."[3] Thus an IWS operates similarly to a traditional WESP in that particulate is charged and attracted to a surface of an opposite charge. A traditional WESP uses electricity to provide an opposite change to the collecting surface whereas in an IWS, the oppositely charged surface is induced by the particulate itself. Due to this similarity in PM control technology, IWSs are addressed as a type of WESP in this appendix.

1.1.9 Cyclones

Cyclones control PM by using centrifugal and inertial forces. Cyclones are typically considered pre-cleaners as they are used to reduce the inlet loading of particulate matter to downstream collection devices by removing larger, abrasive particles.

1.1.10 HEPA or ULPA Filters

High-efficiency particulate air (HEPA) and ultra-low particulate air (ULPA) filters are control devices capable of removing submicron particles. HEPA/ULPA filters are best applied in situations with low air flowrates and low exhaust gas concentration where high collection efficiency of submicron PM is required, where toxic and/or hazardous PM cannot be cleaned from the filter, or where the PM is difficult to clean from the filter.

[2] Ibid.

[3] Ionizing Wet Scrubbers [redacted] Accessed April, 2023

1.1.11 Ceramic Filters

Ceramic filters can be used within traditional baghouse housing units and allow for the removal of particulate at temperatures up to 1,000°C.

1.1.12 Venturi Scrubbers

Venturi scrubbers remove PM by using inertial and diffusional interception. Venturi scrubbers accelerate the waste gas stream to atomize the scrubbing liquid and to improve gas-liquid contact. As the gas enters the venturi throat, the velocity and turbulence increases and after the throat section, the scrubbing liquid-gas stream decelerates causing the droplets to agglomerate. The design of the venturi scrubbers can be adjusted to control the velocity of the gas stream and the pressure drop to increase PM agglomeration and the PM control efficiency.

1.1.13 Fiber Bed Filters

Fiber bed filters remove PM by inertial and diffusional interception to capture and remove liquid, as well as soluble solid particulate matter, from gas streams. The process gas mist passes in a radial, horizontal direction perpendicular to one side of the filter bed and cleaned gas exits from the opposite side. The collected liquid particles coalesce into larger droplets on the filter's fiber surface and drain from the media by gravity once the mass of the particle is great enough to allow the droplet to flow.

1.1.14 Exhaust Gas Segregation

Exhaust gas segregation can be used to segregate different classes of chemicals to avoid mixing of incompatible exhaust streams that could result in undesirable reactions and to further prevent undesirable reactions, corrosion, and/or failure of ductwork.

1.1.15 Baghouse/Fabric Filters for Silos

Baghouses, also known as fabric filters, are designed to reduce PM emissions by using a series of fabric bags or filter media to capture and remove particulates from exhaust streams. As the PM-containing air passes through the fabric filters, the particles are physically trapped on the surface of the filter media. Most baghouses and fabric filters have a cleaning system that transfers the captured PM from the fabric filter to a container or back to a unit.

Storage silos for bulk materials are typically controlled by fabric filters known as "bin vents". A bin vent is a fabric filter that captures silo material only when the silo is being filled, i.e., displacement air that is being pushed from the silo to ambient air. As the silo is emptied, air is drawn into the silo, and under this condition, emissions from the silo are not occurring.

1.1.16 Packed Bed Scrubber/Wet Scrubbers

A packed bed scrubber is used to control PM emissions by passing exhaust gas through a column filled with structured packing material where PM is captured through mechanical impaction and gas-liquid interaction. In most cases, pollutants are removed by inertial or diffusional impaction, reaction with a sorbent or reagent slurry, or absorption into liquid solvent. This type of technology is often referred to as “wet scrubbers,” and, when used to control inorganic gases, they may also be referred to as “acid gas scrubbers.”

Wet scrubbers are utilized for a variety of applications and control of many pollutants, including less than PM_{10} and $PM_{2.5}$. However, packed-bed wet scrubbers are limited to applications in which dust loading is low (0.20 grains per standard cubic foot (gr/scf)), and collection efficiencies range from 50% to 95%, depending on the application.[4]

1.1.17 Low Total Dissolved Solids in Cooling Tower Water

Low total dissolved solids (TDS) in cooling tower water contributes to the reduction of PM emissions by minimizing the accumulation of dissolved particulate matter within the tower. When TDS levels are low, there is less material available to form solid particles from mist generated from operation of the tower. A means to control TDS is to control makeup influent rate which affects TDS levels.

1.1.18 Paved Roads

Paved roads decrease the amount of PM emissions that are dispersed into the air when the road is disturbed. Since less PM is dispersed when the road is disturbed, less PM is transferred from the road to the atmosphere.

1.1.19 Waste Minimization and Efficient Design

Reducing the generation of the waste at the source reduces the PM loading of the wastewater and thus lowers PM emissions generated in the wastewater treatment process.

1.1.20 Roadway Surface Treatments

Surface treatments including wet suppression and chemical stabilization/treatment reduce PM emissions from unpaved roads by binding the particles together and preventing them from becoming airborne.

1.1.21 Control Technologies Not Evaluated

Some control technologies have been omitted from the BACT evaluation due to various considerations. These control technologies, and the reasons for their omission, are summarized in Table 1-1.

[4] Air Pollution Control Technology Fact Sheet for Packed-Bed/Packed-Tower Wet Scrubber (EPA-452/F-03-015).

Table 1-1. Summary of Control Technologies Not Evaluated

Emission Source Category	Technology	Reasoning
All Source Categories	Use of Alternate Fuels	The use of different fuel or raw material that would redefine the Proposed Air Permit Project are out of the scope of BACT and LAER evaluations. Where different fuel specifications within the fuel type (i.e., use of ULSD) are feasible for the project, they have been identified above in Section 1.1 and are evaluated in the sections following this table.
Natural Gas-Fired Boilers and Water Bath Vaporizers	Baghouse/Fabric Filter	The control technology search conducted returned only one instance of a baghouse used on natural gas combustion devices. This case involved a boiler that burned both natural gas and carbon black oil. This is not relevant for comparison to the Proposed Air Permit Project as the proposed units will burn solely natural gas; therefore, the use of a baghouse has not been evaluated further.
	ESP	The control technology search conducted did not return any instances of an ESP used on natural gas-fired combustion devices. As such, this control has not been evaluated further.
	Wet Scrubber	The control technology search conducted did not return any instances of a wet scrubber used on natural gas-fired combustion devices. As such, this control has not been evaluated further.
	Cyclone	The control technology search conducted did not return any instances of a cyclone used on natural gas-fired combustion devices. As such, this control has not been evaluated further.
	Inertial Separation Systems	The control technology search conducted did not return any instances of inertial separation systems used on natural gas-fired combustion devices. As such, this control has not been evaluated further.
Diesel-Fired Emergency Generator Engines and Diesel-Fired Emergency Fire Pump Engine	Oxidation Catalyst	The control technology search conducted did not return any instances of oxidation catalysts used on diesel-fired engines for the control of PM. While oxidation catalysts may result in a slight reduction in PM emissions by promoting the oxidation of certain PM precursors, they primarily target gaseous pollutants such as carbon monoxide and volatile organic compounds. As such, this control has not been evaluated further as an effective control of PM.
	ESPs	The control technology search conducted did not return any instances of an ESP used on diesel-fired emergency generator engines or emergency fire pump engines. As such, this control has not been evaluated further.

Emission Source Category	Technology	Reasoning
Bulk Material Storage Silo	ESP	The control technology search conducted did not return any instances of an ESP used on storage silos. As such, this control has not been evaluated further.
	Cyclone	The control technology search conducted did not return any instances of a cyclone used on storage silos. As such, this control has not been evaluated further.
Bulk Material Storage Silo	Wet Scrubber	The control technology search conducted did not return any instances of a wet scrubber used on storage silos. As such, this control has not been evaluated further.
Wastewater Treatment Plant	ESP	The control technology search conducted did not return any instances of an ESP used in wastewater treatment plants. As such, this control has not been evaluated further.
	Cyclone	The control technology search conducted did not return any instances of a cyclone used in wastewater treatment plants. As such, this control has not been evaluated further.
	Wet Scrubber	The control technology search conducted did not return any instances of a wet scrubber used in wastewater treatment plants. As such, this control has not been evaluated further.
	Fabric Filters	The control technology search conducted did not return any instances of fiber bed filters used in wastewater treatment plants. As such, this control has not been evaluated further.

1.2 Natural Gas-Fired Boilers

Natural gas-fired boilers are heating systems used to generate hot water or steam for maintaining precise temperature control for various stages of production, ensuring the efficient operation of machinery. Micron is proposing to use efficient units that are specifically designed to meet the Proposed Air Permit Project's thermal requirements while minimizing energy consumption and emissions.

The BACT analysis for PM emissions from natural gas-fired boilers is presented in this section.

1.2.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing PM emissions from the proposed natural gas-fired boilers:

- Good combustion and maintenance practices; and
- Operating hour limitations.

In addition to identifying specific control technologies, Micron has identified potentially relevant numerical emission limits that could be considered BACT for natural gas-fired boilers. Proposed BACT emission limits are discussed further in Step 5.

1.2.2 Step 2. Eliminate Technically Infeasible Options

All control technologies identified in Step 1 for natural gas-fired boilers are technically feasible.

1.2.3 Step 3. Rank Remaining Control Technologies by Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.2.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.2.5 Step 5. Select BACT

Micron intends to purchase natural gas-fired boilers designed to meet a PM emission limit of 7.6 pounds per million standard cubic feet (lb/MMscf). This is the lowest emission limitation identified as BACT based on the RBLC search conducted. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results. Micron will also implement the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 6,000 hours per year for each boiler.

1.3 Natural Gas-Fired Water Bath Vaporizers

This Permit Application 2 separates "natural gas-fired combustion equipment" into boilers and water bath vaporizers. Natural gas-fired water bath vaporizers are used in the semiconductor industry to provide a reliable and efficient source of high-purity nitrogen gas. These water bath vaporizers use natural gas to heat water that is used to vaporize liquified nitrogen used in semiconductor manufacturing.

The BACT analysis for PM emissions from natural gas-fired water bath vaporizers is presented in this section.

1.3.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing PM emissions from the proposed natural gas-fired water bath vaporizers:

- Good combustion and maintenance practices; and
- Operating hour limitations.

In addition to identifying specific control technologies, Micron has identified potentially relevant numerical emission limits that could be considered BACT for natural gas-fired water bath vaporizers. Proposed BACT emission limits are discussed further in Step 5.

1.3.2 Step 2. Eliminate Technically Infeasible Options

All control technologies identified in Step 1 for natural gas-fired water bath vaporizers are technically feasible.

1.3.3 Step 3. Rank Remaining Control Technologies by Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.3.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.3.5 Step 5. Select BACT

Micron intends to purchase natural gas-fired water bath vaporizers designed to meet a PM emission limit of 7.6 lb/MMscf. This is the lowest emission limitation identified as BACT based on the RBLC search conducted. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results. Micron will also implement the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following as BACT:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 8,000 hours per year for all water bath vaporizers combined, with no more than four units operating at a time.

1.4 Diesel-Fired Emergency Generator Engines

The Proposed Air Permit Project will utilize diesel-fired emergency generator engines to ensure that critical life safety and process safety systems receive uninterrupted power during power outages. These units will not be designed to run manufacturing operations during major electrical outages and instead will allow equipment and processes to shut down gradually as necessary, protecting sensitive manufacturing operations, preventing unsafe conditions from forming in the fabs, reducing emissions of process gases directly to the atmosphere, and protecting employee safety.

1.4.1 Step 1. Identify All Control Technologies

Diesel-fired emergency generator engine technology and associated emission standard requirements are well known and are considered by many regulatory entities to meet BACT. These standards are based on the engine's maximum power capacity and the year in which the engine was manufactured. Currently, the EPA has implemented the Tier 4 Final emission standards for non-road diesel engines, which set stringent limits for newly manufactured units.[5] EPA has also set limitations for stationary internal combustion engines under 40 CFR Part 60 Subpart IIII (NSPS Subpart IIII), "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." For engines with certain power capacity and manufacture year, NSPS Subpart IIII references the engine standards established for nonroad engines under 40 CFR 1039.

In addition, the following control methods have been identified for reducing PM emissions from the proposed diesel-fired emergency generators engines:

- Good combustion and maintenance practices;
- Operating hours limitations; and
- Use of ULSD.

1.4.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 for diesel-fired emergency generator engines are technically feasible.

1.4.3 Step 3. Rank Remaining Control Technologies by Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.4.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

[5] 40 CFR 1039.101

1.4.5 Step 5. Select BACT

The following control technologies are proposed to achieve BACT for diesel-fired emergency generator engines:

- The purchase of an engine compliant with emission standards;
- Good combustion and maintenance practices, including a combination of the following:
  - Minimizing engine's idle time at startup;
  - Optimizing the air-fuel ratio;
  - Maintaining proper insulation;
  - Establishing proper combustion zone temperature control;
  - Conducting operator training; and
  - Conducting periodic maintenance
- The use of ULSD; and
- Operating hour limitations.

A BACT limit must not be higher than an applicable NSPS emission limit. The diesel-fired generators will be affected facilities under 40 CFR Part 60 Subpart IIII (NSPS Subpart IIII), "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." NSPS Subpart IIII provides PM emission standards for various engine power and displacement categories. However, these emission standards are less stringent than the Tier 4 Final emission standards.

Tier 4 Final emission standards outlined in Table 1-2 are the lowest emission limits found for diesel-fired emergency generator engines in the RBLC search conducted. In reaching out to potential vendors, Micron found that the lowest vendor-guaranteed emission rate for the proposed engines is 0.008 g/kW-hr which is lower than the Tier 4 Final emission standards. Micron is thus proposing to meet 0.008 g/kW-hr as the PM BACT limit for diesel-fired emergency generator engines and will procure new engines for the Proposed Air Permit Project that meet this standard. Control technologies to achieve the guaranteed emission standard may vary depending on the engine manufacturer and may include the use of diesel particulate filters where that technology is available and appropriate. In addition, Micron will fire only ULSD in the diesel-fired emergency generator engines and proposes an operating hours limit of 100 hours per year for each engine.

Table 1-2. 40 CFR §1039.101
Tier 4 Final Exhaust Emission Standards After the 2014 Model Year, g/kW-hr

Maximum Engine Power (kW)	Application	PM Emission Standard
kW <19	All	0.40
19 ≤kW <56	All	0.03
56 ≤kW <130	All	0.02
130 ≤kW ≤560	All	0.02
kW >560	Generator Sets	0.03
	All Except Generator Sets	0.04

1.5 Diesel-Fired Emergency Fire Pump Engine

The Proposed Air Permit Project will include one diesel-fired emergency fire pump engine to provide a reliable power source in the event of a fire occurring during a power outage when the electric fire pump would not be available.

1.5.1 Step 1. Identify All Control Technologies

Diesel-fired emergency fire pump engine technology and associated emission standard requirements are well known and are considered by many regulatory entities to meet BACT. These standards are based on the fire pump engine's maximum power capacity and the year in which the engine was manufactured. EPA has set limitations for stationary internal combustion engines, including fire pump engines, under NSPS Subpart IIII. The EPA has also implemented Tier emission standards (Tier 1 – Tier 4 Final) for non-road diesel engines, which set stringent limits for newly manufactured units. Based on the RBLC search conducted, as well as input from Micron's equipment vendors, Tier 4 compliant fire pump engines are not available. As such, the most stringent emission standards are Tier 3, which align with NSPS IIII emission standards for the proposed fire pump engine for PM.

In addition, the following control methods have been identified for reducing PM emissions from the proposed diesel-fired emergency fire pump engine:

- Good combustion and maintenance practices;
- Operating hours limitations; and
- Use of ULSD.

1.5.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 for the diesel-fired emergency fire pump engine are technically feasible.

1.5.3 Step 3. Rank Remaining Control Technologies by Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.5.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.5.5 Step 5. Select BACT

The following control technologies are proposed to achieve BACT for the diesel-fired emergency fire pump engine:

- The purchase of an engine compliant with emission standards;
- Good combustion and maintenance practices, including a combination of the following:
  - Minimizing engine's idle time at startup;
  - Optimizing the air-fuel ratio;
  - Maintaining proper insulation;
  - Establishing proper combustion zone temperature control;
  - Conducting operator training; and
  - Conducting periodic maintenance
- The use of ULSD; and
- Operating hour limitations.

A BACT limit must not be higher than an applicable NSPS emission limit. The diesel-fired emergency fire pump engine will be an affected facility under NSPS Subpart IIII. NSPS Subpart IIII provides PM emission standards for various engine power and displacement categories. For the capacity of the proposed diesel-fired emergency fire pump engine, NSPS IIII emission standards align with Tier 3 emission standards.

Therefore, Micron is proposing compliance with the NSPS IIII and Tier 3 emission standard of 0.15 grams per brake horsepower-hour (g/bhp-hr) as the BACT PM limit for the diesel-fired emergency fire pump engine. Control technologies to achieve this emission standard may vary depending on the engine manufacturer and may include the use of diesel particulate filters where that technology is available and appropriate. In addition, Micron will fire only ULSD in the diesel-fired emergency fire pump engine and proposes an operating hours limit of 500 hours per year.

1.6 Semiconductor Process Tools and PEECs

Micron is proposing to install semiconductor process equipment, or "tools", as discussed within the Micron Clay Air Permit Application. Particulate matter is emitted through the operation of the process tools and subsequent management of process materials in PEECs in the exhaust stream that create PM. PEECs that support semiconductor processes also generate PM emissions through natural gas combustion. It is not the primary purpose of these devices to control PM emissions that are emitted from process tools, however, they may incidentally manage PM emissions.

Certain types of process tool emissions (i.e., acid gases, ammonia) are routed to a centralized wet scrubber system, which is employed in semiconductor manufacturing to effectively neutralize and remove gases generated during various fab processes. The type of wet scrubbers employed for acid gas and ammonia control are mass-transfer-based units (i.e., vapor phase into the liquid phase) and are designed to abate water-soluble gases, some of which are PM (i.e., acids gases such as hydrofluoric acid) and are not designed to efficiently abate non-soluble PM emissions.

Particulate matter emissions include a wide range of particles suspended in the air; however, much of the PM emissions generated in the process tools and PEECs are estimated to be less than one micron (1 µm) – also known as submicron – which adds further complexity in identifying appropriate and effective control devices. To abate particulate matter more effectively, additional control devices have been considered to be added at the exhaust of the centralized acid wet scrubbers.

1.6.1 Step 1. Identify All Control Technologies

Upon review of the RBLC database, BAAQMD BACT guidance, and relevant semiconductor air permits, the following control methods have been identified for reducing PM emissions from the proposed semiconductor manufacturing process tools and their associated emissions:

- Good combustion and maintenance practices for PEECs;
- Use of mist eliminators on wet scrubbers;
- Per requirements established by the BAAQMD, BACT for PM_{10} for Siliconizing Reactors, Furnace Chambers, and Chemical Vapor Deposition (CVD) Reactors in semiconductor fabrication operations is to vent exhaust to a combustion chamber followed by a wet scrubber with a particulate control efficiency of $\geq$99%;[6]
- WESP technology has been identified as appropriate control technology for emissions from other semiconductor manufacturing operations in air permits reviewed as part of this BACT analysis;
- Use of Ceramic Filters;
- Use of Baghouse/Fabric filters;
- Use of HEPA/ULPA Filters;
- Use of Fiber Bed Filters;
- Use of Venturi Scrubbers;
- Use of Cyclones;
- Use of Packed Bed Scrubbers; and
- Use of Exhaust Gas Segregation.

For PM generated in the process tools and PEECs, WESP technology could abate the PM emissions at the exhaust of the centralized acid or ammonia wet scrubber systems. For the Proposed Air Permit Project, all semiconductor manufacturing operations that fall within the categories identified in the third bullet above regarding BAAQMD BACT fall within the CVD operations which will be vented through the CVD scrubbers. Additional details of each of these exhaust types are provided in the Micron Clay Air Permit Application, Section 1.4.3.3.

1.6.2 Step 2. Eliminate Technically Infeasible Options

Not all of the available control technologies are considered technically feasible for the semiconductor process tools and PEECs. A discussion of these infeasible control technologies is included below.

1.6.2.1 Ceramic Filters

Ceramic filters have not been demonstrated in practice in the semiconductor industry. The submicron PM generated in the process tools and PEECs would penetrate the ceramic filter media leading to severe plugging of the filter media and resulting in reduced efficiency or system failure. Because these filters would require frequent replacement, this control is considered infeasible for semiconductor operations and is not considered further.

[6] BAAQMD BACT/TBACT Workbook, Semiconductor Manufacturing Operations section, Semiconductor Fab – Siliconizing Reactors, Furnace Chambers, Vapor Deposition; https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook; accessed March 14, 2024.

1.6.2.2 Baghouse/Fabric Filters

Baghouse/fabric filters have not been demonstrated in practice in the semiconductor industry. The removal efficiency of fabric filters continually decreases for submicron particles expected to be generated from these semiconductor operations. Therefore, this control is considered infeasible for semiconductor operations and is not considered further.

1.6.2.3 HEPA/ULPA Filters

HEPA/ULPA filters have not been demonstrated in practice in the semiconductor industry. Although HEPA and ULPA filters are designed to abate submicron particles, once the differential pressure set point across the filter media is reached, the filter must be replaced, creating an additional solid waste stream. Additionally, these filters are designed for low exhaust gas flowrate and low concentration particulate matter gas streams, which is not the case in the particulate matter formed in the semiconductor process tools and PEECs. Further, the filters are subject to physical damage from mechanical stress as well as reduced filter lifespan in the presence of acid or alkaline particulates or gas constituents. These filters also pose a fire risk if readily oxidizable dust is being collected. Therefore, this control is considered infeasible for semiconductor operations.

1.6.2.4 Fiber Bed Filters

Fiber bed filters have not been demonstrated in practice in the semiconductor industry. Fiber bed filters are most effective for exhaust streams containing primarily condensable particulate matter. While the exhaust of the semiconductor processes and PEECs will contain some condensable particulate matter, the primary form of particulate will be filterable. Utilizing fiber bed filters to control filterable particulate matter would result in excessive buildup on the surface of the filters, resulting in significant and frequent maintenance. Therefore, this control technology is considered technically infeasible for semiconductor operations and are not considered further.

1.6.2.5 Venturi Scrubbers

Venturi scrubbers have not been demonstrated in practice in the semiconductor industry. Venturi scrubbers do not induce inertial impaction for submicron and nanometer size PM due to low mass of the particles. Additionally, the high pressure drop associated with venturi scrubber operation results in high energy requirements and operating costs in comparison to traditional wet scrubbers. These scrubbers also have a high potential for corrosion. For these reasons, venturi scrubbers are considered technically infeasible for semiconductor operations and are not considered further.

1.6.2.6 Cyclones

Cyclones have not been demonstrated in practice in the semiconductor industry. Cyclones are considered pre-cleaners and improve collection efficiency for downstream control devices by removing larger size PM. However, cyclones do not induce centrifugal and inertial impaction for submicron size PM and therefore considered infeasible for the semiconductor operations.

1.6.2.7 Packed Bed Scrubbers

Packed bed scrubbers have not been demonstrated in practice in the semiconductor industry. Packed bed scrubbers have been designed to abate water soluble gases such as hydrogen fluoride (HF) and hydrogen chloride (HCl). Packed bed scrubbers also use inertial or diffusional impaction to control PM emissions. These packed bed scrubbers do not induce inertial impaction for submicron size and therefore are considered technically infeasible for semiconductor operations.

All other control technologies identified in Step 1 for semiconductor process tools, safety equipment, cleaning operations and POU control devices are technically feasible; however, the BAAQMD BACT included in the third bullet above identifies a 99% PM_{10} control efficiency associated with combustion followed by wet scrubbing. Based on information provided by leading vendors in the semiconductor industry, Micron believes that a 99% PM_{10} control efficiency has not been achieved in practice. For this reason, Micron is evaluating the venting of CVD operations to a combustion chamber followed by a wet scrubber technology as a potential control technology and is proposing an 82% (minimum inlet concentration 0.04 ppmv) associated control efficiency.

1.6.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

The order of effectiveness of the four technically feasible control options listed in Step 1 is as follows (highest efficiency listed first):

- WESP technology for emissions from other (i.e. non-CVD) semiconductor manufacturing operations;
- For CVD processes within the Proposed Air Permit Project, the process exhaust must be vented to a combustion chamber followed by a wet scrubber where appropriate;
- Use of mist eliminators on wet scrubbers;
- Good combustion and maintenance practices for combustion-based oxidation devices; and
- Exhaust gas segregation.

Although wet scrubbers and WESPs can achieve high levels of PM control, they require additional electricity to operate which would result in emissions from generation and supply of the electricity to the Micron Campus, and an additional consequence of their use is generation of wastewater that requires management and treatment.

1.6.4 Step 4. Evaluate the Most Effective Controls and Document

The most effective controls for each semiconductor process exhaust type (which are described in the Micron Clay Air Permit Application, Section 1.4.3.2) vary based on PM generated by specific processes venting to the centralized control equipment, then to atmosphere. Notably, the control must be effective at submicron PM (i.e., less than 1 µm in diameter) emissions as much of the PM emissions generated in the process tools are estimated to fall into this range which adds further complexity in identifying appropriate and effective control devices.

Semiconductor process equipment venting to CVD Exhaust, Acid Exhaust and Ammonia Exhaust systems are addressed below in the remainder of Section 1.6.4.

1.6.4.1 CVD Processes and CVD Scrubbers

For CVD processes within the Proposed Air Permit Project, the combination of the process exhaust being vented to a combustion chamber followed by a wet scrubber is the most effective control identified.

Micron is currently planning to utilize PEECs equipped with combustion chambers as required safety equipment to manage process gases that are pyrophoric, flammable, toxic, or incompatible with other process gases or the ductwork. PEECs may incidentally manage PM emissions that are comingled with these hazardous materials. CVD process exhaust will be routed to PEECs and then to CVD wet scrubbers and ultimately to IWSs to control PM emissions collected in the CVD process header.

1.6.4.2 Processes Vented to Acid Exhaust and Ammonia Exhaust

There is the potential to emit PM from the process tools that vent to the acid scrubbers and ammonia scrubbers. However, unlike the CVD scrubbers, the amount of PM generated in the process tools is generally small, and it is not common in the industry to install PM control at the exhaust of these scrubbers. Nevertheless, Micron has evaluated adding an IWS to the acid scrubbers and the ammonia scrubbers.

As described in Section 1.1.8 above, an IWS is one type of WESP using the same PM removal technology as a traditional WESP control technology. In Micron's experience, the IWS application of WESP technology is most suitable for their semiconductor manufacturing operations. In part, this is due to the ability of an IWS to control submicron particles as described in Section 1.1.8 of this appendix.

An economic feasibility analysis was completed based on a cost estimate for a similar Micron facility and the projected emission rate for the Proposed Air Permit Project. The analysis is presented in Attachment 4, BACT Economic Feasibility Evaluation, and the cost effectiveness of control is presented in Table 1-3. This analysis assumes the lower end of the operating efficiencies listed in EPA's Air Pollution Control Technology Fact Sheet for new WESPs (99% control) to calculate the total cost measured in dollars per ton of PM removed ($/ton PM Removed).[7]

Table 1-3. PM BACT Economic Feasibility Summary (IWS)

Exhaust Type	PM Emissions Controlled (ton/yr/stack)	Cost Effectiveness ($/ton PM Removed)
Acid Scrubbers	0.10	$44,882,349
Ammonia Scrubbers	0.06	$78,455,814

[7] The EPA Air Pollution Control Cost Manual (https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution, Accessed April 2024) provides guidelines for calculating cost effectiveness for use of WESPs for PM Control (additional details provided in Attachment 4 to this appendix). However, the Manual does not provide a means to estimate control costs for IWSs. Considering the similarity of control technology, and the considerable cost ($/ton PM removed) calculated using EPA's WESP cost estimation methodology, it is assumed that a cost effectiveness evaluation using actual IWS costs would also conclude that controlling PM from acid scrubber and ammonia scrubber exhaust stacks is not economically feasible.

Trinity is not aware of a published BACT cost effectiveness value for PM emissions. However, the cost per ton removed presented in Table 1-3 is excessive for the benefit of the control and as such, it is concluded that this technology is not economically feasible.

1.6.4.3 Generation of PM from Operation of Wet Scrubbers

Mist eliminators are a technically and economically feasible control technology to prevent PM carryover from the operation of wet scrubbers.

1.6.5 Step 5. Select BACT

Micron proposes to use IWS units at the CVD scrubber exhaust with 82% control efficiency with a minimum inlet concentration of 0.04 ppmv as BACT for PM emissions from siliconizing reactors, furnace chambers, and CVD reactors.

Micron proposes to equip acid scrubbers and ammonia scrubbers with mist eliminators as a BACT-level control. Because the CVD scrubbers will be equipped with the higher-ranked IWS system, a mist eliminator is unnecessary for these operations.

Micron is also proposing good combustion and maintenance practices as BACT for manufacturing process emission sources equipped with PEECs. Micron also has incorporated exhaust gas segregation, as appropriate, into the fab design to route compound-specific common vent headers to one of five exhaust types as described in Section 1.4.2.2 of the of the Micron Clay Air Permit Application 2.

1.7 Cooling Towers

Cooling towers are used to dissipate the large heat loads generated by the factory and condition the incoming air to the correct temperature. Cooling tower demand is high in warmer months and lower in cooler months. Emissions of PM are generated from cooling towers because the water circulating in the tower contains small amounts of dissolved solids (e.g., calcium, magnesium, etc.) that crystallize and form airborne particles as the water drift leaves the cooling tower.

1.7.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing PM emissions from the RCTO:

- Drift/Mist Eliminators; and
- Maintaining low Total Dissolved Solids (TDS) in cooling tower water.

1.7.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 are technically feasible.

1.7.3 Step 3. Rank Remaining Control Technologies by Effectiveness

All control technologies identified are considered feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.7.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.7.5 Step 5. Select BACT

Micron is proposing the installation of drift/mist eliminators certified to less than 0.0005% drift rate. In addition, Micron will operate the cooling towers to ensure that total dissolved solids are less than 1,200 milligrams / liter (mg/l) at all times as BACT. This proposal is consistent with the results of the RBLC search. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results.

1.8 Bulk Material Storage Silos

Silos are used to store raw materials for semiconductor manufacturing, and raw materials, such as lime, are held in storage until needed for production. The followings sections summarize the BACT analysis for bulk material storage silos.

1.8.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing PM emissions from the fugitive emissions:

- Fabric Filters; and
- Good Operating Practices.

1.8.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 are technically feasible.

1.8.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All control technologies identified are considered feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary and the next step is to evaluate the most effective controls.

1.8.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.8.5 Step 5. Select BACT

Due to the high control efficiency and cost effectiveness, Micron proposes fabric filters (i.e., passive bin vents or dust collectors with an extraction system) certified to meet an exhaust grain loading of 0.005 gr/dscf, along with good operating and maintenance practices, as BACT for the bulk materials storage silos. This is the lowest emission limitation identified as BACT based on the RBLC search conducted. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results.

1.9 Vehicle Traffic Dust Emissions

Particulate matter emissions will be generated from vehicle travel on site. These fugitive emissions contribute to the overall PM emissions from the Proposed Air Permit Project.

1.9.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing PM emissions from road dust:

- Vehicle traffic restrictions;
- Surface improvements; and
- Surface treatments.

1.9.2 Step 2. Eliminate Technically Infeasible Options

Micron has evaluated the locations where regular vehicular traffic is expected based on delivery of materials, shipment of products, employee parking and other foreseeable vehicle use. Each such area will be improved (paved). Refer to Appendix P of the Micron Clay Air Permit Application for a plot plan which illustrates roadways, paved areas around the buildings, etc. Although there may be vehicle traffic in areas that are not paved for maintenance, special purposes that are temporary in nature, or other reasons, additional regular vehicular traffic in areas outside of the paved areas is not expected based on the operation of other Micron facilities.

All remaining control technologies identified in Step 1 are technically feasible for areas expected to experience regular vehicular traffic.

1.9.3 Step 3. Rank Remaining Control Technologies by Effectiveness

All control technologies identified are considered feasible for areas where regular vehicular traffic is expected and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies in areas where regular vehicular traffic is expected to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

While paving surfaces reduces PM from vehicular traffic, it also has other unfavorable environmental impacts. Notably, additional paving will result in additional ground disturbance, and it will cause additional impervious surface areas that are likely to result in additional storm water runoff which would require additional stormwater management infrastructure than already planned. Therefore, minimizing improved/paved surfaces to the extent practicable and addressing areas where regular vehicular traffic is expected is desirable to balance overall potential environmental impacts.

1.9.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered feasible in areas where vehicular traffic is expected and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.9.5 Step 5. Select BACT

Micron proposes BACT for the proposed fugitive emissions of PM in areas where vehicular traffic is expected on the Micron Campus to be the surface improvement (e.g., paving) of roads wherever feasible, the implementation of a speed limit(s), and surface treatments (i.e., watering unpaved areas, localized speed limits) for areas that experience traffic where paving is not feasible.

For areas where vehicular traffic is intermittent and unpredictable, Micron will employ appropriate measures, including surface treatments (i.e., watering unpaved areas) and localized speed limits as necessary to minimize PM generation from vehicular traffic.

1.10 Wastewater Treatment Plant

Micron is proposing to install a wastewater treatment plant as a part of the Proposed Air Permit Project to treat high fluoride wastewater, industrial wastewater, and hydrocarbon in wastewater generated from the semiconductor process tools. Particulate matter generated from the wastewater treatment plant includes [redacted] and tetramethyl ammonium hydroxide. Micron proposes to discharge a portion of the treated wastewater to the nearest waterbody using the outfalls located at the Proposed Air Permit Project and reuse some treated wastewater and stored in the reclaimed water tank.

1.10.1 Step 1. Identify All Control Technologies

A review of the EPA's RBLC database did not identify any entries of facilities that utilize add-on control devices to abate PM emissions that are generated from wastewater treatment plants.

Micron also reviewed relevant semiconductor air permits to evaluate if any control technologies are currently being utilized to abate PM emissions from wastewater treatment plants. During the review of these permits, it was determined that no add-on control devices are currently installed to abate such PM emissions.

Waste minimization and efficient design is the only method that has been identified for reducing PM emissions from the wastewater treatment plant.

1.10.2 Step 2. Eliminate Technically Infeasible Options

The only control technology identified in Step 1 for wastewater treatment plants is technically feasible.

1.10.3 Step 3. Rank Remaining Control Technologies by Effectiveness

Since the use of waste minimization and efficient design is the only identified control option, ranking the remaining control technologies by control effectiveness is unnecessary. Therefore, the next step is to evaluate the most effective controls.

1.10.4 Step 4. Evaluate the Most Effective Controls and Document

Since the use of waste minimization and efficient design is the only identified control option, evaluating the most effective controls is unnecessary. Therefore, the next step is to select BACT.

1.10.5 Step 5. Select BACT

Micron is proposing to comply with waste minimization and efficient design as a work practice standard to achieve BACT for PM emitted from the wastewater treatment plant in lieu of a formal limit.

Attachment 1
RACT/BACT/LAER Clearinghouse Search Results

Process IDs: 12.310, 13.310, 19.600
Other Search Criteria: Process Name Contains "Boiler"
Process Description Natural Gas-fired Boilers
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas", Heat Input ≤50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	02/14/2019	SN-233 Galvanizing Line Boilers	13.31	Particulate matter, filterable (FPM)	Good combustion practices	0.0019	LB/MMBTU
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	02/14/2019	SN-233 Galvanizing Line Boilers	13.31	Particulate matter, total 10 µ (TPM10)	Good combustion practices	0.0076	LB/MMBTU
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-202, 203, 204 Pickle Line Boilers	13.31	Particulate matter, filterable (FPM)	Good Combustion Practice	0.0019	LB/MMBTU
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-202, 203, 204 Pickle Line Boilers	13.31	Particulate matter, total 10 µ (TPM10)	Good Combustion Practice	0.0076	GR/DSCF
KS-0029	THE EMPIRE DISTRICT ELECTRIC COMPANY	KS	C-12987	07/14/2015	Auxiliary boiler	13.31	Particulate matter, total (TPM)	Not Specified	0.005	LB PER MMBTU
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Pickle Line #2 Boiler #1 & #2 (EP 21-04 & EP 21-05)	13.31	Particulate matter, total 10 µ (TPM10)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	7.6	LB/MMSCF
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Pickle Line #2 Boiler #1 & #2 (EP 21-04 & EP 21-05)	13.31	Particulate matter, filterable (FPM)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	1.9	LB/MMSCF
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	AUXILLARY BOILER	13.31	Particulate matter, filterable (FPM)	EXCLUSIVE USE OF PIPELINE QUALITY NATURAL GAS AND GOOD COMBUSTION PRACTICES	0.0075	LB/MMBTU

Process IDs: 12.310, 13.310, 19.600
Other Search Criteria: Process Name Contains "Boiler"
Process Description Natural Gas-fired Boilers
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas", Heat Input ≤50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	AUXILIARY BOILER	13.31	Particulate matter, filterable (FPM)	USE OF PIPELINE QUALITY NATURAL GAS AND GOOD COMBUSTION PRACTICES	0.0019	LB/MMBTU
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	AUXILIARY BOILER	13.31	Particulate matter, total 10 µ (TPM10)	USE OF PIPELINE QUALITY NATURAL GAS AND GOOD COMBUSTION PRACTICES	0.0075	LB/MMBTU
MI-0420	DTE GAS COMPANY--MILFORD COMPRESSOR STATION	MI	185-15	06/03/2016	FGAUXBOILERS	13.31	Particulate matter, total 10 µ (TPM10)	Good combustion practices and low sulfur fuel (pipeline quality natural gas).	0.0075	LB/MMBTU
MI-0426	DTE GAS COMPANY - MILFORD COMPRESSOR STATION	MI	185-15A	03/24/2017	FGAUXBOILERS (6 auxiliary boilers EUAUXBOIL2A, EUAUXBOIL3A, EUAUXBOIL2B, EUAUXBOIL3B, EUAUXBOIL2C, EUAUXBOIL3C)	13.31	Particulate matter, total 10 µ (TPM10)	Good combustion practices and low sulfur fuel (pipeline quality natural gas).	0.52	LB/MMSCF
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Auxiliary Boiler (B001)	13.31	Particulate matter, total 10 µ (TPM10)	Low sulfur fuel	0.27	LB/H

Process IDs: 12.310, 13.310, 19.600
Other Search Criteria: Process Name Contains "Boiler"
Process Description Natural Gas-fired Boilers
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas", Heat Input ≤50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Auxiliary Boiler (B001)	13.31	Particulate matter, total 10 µ (TPM10)	Low sulfur fuel	0.3	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Auxiliary Boiler (B001)	13.31	Particulate matter, total 10 µ (TPM10)	low sulfur fuel	0.3	LB/H
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Auxiliary Boiler (B001)	13.31	Particulate matter, total (TPM)	Low sulfur fuel	0.27	LB/H
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Auxiliary Boiler (B001)	13.31	Particulate matter, total (TPM)	Pipeline quality natural gas	0.33	LB/H
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	02/06/2019	Startup boiler (B001)	13.31	Particulate matter, total 10 µ (TPM10)	Good combustion practices and the use of natural gas	0.113	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	13.31	Particulate matter, filterable (FPM)	Good combustion practices and the use of natural gas	1.68	T/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	13.31	Particulate matter, total 10 µ (TPM10)	Good combustion practices and the use of natural gas	0.46	T/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	13.31	Particulate matter, total 2.5 µ (TPM2.5)	Good combustion practices and the use of natural gas	0.38	T/YR
OR-0050	TROUTDALE ENERGY CENTER, LLC	OR	26-0235	03/05/2014	Auxiliary boiler	13.31	Particulate matter, total 10 µ (TPM10)	Good combustion practices; Utilize only natural gas.	--	--
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Auxillary Boiler	13.31	Particulate matter, filterable (FPM)	Natural gas fired exclusively	0.002	LB/MMBTU
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Auxillary Boiler	13.31	Particulate matter, total 10 µ (TPM10)	Not Specified	0.007	LB/MMBTU
PA-0316	RENOVO ENERGY CENTER, LLC	PA	18-00033A	01/26/2018	Auxiliary Boiler	13.31	Particulate matter, filterable 10 µ (FPM10)	Not Specified	0.0019	LB

Process IDs: 12.310, 13.310, 19.600
Other Search Criteria: Process Name Contains "Boiler"
Process Description Natural Gas-fired Boilers
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas", Heat Input ≤50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
SC-0193	MERCEDES BENZ VANS, LLC	SC	0560-0385-CA	04/15/2016	Energy Center Boilers	13.31	Particulate matter, total (TPM)	Annual tune ups per 40 CFR 63.7540(a)(10) are required.	7.6	LB/MMSCF
TX-0772	PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT)	TX	118901, GHGPSDTX108 AND PSDTX1	11/06/2015	Commercial/Institutional-Size Boilers/Furnaces	13.31	Particulate matter, total 10 µ (TPM10)	Good combustion practice to ensure complete combustion.	0.4	T/YR
TX-0772	PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT)	TX	118901, GHGPSDTX108 AND PSDTX1	11/06/2015	Commercial/Institutional-Size Boilers/Furnaces	13.31	Particulate matter, total 2.5 µ (TPM2.5)	Good combustion practice to ensure complete combustion.	4	T/YR
WI-0306	WPL- RIVERSIDE ENERGY CENTER	WI	19-POY-212	02/28/2020	Temporary Boiler (B98A)	13.31	Particulate matter, total (TPM)	Combust only pipeline quality natural gas, can be operated for no more than 500 hours.	0.008	LB/MMBTU
WV-0031	MOCKINGBIRD HILL COMPRESSOR STATION	WV	R14-0033	06/14/2018	WH-1 - Boiler	13.31	Particulate matter, total (TPM)	Limited to natural gas.	--	--
WY-0075	CHEYENNE PRAIRIE GENERATING STATION	WY	MD-16173	07/16/2014	Auxiliary Boiler	13.31	Particulate matter, total (TPM)	good combustion practices	0.0175	LB/MMBTU
SC-0183	NUCOR STEEL - BERKELEY	SC	0420-0060-DX	05/04/2018	Pickle Line Equipment (pickle line no. 3 boilers)	19.6	Particulate matter, filterable (FPM)	Good combustion practices	1.9	LB/MMSCF
SC-0183	NUCOR STEEL - BERKELEY	SC	0420-0060-DX	05/04/2018	Pickle Line Equipment (pickle line no. 3 boilers)	19.6	Particulate matter, total 10 µ (TPM10)	Good Combustion Practices	7.6	LB/MMSCF

Process IDs: --
Other Search Criteria: Process Name Contains "Vaporizer"
Process Description Natural Gas-fired Water Bath Vaporizers
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Fuel type as "Natural Gas" or Equivalent

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Air Separation Plant Water Vaporizer	81.29	Particulate matter, filterable (FPM)	Combustion of natural gas and good combustion practices	0.0075	LB/MMBTU
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 13-01 - Water Bath Vaporizer	19.9	Particulate matter, total 10 µ (TPM10)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	7.6	LB/MMSCF
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 13-01 - Water Bath Vaporizer	19.9	Particulate matter, filterable (FPM)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	1.9	LB/MMSCF
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Unit Water Bath Vaporizer (2 indirect burners) (EP 23-01)	19.6	Particulate matter, total 10 µ (TPM10)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	7.6	LB/MMSCF
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Unit Water Bath Vaporizer (2 indirect burners) (EP 23-01)	19.6	Particulate matter, filterable (FPM)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	1.9	LB/MMSCF
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	13.31	Particulate matter, total 10 µ (TPM10)	Good combustion practices and the use of natural gas	0.12	T/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	13.31	Particulate matter, total 2.5 µ (TPM2.5)	Good combustion practices and the use of natural gas	0.1	T/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	13.31	Particulate matter, filterable (FPM)	Good combustion practices and the use of natural gas	0.45	T/YR
WV-0034	WEST VIRGINIA STEEL MILL	WV	R14-0039	05/05/2022	Water Bath Vaporizer	81.29	Particulate matter, total (TPM)	PNG Good Combustion Practices	0.08	LB/HR

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AK-0082	POINT THOMSON PRODUCTION FACILITY	AK	AQ1201CPT03	01/23/2015	Emergency Camp Generators	17.11	Particulate matter, filterable 10 µ (FPM10)	Not Specified	0.15	GRAMS/HP-H
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Black Start and Emergency Internal Cumbustion Engines	17.11	Particulate matter, total (TPM)	Clean Fuel and Good Combustion Practices	0.25	G/KW-HR
AL-0301	NUCOR STEEL TUSCALOOSA, INC.	AL	413-0033-X014 - X020	07/22/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	Particulate matter, filterable (FPM)	Not Specified	0.0007	LB/HP-H
AR-0177	NUCOR STEEL ARKANSAS	AR	1139-AOP-R27	11/21/2022	SN-230 Galvanizing Line No, 2 Emergency Generator	17.11	Particulate matter, filterable (FPM)	Not Specified	0.2	G/KW-HR
*AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Emergency Generators	17.11	Particulate matter, total (TPM)	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.1	G/BHP-HR
FL-0346	LAUDERDALE PLANT	FL	0110037-011-AC	04/22/2014	Four 3100 kW black start emergency generators	17.11	Particulate matter, total (TPM)	Good combustion practice	0.2	GRAMS PER KW-HR
FL-0347	ANADARKO PETROLEUM CORPORATION - EGOM	FL	OCS-EPA-R4015	09/16/2014	Emergency Diesel Engine	17.11	Particulate matter, total (TPM)	Use of good combustion practices based on the most recent manufacturer's specifications issued for engines and with turbocharger, aftercooler, and high injection pressure	--	--
FL-0356	OKEECHOBEE CLEAN ENERGY CENTER	FL	0930117-001-AC	03/09/2016	Three 3300-kW ULSD emergency generators	17.11	Particulate matter, total (TPM)	Use of clean fuel	0.2	G / KW-HR
FL-0363	DANIA BEACH ENERGY CENTER	FL	0110037-017-AC	12/04/2017	Two 3300 kW emergency generators	17.11	Particulate matter, filterable (FPM)	Clean fuel	0.2	GRAMS PER KWH
FL-0367	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-001-AC	07/27/2018	1,500 kW Emergency Diesel Generator	17.11	Particulate matter, filterable (FPM)	Operate and maintain the engine according to the manufacturer's written instructions	0.2	G/KW-HOUR

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IL-0114	CRONUS CHEMICALS, LLC	IL	13060007	09/05/2014	Emergency Generator	17.11	Particulate matter, filterable (FPM)	Tier IV standards for non-road engines at 40 CFR 1039.102, Table 7.	0.1	G/KW-H
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Emergency Engine	17.11	Particulate matter, total (TPM)	Not Specified	0.2	G/KW-HR
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Emergency Engines	17.11	Particulate matter, total (TPM)	Not Specified	0.2	GRAMS
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Emergency Generator Engine	17.11	Particulate matter, total 10 µ (TPM10)	Not Specified	0.2	G/KW-HR
IN-0173	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	Particulate matter, filterable (FPM)	GOOD COMBUSTION PRACTICES	0.15	G/BHP-H
IN-0180	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	Particulate matter, filterable (FPM)	GOOD COMBUSTION PRACTICES	0.15	G/B-HP-H
IN-0263	MIDWEST FERTILIZER COMPANY LLC	IN	129-36943-00059	03/23/2017	EMERGENCY GENERATORS (EU014A AND EU-014B)	17.11	Particulate matter, total (TPM)	GOOD COMBUSTION PRACTICES	0.15	G/HP-H EACH
IN-0317	RIVERVIEW ENERGY CORPORATION	IN	T147-39554-00065	06/11/2019	Emergency generator EU-6006	17.11	Particulate matter, total (TPM)	Tier II diesel engine	0.2	G/KWH
IN-0324	MIDWEST FERTILIZER COMPANY LLC	IN	129-44510-00059	05/06/2022	emergency generator EU 014a	17.11	Particulate matter, total 10 µ (TPM10)	Not Specified	0.15	G/HP-HR
IN-0359	NUCOR STEEL	IN	107-45480-00038	03/30/2023	Emergency Generator (CC-GEN1)	17.11	Particulate matter, total (TPM)	certified engine	0.15	G/HP-H
IN-0365	MAPLE CREEK ENERGY LLC	IN	T153-45909-00056	06/19/2023	Emergency generator	17.11	Particulate matter, total (TPM)	Not Specified	0.15	G PER HP-HR
KS-0040	JOHNS MANVILLE AT MCPHERSON	KS	CSD00081 V1.0	12/03/2019	Emergency Diesel Engines	17.11	Particulate matter, filterable (FPM)	Emergency Diesel Engine and Fire Pump Subject to NSPS Subpart IIII - Combustion Control and Limited Operating Hours.	0.2	GR/KWH

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KY-0109	FRITZ WINTER NORTH AMERICA, LP	KY	V-16-022 R1	10/24/2016	Emergency Generators #1, #2, & #3 (EU72, EU73, & EU74)	17.11	Particulate matter, total 2.5 µ (TPM2.5)	The permittee shall prepare and maintain for EU72, EU73, and EU74, within 90 days of startup, a good combustion and operation practices plan (GCOP) that defines, measures and verifies the use of operational and design practices determined as BACT for minimizing CO, VOC, PM, PM10, and PM2.5 emissions. Any revisions requested by the Division shall be made and the plan shall be maintained on site. The permittee shall operate according to the provisions of this plan at all times, including periods of startup, shutdown, and malfunction. The plan shall be incorporated into the plant standard operating procedures (SOP) and shall be made available for the Division's inspection. The plan shall include, but not be limited to: i. A list of combustion optimization practices and a means of verifying the practices have occurred. ii. A list of combustion and operation practices to be used to lower energy consumption and a means of verifying the practices have occurred. iii. A list of the design choices determined to be BACT and verification that designs were implemented in the final construction.	0.149	G/HP-HR (EU72 &EU73)
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-02 - North Water System Emergency Generator	17.11	Particulate matter, filterable (FPM)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0.15	G/HP-HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-03 - South Water System Emergency Generator	17.11	Particulate matter, filterable (FPM)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0.15	G/HP-HR

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-07 - Air Separation Plant Emergency Generator	17.11	Particulate matter, filterable (FPM)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0.15	G/HP-HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-01 - Caster Emergency Generator	17.11	Particulate matter, filterable (FPM)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0.15	G/HP-HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	New Pumphouse (XB13) Emergency Generator #1 (EP 08-05)	17.11	Particulate matter, filterable (FPM)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan.	0.15	G/HP-HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Tunnel Furnace Emergency Generator (EP 08-06)	17.11	Particulate matter, filterable (FPM)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0.15	G/HP-HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Caster B Emergency Generator (EP 08-07)	17.11	Particulate matter, filterable (FPM)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0.15	G/HP-HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Unit Emergency Generator (EP 08-08)	17.11	Particulate matter, filterable (FPM)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0.15	G/HP-HR
LA-0288	LAKE CHARLES CHEMICAL COMPLEX	LA	PSD-LA-778	05/23/2014	Emergency Diesel Generators (EQT 629, 639, 838, 966, & 1264)	17.11	Particulate matter, total 10 µ (TPM10)	Comply with 40 CFR 60 Subpart IIII; operate the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	0.88	LB/HR
LA-0292	HOLBROOK COMPRESSOR STATION	LA	PSD-LA-769(M-1)	01/22/2016	Emergency Generators No. 1 & No. 2	17.11	Particulate matter, total 2.5 µ (TPM2.5)	Use of a certified engine, low sulfur diesel, and limiting non-emergency use to no more than 100 hours per year	0.44	LB/HR
LA-0296	LAKE CHARLES CHEMICAL COMPLEX LDPE UNIT	LA	PSD-LA-779	05/23/2014	Emergency Diesel Generators (EQTs 622, 671, 773, 850, 994, 995, 996, 1033, 1077, 1105, & 1202)	17.11	Particulate matter, total 10 µ (TPM10)	Compliance with 40 CFR 60 Subpart IIII; operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage.	0.88	LB/HR
LA-0305	LAKE CHARLES METHANOL FACILITY	LA	PSD-LA-803(M1)	06/30/2016	Diesel Engines (Emergency)	17.11	Particulate matter, total 10 µ (TPM10)	Complying with 40 CFR 60 Subpart IIII	--	--

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Emergency Generator Engines	17.11	Particulate matter, total 10 µ (TPM10)	Complying with 40 CFR 60 Subpart IIII	0.2	G/KW-HR
LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	06/30/2017	DEG1-13 - Diesel Fired Emergency Generator Engine (EQT0012)	17.11	Particulate matter, total 10 µ (TPM10)	Compliance with NSPS Subpart IIII	0.08	LB/HR
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Generator 1	17.11	Particulate matter, filterable 10 µ (FPM10)	Compliance with NESHAP 40 CFR 63 Subpart ZZZZ and NSPS 40 CFR 60 Subpart IIII, and good combustion practices (use of ultra-low sulfur diesel fuel).	0.86	LB/H
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 1	17.11	Particulate matter, total 10 µ (TPM10)	Proper design and operation; use of ultra-low sulfur diesel	1.76	LB/H
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 2	17.11	Particulate matter, total 10 µ (TPM10)	Proper design and operation; use of ultra-low sulfur diesel	1.76	LB/H
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	emergency generator engines (6 units)	17.11	Particulate matter, total 10 µ (TPM10)	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0317	METHANEX - GEISMAR METHANOL PLANT	LA	PSD-LA-761(M4)	12/22/2016	Emergency Generator Engines (4 units)	17.11	Particulate matter, total 10 µ (TPM10)	complying with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	--	--
LA-0331	CALCASIEU PASS LNG PROJECT	LA	PDS-LA-805	09/21/2018	Large Emergency Engines (>50kW)	17.11	Particulate matter, total 10 µ (TPM10)	Good combustion and operating practices.	0.2	G/KW-H
LA-0350	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-744(M2)	03/28/2018	emergency generators (3 units) EQT0039, EQT0040, EQT0041	17.11	Particulate matter, total 10 µ (TPM10)	Comply with 40 CFR 60 Subpart IIII	--	--

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0364	FG LA COMPLEX	LA	PSD-LA-812	01/06/2020	Emergency Generator Diesel Engines	17.11	Particulate matter, total 10 µ (TPM10)	Compliance with the limitations imposed by 40 CFR 63 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	--	--
LA-0379	SHINTECH PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-4)	05/04/2021	VCM Unit Emergency Generator A	17.11	Particulate matter, total 10 µ (TPM10)	Good combustion practices/gaseous fuel burning.	0.4	G/HP-HR
LA-0379	SHINTECH PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-4)	05/04/2021	C/A Emergency Generator B	17.11	Particulate matter, total (TPM)	Good combustion practices/gaseous fuel burning.	0.4	G/HP-HR
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Generator Engine	17.11	Particulate matter, total 10 µ (TPM10)	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and use of ultra-low sulfur diesel fuel.	0.15	G/HP-HR
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	06-22 - AO-5 Emergency Generator	17.11	Particulate matter, total 2.5 µ (TPM2.5)	Use of good combustion practices and compliance with NSPS Subpart IIII	0.22	LB/HR
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	53-22 - PAO Emergency Generator	17.11	Particulate matter, total 2.5 µ (TPM2.5)	Use of good combustion practices, compliance with NSPS Subpart IIII, and limiting non-emergency operation to no more than 100 hours per year	0.22	LB/HR
*LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	EGEN - Plant Emergency Generator	17.11	Particulate matter, total 10 µ (TPM10)	Compliance with 40 CFR 60 Subpart IIII	1.19	LB/HR
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	01/30/2014	Emergency Engine/Generator	17.11	Particulate matter, total 10 µ (TPM10)	Not Specified	0.15	GM/BHP-H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	EMERGENCY GENERATOR 1	17.11	Particulate matter, filterable (FPM)	EXCLUSIVE USE OF ULSD FUEL, GOOD COMBUSTION PRACTICES, LIMITED HOURS OF OPERATION, AND DESIGNED TO ACHIEVE EMISSION LIMITS	0.15	G/HP-H
MD-0043	PERRYMAN GENERATING STATION	MD	PSC CASE NO. 9136	07/01/2014	EMERGENCY GENERATOR	17.11	Particulate matter, total 10 µ (TPM10)	GOOD COMBUSTION PRACTICES, LIMITED HOURS OF OPERATION, AND EXCLUSIVE USE OF ULSD	0.17	G/HP-H
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	06/09/2014	EMERGENCY GENERATOR	17.11	Particulate matter, filterable (FPM)	EXCLUSIVE USE OF ULSD FUEL, GOOD COMBUSTION PRACTICES AND DESIGNED TO ACHIEVE EMISSION LIMITS	0.15	G/HP-H
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	06/09/2014	EMERGENCY GENERATOR	17.11	Particulate matter, total 10 µ (TPM10)	EXCLUSIVE USE OF ULSD FUEL, GOOD COMBUSTION PRACTICES AND DESIGNED TO ACHIEVE EMISSION LIMITS	0.17	G/HP-H
MI-0421	GRAYLING PARTICLEBOARD	MI	59-16	08/26/2016	Emergency Diesel Generator Engine (EUEMRGRICE in FGRICE)	17.11	Particulate matter, filterable (FPM)	Certified engines, good design, operation and combustion practices. Operational restrictions/limited use.	1.41	LB/H
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUEMENGINE (Diesel fuel emergency engine)	17.11	Particulate matter, filterable (FPM)	Good combustion practices and meeting NSPS Subpart IIII requirements.	0.2	G/KW-H
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUEMENGINE (Diesel fuel emergency engine)	17.11	Particulate matter, total 10 µ (TPM10)	Good combustion practices.	1.58	LB/H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	05/09/2017	EUEMRGRICE1 in FGRICE (Emergency diesel generator engine)	17.11	Particulate matter, filterable (FPM)	Certified engines, good design, operation and combustion practices. Operational restrictions/limited use.	0.66	LB/H
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	05/09/2017	EUEMRGRICE2 in FGRICE (Emergency Diesel Generator Engine)	17.11	Particulate matter, filterable (FPM)	Certified engines, good design, operation and combustion practices. Operational restrictions/limited use.	0.22	LB/H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (North Plant): Emergency Engine	17.11	Particulate matter, filterable (FPM)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.2	G/KW-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (North Plant): Emergency Engine	17.11	Particulate matter, total 10 µ (TPM10)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.54	LB/H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (North Plant): Emergency Engine	17.11	Particulate matter, total 2.5 µ (TPM2.5)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.52	LB/H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (South Plant): Emergency Engine	17.11	Particulate matter, filterable (FPM)	Diesel particulate filter, good combustion practices and meeting NSPS IIII requirements.	0.2	G/KW-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (South Plant): Emergency Engine	17.11	Particulate matter, total 10 µ (TPM10)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.54	LB/H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (South Plant): Emergency Engine	17.11	Particulate matter, total 2.5 µ (TPM2.5)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.52	LB/H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUEMENGINE: Emergency engine	17.11	Particulate matter, filterable (FPM)	State of the art combustion design	0.2	G/KW-H
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUEMENGINE: Emergency engine	17.11	Particulate matter, total 10 µ (TPM10)	State of the art combustion design	1.18	LB/H
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD1--A 1500 HP diesel fueled emergency engine	17.11	Particulate matter, total 10 µ (TPM10)	Good combustion practices, burn ultra-low sulfur diesel fuel and be NSPS compliant.	0.69	LB/H
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD2--A 6000 HP diesel fuel fired emergency engine	17.11	Particulate matter, total 10 µ (TPM10)	Good combustion practices, burn ultra low sulfur diesel fuel, and be NSPS compliant.	2.7	LB/H
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGEMENGINE	17.11	Particulate matter, total (TPM)	Good combustion practices and ultra low sulfur diesel	0.04	G/HP-H
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGEMENGINE	17.11	Particulate matter, total 10 µ (TPM10)	Good combustion practices and ultra low sulfur diesel	7.85	LB/1000 GAL
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGEMENGINE	17.11	Particulate matter, total 2.5 µ (TPM2.5)	Good combustion practices and ultra low sulfur diesel.	7.55	LB/1000 GAL
MI-0447	LBWL--ERICKSON STATION	MI	74-18A	01/07/2021	EUEMGD--emergency engine	17.11	Particulate matter, filterable (FPM)	Good combustion practices, burn ultra-low diesel fuel, and will be NSPS compliant.	0.2	G/KW-H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0447	LBWL--ERICKSON STATION	MI	74-18A	01/07/2021	EUEMGD--emergency engine	17.11	Particulate matter, total 10 µ (TPM10)	Good combustion practices, burn ultra-low diesel fuel and be NSPS compliant.	1	LB/H
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE1 in FGRICE)	17.11	Particulate matter, filterable (FPM)	Certified Engines, Good Design, Operation, and Combustion Practices, Operational Restrictions/Limited Use	0.66	LB/H
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE2 in FGRICE)	17.11	Particulate matter, filterable (FPM)	Certified Engines, Good Design, Operation, and Combustion Practices, Operational Restrictions/Limited Use	0.22	LB/H
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUEMENGINE (North Plant): Emergency engine	17.11	Particulate matter, filterable (FPM)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.2	G/KW-H
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUEMENGINE (North Plant): Emergency engine	17.11	Particulate matter, total 10 µ (TPM10)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.54	LB/H
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUEMENGINE (North Plant): Emergency engine	17.11	Particulate matter, total 2.5 µ (TPM2.5)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.52	LB/H
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUEMENGINE (South Plant): Emergency engine	17.11	Particulate matter, filterable (FPM)	Diesel particulate filter, Good Combustion Practices and meeting NSPS Subpart IIII requirements	0.2	G/KW-H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUEMENGINE (South Plant): Emergency engine	17.11	Particulate matter, total 10 µ (TPM10)	Diesel particulate filter, Good Combustion Practices and meeting NSPS Subpart IIII requirements	0.54	LB/H
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUEMENGINE (South Plant): Emergency engine	17.11	Particulate matter, total 2.5 µ (TPM2.5)	Diesel particulate filter, Good Combustion Practices and meeting NSPS Subpart IIII requirements	0.52	LB/H
MI-0454	LBWL-ERICKSON STATION	MI	74-18D	12/20/2022	EUEMGD	17.11	Particulate matter, filterable (FPM)	Good combustion practices, burn ultra-low diesel fuel, and will be NSPS compliant.	0.2	G/KWH
MI-0454	LBWL-ERICKSON STATION	MI	74-18D	12/20/2022	EUEMGD	17.11	Particulate matter, total 10 µ (TPM10)	Good combustion practices, burn ultra-low diesel fuel, and be NSPS compliant.	1	LB/H
NJ-0084	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068/BOP150001	03/10/2016	Diesel Fired Emergency Generator	17.11	Particulate matter, filterable (FPM)	use of ULSD a clean burning fuel, and limited hours of operation	0.26	LB/H
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Emergency generator (P002)	17.11	Particulate matter, total (TPM)	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	0.77	LB/H
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency generator (P003)	17.11	Particulate matter, total 10 µ (TPM10)	State-of-the-art combustion design	0.77	LB/H
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency generator (P003)	17.11	Particulate matter, total 10 µ (TPM10)	State-of-the-art combustion design	0.97	LB/H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Generator (P009)	17.11	Particulate matter, total 10 µ (TPM10)	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	0.2	LB/H
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency generator (P003)	17.11	Particulate matter, total 10 µ (TPM10)	Ultra low sulfur diesel fuel	0.5	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency generator (P003)	17.11	Particulate matter, total 10 µ (TPM10)	Ultra low sulfur diesel fuel	0.5	LB/H
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Generators (2 identical, P004 and P005)	17.11	Particulate matter, total (TPM)	Certified to the meet the emissions standards in 40 CFR 89.112 and 89.113 pursuant to 40 CFR 60.4205(b) and 60.4202(a)(2). Good combustion practices per the manufacturer's operating manual.	0.73	LB/H
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Emergency Diesel Generator Engine (P001)	17.11	Particulate matter, total (TPM)	Good combustion design	0.73	LB/H
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Emergency diesel-fired generator (P007)	17.11	Particulate matter, total 10 µ (TPM10)	Comply with NSPS 40 CFR 60 Subpart IIII	1.01	LB/H
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Diesel Generator (P003)	17.11	Particulate matter, total (TPM)	Good combustion practices (ULSD) and compliance with 40 CFR Part 60, Subpart IIII	0.62	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Emergency Diesel-fired Generator Engine (P007)	17.11	Particulate matter, total (TPM)	certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual	1.1	LB/H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	1,000 kW Emergency Generators (P008 - P010)	17.11	Particulate matter, total (TPM)	certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual	0.44	LB/H
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	02/06/2019	Emergency Generators (P005 and P006)	17.11	Particulate matter, filterable 10 µ (FPM10)	Tier IV engine Good combustion practices	0.15	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	5,051 bhp (3,768 kWm) Diesel-Fired Emergency Generators: P001 through P046	17.11	Particulate matter, total (TPM)	Certified to meet Tier 2 standards and good combustion practices	0.2	G/KW-H
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	2000 kW Emergency Generator	17.11	Particulate matter, filterable (FPM)	Not Specified	0.025	GM/HP-HR
PA-0310	CPV FAIRVIEW ENERGY CENTER	PA	11-00536A	09/02/2016	Emergency Generator Engines	17.11	Particulate matter, total (TPM)	Not Specified	0.15	G/BHP-HR
PA-0311	MOXIE FREEDOM GENERATION PLANT	PA	40-00129A	09/01/2015	Emergency Generator	17.11	Particulate matter, total (TPM)	Not Specified	0.04	G/HP-HR
*PA-0313	FIRST QUALITY TISSUE LOCK HAVEN PLT	PA	18-00030C	07/27/2017	Emergency Generator	17.11	Particulate matter, total (TPM)	Not Specified	0.2	G
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Generator	17.11	Particulate matter, filterable (FPM)	Not Specified	0.15	G/B-HP-H
TX-0728	PEONY CHEMICAL MANUFACTURING FACILITY	TX	118239, N200	04/01/2015	Emergency Diesel Generator	17.11	Particulate matter, filterable (FPM)	Minimized hours of operations Tier II engine	0.15	LB/H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
TX-0939	ORANGE COUNTY ADVANCED POWER STATION	TX	166032 PSDTX1598 GHGPSDTX210	03/13/2023	EMERGENCY GENERATOR	17.11	Particulate matter, filterable (FPM)	GOOD COMBUSTION PRACTICES, LIMITED TO 100 HR/YR	0.0003	LB/HP HR
TX-0939	ORANGE COUNTY ADVANCED POWER STATION	TX	166032 PSDTX1598 GHGPSDTX210	03/13/2023	EMERGENCY GENERATOR	17.11	Particulate matter, filterable 2.5 µ (FPM2.5)	GOOD COMBUSTION PRACTICES, LIMITED TO 100 HR/YR	0.003	LB/HP HR
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED EMERGENCY GENERATOR 3000 kW (1)	17.11	Particulate matter, total 10 µ (TPM10)	Ultra Low Sulfur Diesel/Fuel (15 ppm max)	0.4	G/KW
VA-0333	NORFOLK NAVAL SHIPYARD	VA	60326-36	12/09/2020	One (1) emergency engine generator	17.11	Particulate matter, total 10 µ (TPM10)	Not Specified	1.1	LB
WI-0284	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-017	04/24/2018	Diesel-Fired Emergency Generators	17.11	Particulate matter, total (TPM)	The Use of Ultra-Low Sulfur Fuel and Good Combustion Practices	0.17	G/KWH
WI-0286	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-022	04/24/2018	P42 -Diesel Fired Emergency Generator	17.11	Particulate matter, total (TPM)	Good Combustion Practices and The Use of Ultra-low Sulfur Fuel	17	G/KWH
WI-0286	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-022	04/24/2018	P42 -Diesel Fired Emergency Generator	17.11	Particulate matter, total 10 µ (TPM10)	Good Combustion Practices and The Use of Ultra-low Sulfur Fuel	0.17	G/KWH

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input >500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
WI-0294	CARDINAL FG COMPANY	WI	19-POY-012	08/26/2019	P10- Diesel emergency Generator	17.11	Particulate matter, total (TPM)	Not Specified	0.05	G/B-HP-H
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Generator (P07)	17.11	Particulate matter, total (TPM)	Limited to operate 500 hours/year, sulfur content of the diesel fuel oil fired may not exceed 15 ppm, and operate and maintain according to the manufacturer's recommendations.	0.15	G/HP-H
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Emergency Generator	17.11	Particulate matter, filterable 2.5 µ (FPM2.5)	Not Specified	--	--
WV-0027	INWOOD	WV	R14-0015M	09/15/2017	Emergency Generator - ESDG14	17.11	Particulate matter, total 10 µ (TPM10)	ULSD	0.2	G/HP-HR
WV-0033	MAIDSVILLE	WV	R14-0038	01/05/2022	Emergency Generator	17.11	Particulate matter, total (TPM)	Clean Fuels and Good Combustion Practices.	0.23	LB/HR
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	03/17/2021	Emergency Engines	17.21	Particulate matter, total (TPM)	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.2	G/KW-HR
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Engines	17.21	Particulate matter, filterable (FPM)	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.1	G/BHP-HR
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	DIESEL-FIRED AUXILIARY (EMERGENCY) ENGINES (TWO)	17.21	Particulate matter, filterable (FPM)	USE OF ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES	0.2	G/KW-H
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	DIESEL-FIRED AUXILIARY (EMERGENCY) ENGINES (TWO)	17.21	Particulate matter, total 10 µ (TPM10)	USE OF ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES.	0.18	G/HP-H

Process IDs: 99.011; 99.006
Other Search Criteria: ---
Process Description Semiconductor Manufacturing
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: None

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0387	INTEL OHIO SITE	OH	P0132323	9/20/2022	Semiconductor Fabrication: P179 through P182	99.011	TPM / PM10 / PM2.5	Good combustion practices and the use of natural gas.	---	---
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	04/24/2018	P12, P22, P18, P19, P28, P29 Organic Stripping Systems, Array/Color Filter and Cell Processes	99.006	Particulate matter, total (TPM)	Regenerative Thermal Oxidizer	0.0075	LB/MMBTU
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	04/24/2018	P15 & P25 VOC System Array Process	99.006	Particulate matter, total (TPM)	Regenerative Thermal Oxidizer	--	--
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	04/24/2018	P13 & P23 Chemical Vapor Deposition System Array Process	99.006	Particulate matter, total (TPM)	Combustor, Baghouse and Wet Scrubber in series	0.004	GR/ACF
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	04/24/2018	P14 & P24 Dry Etching System Array Process	99.006	Particulate matter, total (TPM)	Combustor and Wet Scrubber in series	0.0075	LB/MMBTU

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IA-0107	MARSHALLTOWN GENERATING STATION	IA	13-A-499-P	04/14/2014	Cooling tower	99.003	Particulate matter, total (TPM)	Mist eliminator	1.2	LB/H
MI-0437	KNAUF INSULATION, INC.--ALBION FACILITY	MI	26-15C	10/10/2018	EU-COOLTOWER (Cooling tower)	99.003	Particulate matter, total 10 µ (TPM10)	Drift eliminators	0.39	T/YR
AR-0161	SUN BIO MATERIAL COMPANY	AR	2384-AOP-R0	09/23/2019	Cooling Towers	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Drift Eliminators Low TDS	0.0005	PERCENT DRIFT RATE
FL-0356	OKEECHOBEE CLEAN ENERGY CENTER	FL	0930117-001-AC	03/09/2016	Mechanical draft cooling tower	99.009	Particulate matter, total (TPM)	Must have certified drift rate no more than 0.0005%.	0.0005	PERCENT DRIFT RATE
FL-0363	DANIA BEACH ENERGY CENTER	FL	0110037-017-AC	12/04/2017	Mechanical draft cooling system	99.009	Particulate matter, filterable (FPM)	Certified drift rate < 0.0005%	0.0005	PERCENT DRIFT RATE
FL-0367	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-001-AC	07/27/2018	Mechanical Draft Auxiliary Cooling System	99.009	Particulate matter, filterable (FPM)	Certified drift rate < 0.0005%	0.0005	PERCENT DRIFT RATE
FL-0368	NUCOR STEEL FLORIDA FACILITY	FL	1050472-001-AC	02/14/2019	Two Cooling Towers	99.009	Particulate matter, total (TPM)	Drift eliminators	0.001	PERCENT DRIFT RATE
FL-0371	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-003-AC (PSD-FL-444A)	06/07/2021	Mechanical Draft Auxiliary Cooling System	99.009	Particulate matter, filterable (FPM)	Certified drift rate < 0.0005%	0.0005	PERCENT DRIFT RATE
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift eliminators	0.0005	PERCENT DRIFT RATE
IN-0173	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	TEN CELL EVAPORATIVE COOLING TOWER	99.009	Particulate matter, filterable (FPM)	HIGH EFFICIENCY DRIFT ELIMINATORS	0.0005	PERCENT DRIFT RATE

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IN-0173	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	SIX CELL EVAPORATIVE COOLING TOWER	99.009	Particulate matter, filterable (FPM)	HIGH EFFICIENCY DRIFT ELIMINATORS	0.0005	PERCENT DRIFT RATE
IN-0185	MAG PELLET LLC	IN	181-33965-00054	04/24/2014	COOLING TOWERS	99.009	Particulate matter, filterable 10 µ (FPM10)	Not Specified	0.07	LB/HR
IN-0317	RIVERVIEW ENERGY CORPORATION	IN	T147-39554-00065	06/11/2019	Cooling tower EU-6001	99.009	Particulate matter, total (TPM)	drift eliminator	2395	MG/L
KS-0029	THE EMPIRE DISTRICT ELECTRIC COMPANY	KS	C-12987	07/14/2015	Mechanical draft cooling tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	high efficiency drift eliminators (integral part of the design)	0.0005	PERCENT DRIFT RATE
KS-0034	ABENGOA BIOENERGY BIOMASS OF KANSAS (ABBK)	KS	C-11396	05/27/2014	Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Drift Eliminator with 0.0005% Drift Rate	1575	PPM TDS
KS-0040	JOHNS MANVILLE AT MCPHERSON	KS	CSD00081 V1.0	12/03/2019	Cooling Towers	99.009	Particulate matter, total (TPM)	Drift Rate Control	0.001	PERCENT DRIFT RATE
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-01 - Melt Shop ICW Cooling Tower	99.009	Particulate matter, filterable (FPM)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.36	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-01 - Melt Shop ICW Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.27	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-01 - Melt Shop ICW Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.0008	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-02 - Melt Shop DCW Cooling Tower	99.009	Particulate matter, filterable (FPM)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.04	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-02 - Melt Shop DCW Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.03	LB/HR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-02 - Melt Shop DCW Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.0001	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-03 - Rolling Mill ICW Cooling Tower	99.009	Particulate matter, filterable (FPM)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.06	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-03 - Rolling Mill ICW Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.04	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-03 - Rolling Mill ICW Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.0001	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-04 - Rolling Mill DCW Cooling Tower	99.009	Particulate matter, filterable (FPM)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.17	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-04 - Rolling Mill DCW Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.12	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-04 - Rolling Mill DCW Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.0004	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-05 - Rolling Mill Quench/ACC Cooling Tower	99.009	Particulate matter, filterable (FPM)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.78	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-05 - Rolling Mill Quench/ACC Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.54	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-05 - Rolling Mill Quench/ACC Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.0017	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-06 - Light Plate Quench DCW Cooling Tower	99.009	Particulate matter, filterable (FPM)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.06	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-06 - Light Plate Quench DCW Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.04	LB/HR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-06 - Light Plate Quench DCW Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.0001	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-07 - Heavy Plate Quench DCW Cooling Tower	99.009	Particulate matter, filterable (FPM)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.02	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-07 - Heavy Plate Quench DCW Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.0001	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-08 - Air Separation Plant Cooling Tower	99.009	Particulate matter, filterable (FPM)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.1	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-08 - Air Separation Plant Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.08	LB/HR
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 09-08 - Air Separation Plant Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High Efficiency Mist Eliminator. The mist eliminator drift loss shall be maintained at 0.001% or less to total gpm.	0.0002	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Laminar Cooling Tower - Hot Mill Cells (EP 03-09)	99.009	Particulate matter, filterable (FPM)	Mist Eliminator, 0.001% drift loss	0.27	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Laminar Cooling Tower - Hot Mill Cells (EP 03-09)	99.009	Particulate matter, total 10 µ (TPM10)	Mist Eliminator, 0.001% drift loss	0.19	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Laminar Cooling Tower - Hot Mill Cells (EP 03-09)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Mist Eliminator, 0.001% drift loss	0.0006	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Direct Cooling Tower-Caster & Roughing Mill Cells (EP 03-10)	99.009	Particulate matter, filterable (FPM)	Mist Eliminator, 0.001% drift loss	0.17	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Direct Cooling Tower-Caster & Roughing Mill Cells (EP 03-10)	99.009	Particulate matter, total 10 µ (TPM10)	Mist Eliminator, 0.001% drift loss	0.12	LB/HR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Direct Cooling Tower-Caster & Roughing Mill Cells (EP 03-10)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Mist Eliminator, 0.001% drift loss	0.0004	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Melt Shop #2 Cooling Tower (indirect) (EP 03-11)	99.009	Particulate matter, filterable (FPM)	Mist Eliminator, 0.001% drift loss	0.39	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Melt Shop #2 Cooling Tower (indirect) (EP 03-11)	99.009	Particulate matter, total 10 µ (TPM10)	Mist Eliminator, 0.001% drift loss	0.29	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Melt Shop #2 Cooling Tower (indirect) (EP 03-11)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Mist Eliminator, 0.001% drift loss	0.0008	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Cold Mill Cooling Tower (EP 03-12)	99.009	Particulate matter, filterable (FPM)	Mist Eliminator, 0.001% drift loss	0.14	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Cold Mill Cooling Tower (EP 03-12)	99.009	Particulate matter, total 10 µ (TPM10)	Mist Eliminator, 0.001% drift loss	0.094	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Cold Mill Cooling Tower (EP 03-12)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Mist Eliminator, 0.001% drift loss	0.0003	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Plant Cooling Tower (EP 03-13)	99.009	Particulate matter, filterable (FPM)	Mist Eliminator, 0.001% drift loss	0.08	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Plant Cooling Tower (EP 03-13)	99.009	Particulate matter, total 10 µ (TPM10)	Mist Eliminator, 0.001% drift loss	0.07	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Plant Cooling Tower (EP 03-13)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Mist Eliminator, 0.001% drift loss	0.0002	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	DCW Auxiliary Cooling Tower (EP 03-14)	99.009	Particulate matter, filterable (FPM)	Mist Eliminator, 0.001% drift loss	0.06	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	DCW Auxiliary Cooling Tower (EP 03-14)	99.009	Particulate matter, total 10 µ (TPM10)	Mist Eliminator, 0.001% drift loss	0.05	LB/HR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	DCW Auxiliary Cooling Tower (EP 03-14)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Mist Eliminator, 0.001% drift loss	0.0001	LB/HR
KY-0116	NOVELIS CORPORATION - GUTHRIE	KY	V-22-011	07/25/2022	EU 043 - Cooling Tower #1	99.009	Particulate matter, filterable (FPM)	Mist Eliminator (0.001% drift loss), Total Dissolved Solids (TDS) concentration limit of 1000 ppm	0.013	LB/HR
KY-0116	NOVELIS CORPORATION - GUTHRIE	KY	V-22-011	07/25/2022	EU 043 - Cooling Tower #1	99.009	Particulate matter, total 10 µ (TPM10)	Mist Eliminator (0.001% drift loss), Total Dissolved Solids (TDS) concentration limit of 1000 ppm	0.006	LB/HR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KY-0116	NOVELIS CORPORATION - GUTHRIE	KY	V-22-011	07/25/2022	EU 043 - Cooling Tower #1	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Mist Eliminator (0.001% drift loss), Total Dissolved Solids (TDS) concentration limit of 1000 ppm	0.001	PERCENT DRIFT LOSS
LA-0288	LAKE CHARLES CHEMICAL COMPLEX	LA	PSD-LA-778	05/23/2014	Process Cooling Towers (EQT 634 & 635)	99.009	Particulate matter, filterable 10 µ (FPM10)	High efficiency drift eliminators and low TDS cooling water	6.99	TPY
LA-0288	LAKE CHARLES CHEMICAL COMPLEX	LA	PSD-LA-778	05/23/2014	ASU Cooling Tower (EQT 636)	99.009	Particulate matter, filterable 10 µ (FPM10)	High efficiency drift eliminators and low TDS cooling water	7.4	TPY
LA-0301	LAKE CHARLES CHEMICAL COMPLEX ETHYLENE 2 UNIT	LA	PSD-LA-779	05/23/2014	Cooling Tower (EQT 979)	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift eliminators and low TDS cooling water	20.47	TPY
LA-0302	LAKE CHARLES CHEMICAL COMPLEX EO/MEG UNIT	LA	PSD-LA-779	05/23/2014	Cooling Tower (EQT 1011)	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift eliminators and low TDS cooling water	1.71	TPY
LA-0305	LAKE CHARLES METHANOL FACILITY	LA	PSD-LA-803(M1)	06/30/2016	Cooling Towers	99.009	Particulate matter, total 10 µ (TPM10)	Drift eliminators	0.0005	PERCENT DRIFT RATE
LA-0306	TOPCHEM POLLOCK, LLC	LA	PSD-LA-815	12/20/2016	Cooling Tower CT-16-1 (EQT032)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High Efficiency Drift Eliminator	0.001	LB/HR
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Cooling Towers	99.009	Particulate matter, total 10 µ (TPM10)	drift eliminators	0.0005	PERCENT DRIFT RATE
LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	06/30/2017	ECT-14 - Econamine Cooling Tower (EQT0018)	99.009	Particulate matter, filterable 2.5 µ (FPM2.5)	High efficiency drift eliminators	0.01	TPY
LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	06/30/2017	ECT-14 - Econamine Cooling Tower (EQT0018)	99.009	Particulate matter, filterable 10 µ (FPM10)	High efficiency drift eliminators	0.44	TPY
LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	06/30/2017	CT-13 - Cooling Tower (EQT0007)	99.009	Particulate matter, filterable 2.5 µ (FPM2.5)	High efficiency drift eliminators	0.01	LB/HR
LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	06/30/2017	CT-13 - Cooling Tower (EQT0007)	99.009	Particulate matter, filterable 10 µ (FPM10)	High efficiency drift eliminators	0.96	LB/HR
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Cooling Tower 1	99.009	Particulate matter, filterable 10 µ (FPM10)	High efficiency drift eliminators	1.24	LB/HR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0314	INDORAMA LAKE CHARLES FACILITY	LA	PSD-LA-813	08/03/2016	cooling towers - 007	99.009	Particulate matter, total 10 µ (TPM10)	drift eliminators	0.0005	PERCENT DRIFT RATE
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift eliminators	0.39	LB/HR
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High efficiency drift eliminators	0.24	LB/HR
LA-0317	METHANEX - GEISMAR METHANOL PLANT	LA	PSD-LA-761(M4)	12/22/2016	cooling towers (I-CT-621, II-CT-621)	99.009	Particulate matter, total 10 µ (TPM10)	Drift eliminators	0.001	PERCENT DRIFT RATE
LA-0318	FLOPAM FACILITY	LA	PSD-LA-747(M5)	01/07/2016	cooling towers	99.009	Particulate matter, total 10 µ (TPM10)	integrated drift eliminators	---	---
LA-0323	MONSANTO LULING PLANT	LA	PSD-LA-890	01/09/2017	Cooling Water Tower	99.009	Particulate matter, total 10 µ (TPM10)	Drift Eliminators with Draft Factor of 0.003%	0.003	PERCENT DRIFT RATE
LA-0323	MONSANTO LULING PLANT	LA	PSD-LA-890	01/09/2017	Cooling Water Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Drift Eliminators with Drift Factor of 0.003%	0.003	PERCENT DRIFT RATE
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High-efficiency drift eliminators.	0.0005	PERCENT DRIFT RATE
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	04-22 - AO-5 Cooling Water Tower, W-S5401	99.009	Particulate matter, total 10 µ (TPM10)	Implementation of a heat exchange leak detection and repair program consistent with 40 CFR 63 Subpart F requirements	0.18	LB/HR
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	04-22 - AO-5 Cooling Water Tower, W-S5401	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Implementation of a heat exchange leak detection and repair program consistent with 40 CFR 63 Subpart F requirements	0.15	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	CWT - Cooling Water Tower	99.009	Particulate matter, total 10 µ (TPM10)	Use of High efficiency drift eliminators	---	---
LA-0402	DESTREHAN OIL PROCESSING FACILITY	LA	PSD-LA-855	12/13/2023	HLK40 - Cooling Towers (EQT0095)	99.009	Particulate matter, filterable 10 µ (FPM10)	Drift elimination system	0.06	LB/HR
LA-0402	DESTREHAN OIL PROCESSING FACILITY	LA	PSD-LA-855	12/13/2023	HLK40 - Cooling Towers (EQT0095)	99.009	Particulate matter, filterable 2.5 µ (FPM2.5)	Drift elimination system	0.02	LB/HR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0424	HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	MI	107-13C	12/05/2016	EUCOOLTWR (Cooling Tower--Wet Mechanical Draft)	99.009	Particulate matter, total 10 µ (TPM10)	Mist/drift eliminators	2.37	T/YR
MI-0427	FILER CITY STATION	MI	66-17	11/17/2017	EUCOOLTWR (Cooling Tower--Wet Mechanical Drift)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Mist/Drift Eliminators	0.0006	PERCENT DRIFT RATE
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUCOOLTOWER (North Plant): Cooling Tower	99.009	Particulate matter, filterable (FPM)	High efficiency drift/mist eliminators	5.59	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUCOOLTOWER (North Plant): Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift/mist eliminators	2.85	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUCOOLTOWER (South Plant): Cooling Tower	99.009	Particulate matter, filterable (FPM)	High efficiency drift/mist eliminators.	5.59	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUCOOLTOWER (South Plant): Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift/mist eliminators.	2.85	T/YR
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUCOOLINGTWR: Cooling Tower	99.009	Particulate matter, filterable (FPM)	High efficiency drift/mist eliminators	4.03	LB/HR
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUCOOLINGTWR: Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift/mist eliminators	0.48	LB/HR
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGCOOLTWR	99.009	Particulate matter, total (TPM)	Particulate in water droplets will be controlled with high efficiency drift/mist eliminators.	4.1	T/YR
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGCOOLTWR	99.009	Particulate matter, total 10 µ (TPM10)	Particulate in water droplets will be controlled with high efficiency drift/mist eliminators	2.6	T/YR
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGCOOLTWR	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Particulate in water droplets will be controlled with high efficiency drift/mist eliminators	0.6	T/YR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MN-0094	CHS OILSEED PROCESSING - FAIRMONT	MN	09100059-101	08/22/2019	Cooling Towers	99.009	Particulate matter, total (TPM)	Not Specified	0.005	PERCENT DRIFT RATE
MS-0092	EMBERCLEAR GTL MS	MS	0040-00055	05/08/2014	Cooling tower, Induced draft	99.009	Particulate matter, total (TPM)	high efficiency drift eliminators	0.001	PERCENT DRIFT RATE
NE-0059	AGP SOY	NE	CP14-007	03/25/2015	Cooling Tower	99.009	Particulate matter, total (TPM)	drift loss design specification and TDS concentration limit	0.0005	PERCENT DRIFT RATE
NE-0064	NORFOLK CRUSH, LLC	NE	CP22-017	11/21/2022	Cooling Tower	99.009	Particulate matter, total (TPM)	There is a drift loss design specification and a TDS concentration limit.	0.0005	PERCENT DRIFT RATE
NE-0068	AG PROCESSING INC - DAVID CITY	NE	CP22-046	06/27/2023	Cooling Tower 1	99.009	Particulate matter, total (TPM)	There is a drift loss design specification with the mist eliminator (CE-8000) and a TDS concentration limit.	0.0005	PERCENT DRIFT RATE
NE-0068	AG PROCESSING INC - DAVID CITY	NE	CP22-046	06/27/2023	Cooling Tower 2	99.009	Particulate matter, total (TPM)	There is a drift loss design specification with the mist eliminator (CE-8001) and a TDS concentration limit.	0.0005	PERCENT DRIFT RATE
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Cooling Tower (P004)	99.009	Particulate matter, total (TPM)	High efficiency drift eliminators and minimize total dissolved solid (TDS)	2.685	LB/HR
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Cooling Tower (P004)	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift eliminators and minimize total dissolved solid (TDS)	1.7	LB/HR
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Cooling Tower (P004)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High efficiency drift eliminators and minimize total dissolved solid (TDS)	0.006	LB/HR
OH-0364	OREGON ENERGY CENTER	OH	P0110708	05/20/2015	Cooling Towers #1 & #2 (P009 & P010)	99.009	Particulate matter, total (TPM)	advanced drift eliminators with a drift rate of less than 0.0005 percent and maintain the total dissolved solids (TDS) content of the circulating cooling water at 5,130 mg/L or less as a 24-hour rolling average	1.48	LB/HR
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Wet Cooling Tower (P005)	99.009	Particulate matter, total 10 µ (TPM10)	Drift eliminator with a maximum drift rate of 0.0005% and total dissolved solids (TDS) concentration of the cooling water less than or equal to 3,075 milligrams per liter.	1.27	LB/HR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Wet Cooling Tower (P005)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Drift eliminator with a maximum drift rate of 0.0005% and total dissolved solids (TDS) concentration of the cooling water less than or equal to 3,075 milligrams per liter.	0.51	LB/HR
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Cooling Towers (2 identical, P005 and P006)	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift eliminators and minimize total dissolved solid (TDS)	1.33	LB/HR
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Cooling Towers (2 identical, P005 and P006)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High efficiency drift eliminators and minimize total dissolved solid (TDS)	0.534	LB/HR
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Cooling Towers #1 & #2 (P010 & P011)	99.009	Particulate matter, total 10 µ (TPM10)	drift eliminators with a maximum drift rate specification of 0.0005 percent or less and total dissolved solids (TDS) concentration of the cooling water less than or equal to 5,000 milligrams per liter (mg/l)	0.3	LB/HR
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Cooling Towers #1 & #2 (P010 & P011)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	drift eliminators with a maximum drift rate specification of 0.0005 percent or less and total dissolved solids (TDS) concentration of the cooling water less than or equal to 5,000 milligrams per liter (mg/l)	0.0018	LB/HR
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Wastewater Treatment Plant Cooling Water Tower (P012)	99.009	Particulate matter, total 10 µ (TPM10)	drift eliminators with a maximum drift rate specification of 0.0005 percent or less and total dissolved solids (TDS) concentration of the cooling water less than or equal to 50,000 milligrams per liter (mg/l)	5	X10-4 LB/H

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Wet Cooling Tower (P005)	99.009	Particulate matter, total 10 µ (TPM10)	drift eliminator with a maximum drift rate of 0.0005% and total dissolved solids (TDS) concentration of the cooling water less than or equal to 3,500 milligrams per liter (mg/l).	1.36	LB/HR
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Wet Cooling Tower (P005)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	drift eliminator with a maximum drift rate of 0.0005% and total dissolved solids (TDS) concentration of the cooling water less than or equal to 3,500 milligrams per liter (mg/l).	0.54	LB/HR
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Wet Cooling Tower (P005)	99.009	Particulate matter, total 10 µ (TPM10)	drift eliminator with a maximum drift rate of 0.0005% and total dissolved solids (TDS) concentration of the cooling water less than or equal to 3,500 milligrams per liter (mg/l).	0.93	LB/HR
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Wet Cooling Tower (P005)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	drift eliminator with a maximum drift rate of 0.0005% and total dissolved solids (TDS) concentration of the cooling water less than or equal to 3,500 milligrams per liter (mg/l).	0.36	LB/HR
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Wet Mechanical Draft Cooling Tower (P003)	99.009	Particulate matter, total (TPM)	High efficiency drift eliminator designed to achieve a 0.0005% drift rate and total dissolved solids (TDS) content not to exceed 5,000 mg/l.	6.58	T/YR
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Wet Mechanical Draft Cooling Tower (P003)	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift eliminator designed to achieve a 0.0005% drift rate and total dissolved solids (TDS) content not to exceed 5,000 mg/l.	4.24	T/YR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Wet Mechanical Draft Cooling Tower (P003)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High efficiency drift eliminator designed to achieve a 0.0005% drift rate and total dissolved solids (TDS) content not to exceed 5,000 mg/l.	1.58	T/YR
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Wet Cooling Tower (P005)	99.009	Particulate matter, total 10 µ (TPM10)	drift eliminator with a maximum drift rate of 0.0005% and total dissolved solids (TDS) concentration of the cooling water less than or equal to 1,100 parts per million by weight (ppmw).	0.02	LB/HR
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Wet Cooling Tower (P005)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	drift eliminator with a maximum drift rate of 0.0005% and total dissolved solids (TDS) concentration of the cooling water less than or equal to 1,100 parts per million by weight (ppmw).	0.01	LB/HR
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Cooling Tower (P011)	99.009	Particulate matter, total (TPM)	High efficiency drift eliminator designed to achieve a 0.0005% drift rate and maintenance of a total dissolved solids (TDS) content not to exceed 2,000 ppm in the circulating cooling water based on a rolling 12-month average.	5.07	T/YR
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Cooling Tower (P011)	99.009	Particulate matter, total 10 µ (TPM10)	High efficiency drift eliminator designed to achieve a 0.0005% drift rate and maintenance of a total dissolved solids (TDS) content not to exceed 2,000 ppm in the circulating cooling water based on a rolling 12-month average.	3.22	T/YR
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Cooling Tower (P011)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	High efficiency drift eliminator designed to achieve a 0.0005% drift rate and maintenance of a total dissolved solids (TDS) content not to exceed 2,000 ppm in the circulating cooling water based on a rolling 12-month average.	0.01	T/YR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	OH	P0126431	09/27/2019	Contact Cooling Towers - Melt Shop 2 (P027)	99.009	Particulate matter, filterable (FPM)	i.use of drift eliminator(s) designed to achieve a 0.001% drift rate; ii.maintenance of a total dissolved solids (TDS) content (for the 5 individual cooling towers) not to exceed the ppm in the circulating cooling water based on a rolling 12-month average as indicated in the table below: Cooling Tower - TDS (ppm) Meltshop 2 Cooling Tower - 1000 Caster Mold Water Cooling Tower - 800 Tunnel Furnace Cooling Tower - 800 Caster Non-Contact 2 Cooling Tower - 800 Caster Contact 2 Cooling Tower - 1400	1.17	T/YR
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	OH	P0126431	09/27/2019	Contact Cooling Towers - Melt Shop 2 (P027)	99.009	Particulate matter, filterable 10 µ (FPM10)	i.use of drift eliminator(s) designed to achieve a 0.001% drift rate; ii.maintenance of a total dissolved solids (TDS) content (for the 5 individual cooling towers) not to exceed the ppm in the circulating cooling water based on a rolling 12-month average as indicated in the table below: Cooling Tower - TDS (ppm) Meltshop 2 Cooling Tower - 1000 Caster Mold Water Cooling Tower - 800 Tunnel Furnace Cooling Tower - 800 Caster Non-Contact 2 Cooling Tower - 800 Caster Contact 2 Cooling Tower - 1400	0.93	T/YR
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	OH	P0126431	09/27/2019	Contact Cooling Towers (P014)	99.009	Particulate matter, filterable (FPM)	i.use of drift eliminator(s) designed to achieve a 0.003% drift rate; ii.maintenance of a total dissolved solids (TDS) content (for the 5 individual cooling towers) not to exceed the ppm in the circulating cooling water based on a rolling 12-month average as indicated in the table below: Cooling Tower - TDS (ppm) Meltshop Cooling Tower (501) - 800 Caster Non-Contact Cooling Tower (6 Cell) - 800 Caster Contact Cooling Tower (503) - 1100 Mill Contact Cooling Tower (505) - 2000 Laminar Flow Cooling Tower (506) - 1400	8.7	T/YR

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	OH	P0126431	09/27/2019	Contact Cooling Towers (P014)	99.009	Particulate matter, filterable 10 µ (FPM10)	i.use of drift eliminator(s) designed to achieve a 0.003% drift rate; ii.maintenance of a total dissolved solids (TDS) content (for the 5 individual cooling towers) not to exceed the ppm in the circulating cooling water based on a rolling 12-month average as indicated in the table below: Cooling Tower - TDS (ppm) Meltshop Cooling Tower (501) - 800 Caster Non-Contact Cooling Tower (6 Cell) - 800 Caster Contact Cooling Tower (503) - 1100 Mill Contact Cooling Tower (505) - 2000 Laminar Flow Cooling Tower (506) - 1400	6.95	T/YR
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	OH	P0126431	09/27/2019	Contact Cooling Towers (P014)	99.009	Particulate matter, filterable 2.5 µ (FPM2.5)	i.use of drift eliminator(s) designed to achieve a 0.003% drift rate; ii.maintenance of a total dissolved solids (TDS) content (for the 5 individual cooling towers) not to exceed the ppm in the circulating cooling water based on a rolling 12-month average as indicated in the table below: Cooling Tower - TDS (ppm) Meltshop Cooling Tower (501) - 800 Caster Non-Contact Cooling Tower (6 Cell) - 800 Caster Contact Cooling Tower (503) - 1100 Mill Contact Cooling Tower (505) - 2000 Laminar Flow Cooling Tower (506) - 1400	0.02	T/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	Cooling Towers: P054 through P178	99.009	Particulate matter, total (TPM)	Drift eliminator	0.0005	PERCENT DRIFT RATE
OH-0391	VALENCIA PROJECT LLC	OH	P0133726	10/27/2023	Cooling Towers (P023, P024, P025)	99.009	Particulate matter, total (TPM)	A drift eliminator achieving drift loss equal to or less than 0.0005 percent	0.05	LB/HR
OH-0391	VALENCIA PROJECT LLC	OH	P0133726	10/27/2023	Cooling Towers (P023, P024, P025)	99.009	Particulate matter, total 10 µ (TPM10)	A drift eliminator achieving drift loss equal to or less than 0.0005 percent	0.04	LB/HR
OH-0391	VALENCIA PROJECT LLC	OH	P0133726	10/27/2023	Cooling Towers (P023, P024, P025)	99.009	Particulate matter, total 2.5 µ (TPM2.5)	A drift eliminator achieving drift loss equal to or less than 0.0005 percent	0.02	LB/HR
SC-0205	SCOUT MOTORS INC A DELAWARE CORPORATION - BLYTHEWOOD PLANT	SC	PSD-50000007 V1.0	10/31/2023	Cooling Towers	99.009	Particulate matter, filterable (FPM)	Drift Eliminator	0.001	PERCENT DRIFT RATE

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
TX-0710	VICTORIA POWER STATION	TX	108258 PSDTX1348	12/01/2014	cooling tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	mist eliminators	0.001	PERCENT DRIFT RATE
TX-0712	TRINIDAD GENERATING FACILITY	TX	111393 PSDTX1368	11/20/2014	cooling tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	mist eliminators	0.001	PERCENT DRIFT RATE
TX-0713	TENASKA BROWNSVILLE GENERATING STATION	TX	108411 PSDTX1350	04/29/2014	cooling tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	mist eliminators	0.0005	PERCENT DRIFT RATE
TX-0714	S R BERTRON ELECTRIC GENERATING STATION	TX	102731 PSDTX1294	12/19/2014	cooling tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	drift eliminators	0.0005	PERCENT DRIFT RATE
TX-0728	PEONY CHEMICAL MANUFACTURING FACILITY	TX	118239, N200	04/01/2015	Cooling tower	99.009	Particulate matter, total (TPM)	drift eliminator is 0.0005% efficient	0.35	LB/HR
TX-0728	PEONY CHEMICAL MANUFACTURING FACILITY	TX	118239, N200	04/01/2015	Cooling tower	99.009	Particulate matter, total 10 µ (TPM10)	drift eliminator is 0.0005% efficient	0.31	LB/HR
TX-0728	PEONY CHEMICAL MANUFACTURING FACILITY	TX	118239, N200	04/01/2015	Cooling tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	drift eliminator is 0.0005% efficient	0.12	LB/HR
TX-0774	BISHOP FACILITY	TX	123216, PSDTX1438 AND GHGPSDTX	11/12/2015	Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	Drift eliminators meeting 0.001% drift	3.07	TPY
TX-0774	BISHOP FACILITY	TX	123216, PSDTX1438 AND GHGPSDTX	11/12/2015	Cooling Tower	99.009	Particulate matter, total 2.5 µ (TPM2.5)	Drift eliminators meeting 0.001% drift	0.01	TPY
TX-0803	PL PROPYLENE HOUSTON OLEFINS PLANT	TX	18999, PSDTX755M1, N216	07/12/2016	Cooling Tower	99.009	Particulate matter, total 10 µ (TPM10)	drift eliminators	0.001	PERCENT DRIFT RATE

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
TX-0815	PORT ARTHUR ETHANE SIDE CRACKER	TX	122353, PSDTX1426, GHGPSDTX114	01/17/2017	Cooling Tower	99.009	Particulate matter, filterable 10 µ (FPM10)	Drift Eliminators	--	--
TX-0832	EXXONMOBIL BEAUMONT REFINERY	TX	PSDTX768M1, PSDTX799, PSDTX802	01/09/2018	COOLING TOWERS	99.009	Particulate matter, total (TPM)	DRIFT ELIMINATOR	--	--
TX-0834	MONTGOMERY COUNTY POWER STATIOIN	TX	N256, PSDTX1510, AND GHGPSDTX1	03/30/2018	COOLING TOWER	99.009	Particulate matter, total (TPM)	DRIFT ELIMINATORS	--	--
TX-0863	POLYETHYLENE 7 FACILITY	TX	153106 AND N268	09/03/2019	COOLING TOWER	99.009	Particulate matter, total 10 µ (TPM10)	DRIFT ELIMINATOR	--	--
TX-0864	EQUISTAR CHEMICALS CHANNELVIEW COMPLEX	TX	N266, PSDTX1542, GHGPSDTX183	09/09/2019	Cooling Tower	99.009	Particulate matter, total (TPM)	drift eliminators	0.005	PERCENT DRIFT RATE
TX-0865	EQUISTAR CHEMICALS CHANNELVIEW COMPLEX	TX	N264, PSDTX1540, GHGPSDTX182	09/09/2019	COOLING TOWER	99.009	Particulate matter, total (TPM)	DRIFT ELIMINATORS	6000	PPMW
TX-0873	PORT ARTHUR REFINERY	TX	PSDTX1062M3 AND GHGPSDTX121M1	02/04/2020	COOLING TOWER	99.009	Particulate matter, total (TPM)	DRIFT ELIMINATORS	--	--
TX-0876	PORT ARTHUR ETHANE CRACKER UNIT	TX	PSDTX1546 AND GHGPSDTX186	02/06/2020	COOLING TOWER	99.009	Particulate matter, filterable (FPM)	DRIFT ELIMINATORS	1200	PPM
TX-0888	ORANGE POLYETHYLENE PLANT	TX	155952 PSDTX1556 GHGPSDTX192	04/23/2020	COOLING TOWERS	99.009	Particulate matter, total (TPM)	DRIFT ELIMINATORS	--	--
TX-0904	MOTIVA POLYETHYLENE MANUFACTURING COMPLEX	TX	156571, PSDTX1564, GHGPSDTX195	09/09/2020	COOLING TOWER	99.009	Particulate matter, total (TPM)	Non-contact design and DRIFT ELIMINATORS	1200	PPMW
TX-0905	DIAMOND GREEN DIESEL PORT ARTHUR FACILITY	TX	160299, PSDTX1576, GHGPSDTX200	09/16/2020	COOLING TOWER	99.009	Particulate matter, total (TPM)	DRIFT ELIMINATORS 0.001%	0.001	PERCENT DRIFT RATE
TX-0915	UNIT 5	TX	160538, PSDTX1528, GHGPSDTX204	03/17/2021	COOLING TOWER	99.009	Particulate matter, total (TPM)	Drift eliminators 0.0005%	60000	PPM

Process IDs: 99.003, 99.009
Other Search Criteria: ---
Process Description Cooling Towers
Date Range 1/1/2013 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered Process Types

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
TX-0922	HOUSTON PLANT - 46307	TX	46307, PSDTX1580, N288, GHG202	06/13/2022	COOLING TOWER	99.009	Particulate matter, total (TPM)	Drift eliminators with 0.0005% drift	0.0005	PERCENT DRIFT RATE
TX-0930	CENTURION BROWNSVILLE	TX	147681, PSDTX1522, GHGPSDTX172	10/19/2021	Cooling Tower	99.009	Particulate matter, total (TPM)	Drift eliminators required. Maximum drift 0.0005 percent. TDS limit of 3,500 ppmw in the cooling water. Daily sampling for TDS required, or weekly TDS sampling is allowed if conductivity is monitored daily and a TDS to conductivity ratio is established.	0.0005	PERCENT DRIFT RATE
TX-0931	ROEHM AMERICA BAY CITY SITE	TX	165103, PSDTX1596, GPSDTX208	12/16/2021	Cooling Tower	99.009	Particulate matter, total (TPM)	Drift eliminators with 0.001% drift	0.001	PERCENT DRIFT RATE
TX-0938	VALERO CORPUS CHRISTI REFINERY WEST PLANT	TX	38754,PSDTX324M15,GHGPSDTX211	05/03/2024	COOLING TOWER	99.009	Particulate matter, total (TPM)	Drift eliminators 0.001% drift	0.001	PERCENT DRIFT RATE
TX-0939	ORANGE COUNTY ADVANCED POWER STATION	TX	166032 PSDTX1598 GHGPSDTX210	03/13/2023	COOLING TOWER	99.009	Particulate matter, total (TPM)	0.001% DRIFT ELIMINATORS	0.001	PERCENT DRIFT RATE
TX-0940	FIBERGLASS MANUFACTURING FACILITY	TX	166392, PSDTX1600	09/06/2022	COOLING TOWER	99.009	Particulate matter, total (TPM)	DRIFT ELIMINATOR	0.001	PERCENT DRIFT RATE
TX-0964	NEDERLAND FACILITY	TX	172324, PSDTX1620, GHGPSDTX231	10/05/2023	COOLING TOWERS	99.009	Particulate matter, filterable (FPM)	Drift eliminators with 0.001% drift	2000	PPMW
TX-0967	QUAIL RUN CARBON CAPTURE PLANT	TX	173197, HAP83, PSDTX1622	02/05/2024	COOLING TOWERS	99.009	Particulate matter, total (TPM)	drift eliminators 0.0005%	0.0005	PERCENT DRIFT RATE
VA-0328	C4GT, LLC	VA	52588	04/26/2018	Cooling Tower	99.009	Particulate matter, filterable 10 µ (FPM10)	Drift rate of 0.00050 percent of the circulating water flow with mist eliminators and a total dissolved solids content of the cooling water, not to exceed 6250 mg.liter.	0.0005	PERCENT DRIFT RATE
WI-0284	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-017	04/24/2018	P02A-P & P03A-P Cooling Towers	99.009	Particulate matter, total (TPM)	Drift Eliminator & Cooling Additive Control System	--	--
WI-0311	SUPERIOR REFINING COMPANY LLC	WI	19-RAB-057	09/27/2019	Cooling Tower No.1 (P80)	99.009	Particulate matter, total (TPM)	Drift eliminator, cooling additive control system that results in a total dissolved solids (TDS) concentration of not more than 3,000 ppm.	0.0005	PERCENT CIRCULATION DRIFT
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Cooling Tower	99.009	Particulate matter, total (TPM)	Drift Eliminator	0.72	LB/HR

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Vehicle Travel on Paved and Unpaved Roads	99.19	Particulate matter, total 10 µ (TPM10)	Development and Implementation of Fugitive Dust Control Plan	0.1	TPY
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Vehicle Travel on Paved and Unpaved Roads	99.19	Particulate matter, filterable (FPM)	Development and Implementation of Fugitive Dust Control Plan	0.2	TPY
IN-0263	MIDWEST FERTILIZER COMPANY LLC	IN	129-36943-00059	03/23/2017	PAVED ROADS AND PARKING LOTS	99.19	Particulate matter, total (TPM)	PAVING ALL PLANT HAUL ROADS, WET SUPPRESSION, PROMPT CLEANUP OF ANY SPILLED MATERIALS.	---	---
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Fugitive Dust from Unpaved Roads	99.15	Particulate matter, total (TPM)	Water and Chemical Suppressant Spray	3500	TPY
AR-0124	EL DORADO SAWMILL	AR	2348-AOP-R0	08/03/2015	HAUL ROADS SN-09	99.15	Particulate matter, total (TPM)	ROAD WATERING PLAN + 0% OFF-SITE OPACITY	12.7	LB/H
AR-0164	GP WOOD PRODUCTS SOUTH LLC GURDON PLYWOOD & LUMBER COMPLEX	AR	0463-AOP-R17	11/22/2019	Plant Haul Roads	30.39	Particulate matter, total (TPM)	Not Specified	8.5	LB/HR
AR-0164	GP WOOD PRODUCTS SOUTH LLC GURDON PLYWOOD & LUMBER COMPLEX	AR	0463-AOP-R17	11/22/2019	Plant Haul Roads	30.39	Particulate matter, total 10 µ (TPM10)	Not Specified	1.7	LB/HR
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	02/14/2019	SN-121 Unpaved Roads	99.15	Particulate matter, filterable (FPM)	Dust Control Plan, Wet Spray, and chemical stabilizers	74.8	LB/HR
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	02/14/2019	SN-121 Unpaved Roads	99.15	Particulate matter, total 10 µ (TPM10)	Dust Control Plan Wet spray and chemical stabilizers.	20	LB/HR

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	02/14/2019	SN-121 Unpaved Roads	99.15	Particulate matter, total 2.5 µ (TPM2.5)	Dust Control Plan Wet spray and chemical stabilizers.	8.8	LB/HR
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-121 SN-211 Unpaved Roads	99.15	Particulate matter, filterable (FPM)	Water Sprays, low silt surface	136	LB/HR
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-121 SN-211 Unpaved Roads	99.15	Particulate matter, total 10 µ (TPM10)	Water Sprays, low silt surface	36.2	LB/HR
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-121 SN-211 Unpaved Roads	99.15	Particulate matter, total 2.5 µ (TPM2.5)	Water Sprays, low silt surface	3.7	LB/HR
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-122 SN-210 Paved Roads	99.14	Particulate matter, filterable (FPM)	Water Sprays, sweeping,	15.2	LB/HR
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-122 SN-210 Paved Roads	99.14	Particulate matter, total 10 µ (TPM10)	Water Sprays, sweeping,	3.9	LB/HR
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-122 SN-210 Paved Roads	99.14	Particulate matter, total 2.5 µ (TPM2.5)	Water Sprays, sweeping,	0.5	LB/HR
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Paved Roadways	99.14	Particulate matter, filterable (FPM)	Development and Implementation of Fugitive Dust Control Plan	2.8	TPY
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Paved Roadways	99.14	Particulate matter, total 10 µ (TPM10)	Development and Implementation of Fugitive Dust Control Plan	0.6	TPY
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Paved Roadways	99.14	Particulate matter, total 2.5 µ (TPM2.5)	Development and Implementation of Fugitive Dust Control Plan	0.2	TPY
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Unpaved Roadways	99.15	Particulate matter, filterable (FPM)	Development and Implementation of Fugitive Dust Control Plan	0.81	TPY
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Unpaved Roadways	99.15	Particulate matter, total 10 µ (TPM10)	Development and Implementation of Fugitive Dust Control Plan	0.38	TPY

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Unpaved Roadways	99.15	Particulate matter, total 2.5 µ (TPM2.5)	Development and Implementation of Fugitive Dust Control Plan	0.06	TPY
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Vehicle Travel on Paved and Unpaved Roads	99.19	Particulate matter, filterable (FPM)	Development and Implementation of Fugitive Dust Control Plan	0.2	TPY
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Vehicle Travel on Paved and Unpaved Roads	99.19	Particulate matter, total 10 µ (TPM10)	Development and Implementation of Fugitive Dust Control Plan	0.1	TPY
FL-0368	NUCOR STEEL FLORIDA FACILITY	FL	1050472-001-AC	02/14/2019	Roads	99.15	Particulate matter, fugitive	Fugitive Dust Control Plan	--	--
IA-0117	SHELL ROCK SOY PROCESSING	IA	20-A-288-P	03/17/2021	Paved Road Fugitives	99.14	Particulate matter, total (TPM)	sweeping	2.97	TONS PER YEAR
IL-0126	NUCOR STEEL KANKAKEE, INC.	IL	18060014	11/01/2018	Roadways	81.29	Particulate matter, filterable (FPM)	Roadways must be paved; Preventative measures, including posted 15 MPH speed limit and good work practices (e.g., water flushing, vacuuming and sweeping)	2.39	TON/YR
IL-0126	NUCOR STEEL KANKAKEE, INC.	IL	18060014	11/01/2018	Roadways	81.29	Particulate matter, total 10 µ (TPM10)	Roadways must be paved; Preventative measures, including posted 15 MPH speed limit and good work practices (e.g., water flushing, vacuuming and sweeping)	0.48	TON/YR
IL-0126	NUCOR STEEL KANKAKEE, INC.	IL	18060014	11/01/2018	Roadways	81.29	Particulate matter, total 2.5 µ (TPM2.5)	Roadways must be paved; Preventative measures, including posted 15 MPH speed limit and good work practices (e.g., water flushing, vacuuming and sweeping)	0.12	TON/YR

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IL-0129	CPV THREE RIVERS ENERGY CENTER	IL	16060032	07/30/2018	Roadways	99.14	Particulate matter, total (TPM)	Paving is required for roads used by trucks transporting bulk materials.	10	% OPACITY
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Roadways	99.14	Particulate matter, total (TPM)	Not Specified	10	PERCENT OPACITY
IL-0132	NUCOR STEEL KANKAKEE, INC.	IL	19120024	01/25/2021	New and Modified Roadways	99.14	Particulate matter, total (TPM)	Roadways shall be paved; speed limit posting of 15 miles/hour; best management practices to reduce fugitive emissions in accordance with written operating program that provides for cleaning or treatment of roadways	--	--
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Roadways	99.14	Particulate matter, total (TPM)	Not Specified	10	PERCENT OPACITY
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Roadways	99.14	Particulate matter, total 10 µ (TPM10)	Paving of all roadways and Fugitive Dust Control Plan, including mitigative measures (sweeping, water sprays, prompt cleanups)	10	PERCENT
IL-0135	NUCOR STEEL KANKAKEE, INC.	IL	19120024	04/30/2024	Roadways (New Roadway Segment)	81.29	Particulate matter, total (TPM)	Roadways must be paved; implementation of preventative measures, including posting 15 mph speed limit and good work practices (e.g., water flushing, vacuuming, sweeping, and opacity of fugitive emissions not to exceed 10 percent).	27.28	TONS
IL-0135	NUCOR STEEL KANKAKEE, INC.	IL	19120024	04/30/2024	Roadways (New Roadway Segment)	81.29	Particulate matter, total 10 µ (TPM10)	Roadways must be paved; implementation of preventative measures, including posting 15 mph speed limit and good work practices (e.g., water flushing, vacuuming, sweeping, and opacity of fugitive emissions not to exceed 10 percent).	5.46	TONS

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IL-0135	NUCOR STEEL KANKAKEE, INC.	IL	19120024	04/30/2024	Roadways (New Roadway Segment)	81.29	Particulate matter, total 2.5 µ (TPM2.5)	Roadways must be paved; implementation of preventative measures, including posting 15 mph speed limit and good work practices (e.g., water flushing, vacuuming, sweeping, and opacity of fugitive emissions not to exceed 10 percent).	1.34	TONS
IN-0173	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	FUGITIVE DUST FROM PAVED ROADS AND PARKING LOTS	99.14	Particulate matter, filterable (FPM)	PAVE ALL HAUL ROADS, DAILY SWEEPING WITH WET SUPPRESSION, PROMPT CLEANUP OF ANY SPILLED MATERIAL.	90	% CONTROL
IN-0180	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	FUGITIVE DUST FROM PAVED ROADS AND PARKING LOTS	99.14	Particulate matter, filterable (FPM)	PAVE ALL HAUL ROADS, DAILY SWEEPING WITH WET SUPPRESSION, PROMPT CLEANUP OF ANY SPILLED MATERIAL.	90	% CONTROL
IN-0263	MIDWEST FERTILIZER COMPANY LLC	IN	129-36943-00059	03/23/2017	PAVED ROADS AND PARKING LOTS	99.19	Particulate matter, total (TPM)	PAVING ALL PLANT HAUL ROADS, WET SUPPRESSION, PROMPT CLEANUP OF ANY SPILLED MATERIALS.	--	--
IN-0317	RIVERVIEW ENERGY CORPORATION	IN	T147-39554-00065	06/11/2019	Paved roads	99.14	Particulate matter, total (TPM)	Fugitive dust control plan	1	MIN
IN-0324	MIDWEST FERTILIZER COMPANY LLC	IN	129-44510-00059	05/06/2022	Fugitive dust from paved roads and parking lots	99.14	Particulate matter, total 10 µ (TPM10)	Not Specified	--	--
IN-0359	NUCOR STEEL	IN	107-45480-00038	03/30/2023	Paved Roads	99.14	Particulate matter, fugitive	comply with fugitive dust control plan	--	--

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IN-0366	CARGILL, INC. - SOYBEAN PROCESSING DIVISION	IN	157-44856-00038	07/05/2023	Paved road fugitives	99.14	Particulate matter, fugitive	Not Specified	--	--
KS-0034	ABENGOA BIOENERGY BIOMASS OF KANSAS (ABBK)	KS	C-11396	05/27/2014	Paved Haul Roads	99.14	Particulate matter, total (TPM)	Truck traffic fugitive control strategy and monitoring plan, including sweeping and speed limits	148	TRUCKS/DAY
KS-0034	ABENGOA BIOENERGY BIOMASS OF KANSAS (ABBK)	KS	C-11396	05/27/2014	Biomass Laydown Roads (Unpaved)	99.15	Particulate matter, total (TPM)	Truck traffic fugitive control strategy and monitoring plan, including sweeping and speed limits	109	TRUCKS/DAY
KY-0109	FRITZ WINTER NORTH AMERICA, LP	KY	V-16-022 R1	10/24/2016	Paved Roadways (EU76)	99.14	Particulate matter, filterable (FPM)	The permittee shall vacuum sweep the pavement at least weekly, except during recent rain events, or as needed in the event of a spill.	--	--
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 14-01 - Paved Roadways	99.14	Particulate matter, fugitive	surface improvements (pavement), sweeping (good work practice) and watering	--	--
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 14-02 - Unpaved Roadways	99.15	Particulate matter, fugitive	use of dust suppressants	--	--
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Paved Roads & Satellite Coil Yard (EPs 04-01 & 04-04)	99.14	Particulate matter, filterable (FPM)	Sweeping & Watering	--	--
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Unpaved Roads (EP 04-02)	99.15	Particulate matter, filterable (FPM)	Wetting/Dust suppressants	--	--
KY-0116	NOVELIS CORPORATION - GUTHRIE	KY	V-22-011	07/25/2022	EU 020 - Paved Roads	99.14	Particulate matter, fugitive	Sweeping (minimum of monthly), speed limit, paving, and reasonable precautions.	--	--

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0379	SHINTECH PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-4)	05/04/2021	Fugitive Dust (Paved Roads)	99.14	Particulate matter, total 10 µ (TPM10)	Paving plant road as much as practicable.	0.08	LB/HR
LA-0382	BIG LAKE FUELS METHANOL PLANT	LA	PSD-LA-781(M1)	04/25/2019	Paved Roads (FUG0004)	99.14	Particulate matter, total 10 µ (TPM10)	Proper maintenance	--	--
LA-0389	SHINTECH PLAQUEMINE PLANT 3	LA	PSD-LA-817(M-2)	10/20/2022	Road - Fugitive Dust (Paved Road)	63.036	Particulate matter, total 2.5 µ (TPM2.5)	Hard Pavement	--	--
MD-0041	CPV ST. CHARLES	MD	PSC CASE NO. 9280	04/23/2014	ROADWAYS	99.14	Particulate matter, fugitive	Not Specified	--	--
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	PAVED AND UNPAVED ROADS	99.999	Particulate matter, fugitive	REASONABLE PRECAUTIONS TO PREVENT PARTICULATE MATTER FROM BECOMING AIRBORNE	0	NOT SPECIFIED
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	ON-SITE PAVED AND UNPAVED ROADS	99.999	Particulate matter, filterable (FPM)	MINIMIZE EMISSIONS BY TAKING REASONABLE PRECAUTIONS TO PREVENT PARTICULATE MATTER FROM BECOMING AIRBORNE BY SWEEPING OR WATER APPLICATION DUST CONTROL, AS NEEDED	--	--
MI-0417	GERDAU MACSTEEL, INC.	MI	102-12A	10/27/2014	EUROADS & PKG01 (Roads and packaging)	81.29	Particulate matter, total 2.5 µ (TPM2.5)	Fugitive Dust Plan	--	--
MI-0429	EAST JORDAN FOUNDRY LLC	MI	185-16	04/27/2017	FGFACILITY--Roadways and Parking Areas	81.49	Particulate matter, fugitive	Work practices within fugitive dust plan.	--	--
MO-0089	OWENS CORNING INSULATION SYSTEMS, LLC	MO	052016-003	05/12/2016	haul roads	99.14	Particulate matter, filterable (FPM)	vacuum sweep, wash, etc	--	--

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Paved Roadways (F001)	99.14	Particulate matter, fugitive	i.Paving of all plant roads that will be used for raw material and product transport; ii.Covering, at all times, of open-bodied vehicles when transporting materials likely to become airborne; and iii.Compliance with the opacity limits. Specifically, additional mitigation measures potentially including road sweeping or wet suppression will be implemented on an as-needed basis determined through visual observation of emissions associated with truck movements on the plant site.	13.2	T/YR
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Paved Roadways (F001)	99.14	Particulate matter, total 10 µ (TPM10)	i.Paving of all plant roads that will be used for raw material and product transport; ii.Covering, at all times, of open-bodied vehicles when transporting materials likely to become airborne; and iii.Compliance with the opacity limits. Specifically, additional mitigation measures potentially including road sweeping or wet suppression will be implemented on an as-needed basis determined through visual observation of emissions associated with truck movements on the plant site.	2.6	T/YR
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Paved roads (F001)	99.14	Particulate matter, filterable 10 µ (FPM10)	water flushing and sweeping	0.63	T/YR
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Paved roads (F001)	99.14	Particulate matter, filterable 2.5 µ (FPM2.5)	water flushing and sweeping	0.15	T/YR

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Facility Roadways (F001)	99.14	Particulate matter, fugitive	i.Pave all in-plant haul roads and parking areas; ii.Implement best management practices including posting and limiting vehicle speeds to 20 miles per hour and water spraying or sweeping as needed based on the daily inspections conducted	1.88	T/YR
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Facility Roadways (F001)	99.14	Particulate matter, total 10 µ (TPM10)	i.Pave all in-plant haul roads and parking areas; ii.Implement best management practices including posting and limiting vehicle speeds to 20 miles per hour and water spraying or sweeping as needed based on the daily inspections conducted	0.38	T/YR
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Facility Roadways (F001)	99.14	Particulate matter, total 2.5 µ (TPM2.5)	i.Pave all in-plant haul roads and parking areas; ii.Implement best management practices including posting and limiting vehicle speeds to 20 miles per hour and water spraying or sweeping as needed based on the daily inspections conducted	0.09	T/YR
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	02/06/2019	Plant Roadways (F001)	99.15	Particulate matter, total 10 µ (TPM10)	Use of wet suppression and commercial dust suppressants. Develop and implement a site-specific work practice plan designed as described to minimize or eliminate fugitive dust emissions.	0.21	T/YR
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	02/06/2019	Plant Roadways (F001)	99.15	Particulate matter, total 2.5 µ (TPM2.5)	Use of wet suppression and commercial dust suppressants. Develop and implement a site-specific work practice plan designed as described to minimize or eliminate fugitive dust emissions.	0.02	T/YR

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0380	AMG VANADIUM LLC	OH	P0125944	08/07/2019	Paved Roadways (F001)	99.14	Particulate matter, total 10 µ (TPM10)	Pave all in-plant haul roads and parking areas. Implement best management practices including posting and limiting vehicle speeds to 15 miles per hour in production areas. Utilize a vacuum sweeper as needed based on the daily inspections	0.06	T/YR
OH-0380	AMG VANADIUM LLC	OH	P0125944	08/07/2019	Paved Roadways (F001)	99.14	Particulate matter, total 2.5 µ (TPM2.5)	Pave all in-plant haul roads and parking areas. Implement best management practices including posting and limiting vehicle speeds to 15 miles per hour in production areas. Utilize a vacuum sweeper as needed based on the daily inspections	0.01	T/YR
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	OH	P0126431	09/27/2019	Plant Roadways & Parking Areas (F005)	99.14	Particulate matter, fugitive	Paved: sweeping, vacuuming, washing with water, and posted speed limits to comply with the applicable requirements. Unpaved: use of dust suppressant as necessary to comply with the applicable requirements.	16.74	T/YR
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	OH	P0126431	09/27/2019	Plant Roadways & Parking Areas (F005)	99.14	Particulate matter, filterable 10 µ (FPM10)	Paved: sweeping, vacuuming, washing with water, and posted speed limits to comply with the applicable requirements. Unpaved: use of dust suppressant as necessary to comply with the applicable requirements.	3.55	T/YR
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	OH	P0126431	09/27/2019	Plant Roadways & Parking Areas (F005)	99.14	Particulate matter, filterable 2.5 µ (FPM2.5)	Paved: sweeping, vacuuming, washing with water, and posted speed limits to comply with the applicable requirements. Unpaved: use of dust suppressant as necessary to comply with the applicable requirements.	0.75	T/YR

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	Facility paved roadways and parking areas	99.14	Particulate matter, filterable 10 µ (FPM10)	Pave all roadways and parking areas and implement best management practices, including limiting vehicle speeds and water spraying or sweeping as needed based on daily inspections.	0.16	T/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	Facility paved roadways and parking areas	99.14	Particulate matter, fugitive	Pave all roadways and parking areas and implement best management practices, including limiting vehicle speeds and water spraying or sweeping as needed based on daily inspections.	0.8	T/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	Facility paved roadways and parking areas	99.14	Particulate matter, filterable 2.5 µ (FPM2.5)	Pave all roadways and parking areas and implement best management practices, including limiting vehicle speeds and water spraying or sweeping as needed based on daily inspections.	0.04	T/YR
OH-0389	TUNNEL HILL RECLAMATION LLC	OH	P0131173	05/08/2023	F001 - Facility unpaved roadways and parking areas	99.15	Particulate matter, fugitive	Develop and implement a site-specific work practice plan with best management practices including the application of water and/or chemical dust suppressants, as needed, based on the inspections conducted in accordance with the requirements of the work practice plan.	119.15	T/YR
OH-0389	TUNNEL HILL RECLAMATION LLC	OH	P0131173	05/08/2023	F001 - Facility unpaved roadways and parking areas	99.15	Particulate matter, filterable 10 µ (FPM10)	Develop and implement a site-specific work practice plan with best management practices including the application of water and/or chemical dust suppressants, as needed, based on the inspections conducted in accordance with the requirements of the work practice plan.	32.2	T/YR

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0389	TUNNEL HILL RECLAMATION LLC	OH	P0131173	05/08/2023	F001 - Facility unpaved roadways and parking areas	99.15	Particulate matter, filterable 2.5 µ (FPM2.5)	Develop and implement a site-specific work practice plan with best management practices including the application of water and/or chemical dust suppressants, as needed, based on the inspections conducted in accordance with the requirements of the work practice plan.	3.22	T/YR
OH-0391	VALENCIA PROJECT LLC	OH	P0133726	10/27/2023	Paved Roads (F001)	99.14	Particulate matter, fugitive	Best available control measures â€“ pave all roadways, speed reduction, good housekeeping practices, and/or watering	4.6	T/YR
OH-0391	VALENCIA PROJECT LLC	OH	P0133726	10/27/2023	Paved Roads (F001)	99.14	Particulate matter, filterable 10 µ (FPM10)	Best available control measures â€“ pave all roadways, speed reduction, good housekeeping practices, and/or watering	0.92	T/YR
OH-0391	VALENCIA PROJECT LLC	OH	P0133726	10/27/2023	Paved Roads (F001)	99.14	Particulate matter, filterable 2.5 µ (FPM2.5)	Best available control measures â€“ pave all roadways, speed reduction, good housekeeping practices, and/or watering	0.23	T/YR
OH-0393	WIN WASTE INNOVATIONS OF SENECA COUNTY	OH	P0133348	09/11/2024	Plant Roadways and Parking Areas (F002)	99.15	Particulate matter, fugitive	Best available control measures â€“ pave all roadways when feasible, speed reduction, good housekeeping practices, and/or watering	93.13	T/YR
OH-0393	WIN WASTE INNOVATIONS OF SENECA COUNTY	OH	P0133348	09/11/2024	Plant Roadways and Parking Areas (F002)	99.15	Particulate matter, filterable 10 µ (FPM10)	Best available control measures â€“ pave all roadways when feasible, speed reduction, good housekeeping practices, and/or watering	23.33	T/YR
OH-0393	WIN WASTE INNOVATIONS OF SENECA COUNTY	OH	P0133348	09/11/2024	Plant Roadways and Parking Areas (F002)	99.15	Particulate matter, filterable 2.5 µ (FPM2.5)	Best available control measures pave all roadways when feasible, speed reduction, good housekeeping practices, and/or watering	3.08	T/YR

Process IDs: 19.190
Other Search Criteria: Process Name Contains "Roads"
Process Description Roads
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for Process ID "Road"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OK-0173	CMC STEEL OKLAHOMA	OK	2015-0643-C PSD	01/19/2016	Unpaved Roads	99.15	Particulate matter, total 10 µ (TPM10)	BACT for PM emissions from roads is selected as work-practice standards of paving roads, sweeping them when needed, and setting of speed limits to minimize fugitive dust emissions. Since the PM emissions are fugitive, no numerical limitation is practical.	--	--
SC-0181	RESOLUTE FP US INC. - CATAWBA LUMBER MILL	SC	2440-0216-CA	11/03/2017	Roads	99.14	Particulate matter, filterable (FPM)	Good housekeeping practices.	0.13	LB/VMT
SC-0181	RESOLUTE FP US INC. - CATAWBA LUMBER MILL	SC	2440-0216-CA	11/03/2017	Roads	99.14	Particulate matter, filterable 10 µ (FPM10)	Good housekeeping practices.	0.03	LB/VMT
SC-0181	RESOLUTE FP US INC. - CATAWBA LUMBER MILL	SC	2440-0216-CA	11/03/2017	Roads	99.14	Particulate matter, filterable 2.5 µ (FPM2.5)	Good housekeeping practices.	0.01	LB/VMT
SC-0193	MERCEDES BENZ VANS, LLC	SC	0560-0385-CA	04/15/2016	Paved Roads	99.14	Particulate matter, fugitive	Proper Maintenance of all roads. Fugitive dust minimization.	--	--
SC-0205	SCOUT MOTORS INC A DELAWARE CORPORATION - BLYTHEWOOD PLANT	SC	PSD-50000007 V1.0	10/31/2023	Roads	99.14	Particulate matter, fugitive	Paving and maintaining all roads	--	--
TN-0183	SINOVA SILICON LLC	TN	979383	04/25/2022	Raw Material Receiving/ Handling and Road Traffic	82.999	Particulate matter, fugitive	Mist control for transfer points, paved roads and watering for traffic with 7% opacity for fugitive transfer points	--	--
WI-0310	NEMADJI TRAIL ENERGY CENTER	WI	21-MMC-011	07/08/2021	Haul Roads (F01)	99.14	Particulate matter, total (TPM)	All roads and parking lots within the property boundary must be paved, 5 mph speed limits posted for all vehicles and develop, maintain, and implement a fugitive dust control plan.	520	TRUCK TRIPS/YR
WI-0315	SUPERIOR REFINING COMPANY LLC	WI	20-RAB-080	10/09/2020	Loading Access Road (F103A)	99.15	Particulate matter, total (TPM)	Not Specified	5	MPH

Process IDs: ---
Other Search Criteria: Process Name Contains "Silos"
Process Description Silos
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for "Silo" and "Lime"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AL-0269	GEORGIA PACIFIC BRETON LLC	AL	502-0001-X047	06/11/2014	Fresh Lime Silo - Lime Storage Silos	30.239	Particulate matter, fugitive	baghouse	0.005	GRAIN/SDCF
AL-0269	GEORGIA PACIFIC BRETON LLC	AL	502-0001-X047	06/11/2014	Re-Burned Lime - Lime Storage Silos	30.239	Particulate matter, fugitive	Bag-house	0.005	GRAIN/SDCF
IN-0235	STEEL DYNAMICS INC. - FLAT ROLL DIVISION	IN	033-34498-00043	11/05/2015	LIME / CARBON STORAGE SILOS	81.29	Particulate matter, filterable (FPM)	BIN VENT	0.01	GR/DSCF
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 06-02 A & B - Lime Silos A & B	90.019	Particulate matter, filterable (FPM)	For Lime Silos A & B (EP 06-02A & B): The permittee shall install, operate, and maintain a bin vent filter on each silo designed to control particulate grain loading to 0.005 grain/dscf and the flow rate to 900 dscf/min.	0.005	GR/DSCF
KY-0116	NOVELIS CORPORATION - GUTHRIE	KY	V-22-011	07/25/2022	EU 042 - Hot Baghouse Lime Silos #1 & #2	90.019	Particulate matter, filterable (FPM)	Bin vent filter, Good Work Practices (GWP) Plan.	0.0014	LB/HR
OH-0380	AMG VANADIUM LLC	OH	P0125944	08/07/2019	Hydrated Lime Silo (P003)	90.021	Particulate matter, filterable (FPM)	Bin vent filter with 100% capture efficiency and 0.005 gr/dscf.	0.005	GR/DSCF

Process IDs: ---
Other Search Criteria: Process Name Contains "Silos"
Process Description Silos
Date Range 1/1/2014 - 11/7/2024
Date Conducted 11/7/2024 - 1/14/2025
Notes & Filtering: Filtered for "Silo" and "Lime"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0380	AMG VANADIUM LLC	OH	P0125944	08/07/2019	LimeAdd Silo (P910)	81.59	Particulate matter, filterable (FPM)	i.Minimize the drop height of the material at the transfer point to the extent possible; ii.Ensure the transfer chute from the silo to the truck is vented back to the silo and associated bin vent filter with a minimum capture efficiency of 90%; and iii.PM/PM10/PM2.5 from this emissions unit shall be vented to a bin vent filter, which shall be capable of achieving the emissions limitations at all times during operation.	0.005	GR/DSCF
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	OH	P0126431	09/27/2019	LMF Silo #2 & Lime/Carbon Silo: P032,P033,P034	81.29	Particulate matter, filterable (FPM)	Fabric filter	0.02	GR/DSCF
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	Lime Silos: P048 through P053	90.999	Particulate matter, total (TPM)	Bin vent filter	0.005	GR/DSCF
SC-0183	NUCOR STEEL - BERKELEY	SC	0420-0060-DX	05/04/2018	Pickle Line Equipment (pickle line no.3 water treatement lime storage silo)	81.29	Particulate matter, filterable (FPM)	Bin Vent Filter; Proper Operation and Maintenance through Good Housekeeping	---	---
WI-0282	WISCONSIN PUBLIC SERVICE CORPORATION FOX ENERGY CENTER	WI	18-DMM-174	04/08/2019	P08 & P09 Lime/Soda Ash Silos	99.12	Particulate matter, total (TPM)	Fabric Filter	0.04	LB/HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AK-0083	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT06	01/06/2015	Diesel Fired Well Pump	17.21	Particulate matter, total 10 µ (TPM10)	Limited Operation of 168 hr/yr.	0.31	LB/MMBTU
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Fire Pump Diesel Internal Combustion Engines	17.21	Particulate matter, total (TPM)	Clean Fuel and Good Combustion Practices	0.19	G/KW-HR
AK-0085	GAS TREATMENT PLANT	AK	AQ1524CPT01	08/13/2020	Three (3) Firewater Pump Engines and two (2) Emergency Diesel Generators	17.21	Particulate matter, total (TPM)	Good combustion practices, ULSD, and limit operation to 500 hours per year per engine	0.19	G/HP-HR
AK-0086	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT07	03/26/2021	Diesel Fired Well Pump	17.21	Particulate matter, total (TPM)	Good Combustion Practices and Limited Use	0.31	LB/MMBTU
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Water Pumps	17.21	Particulate matter, total (TPM)	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	1	G/BHP-HR
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Emergency Water Pumps	17.21	Particulate matter, total (TPM)	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	1	G/BHP-HR
FL-0346	LAUDERDALE PLANT	FL	0110037-011-AC	04/22/2014	Emergency fire pump engine (300 HP)	17.21	Particulate matter, total (TPM)	Good combustion practice	0.2	GRAM PER HP-HR
FL-0354	LAUDERDALE PLANT	FL	0110037-013-AC	08/25/2015	Emergency fire pump engine, 300 HP	17.21	Particulate matter, total (TPM)	Low-emitting fuel and certified engine	0.2	G / KWH
FL-0356	OKEECHOBEE CLEAN ENERGY CENTER	FL	0930117-001-AC	03/09/2016	One 422-hp emergency fire pump engine	17.21	Particulate matter, total (TPM)	Use of clean fuel	0.2	G / KW-HR
FL-0363	DANIA BEACH ENERGY CENTER	FL	0110037-017-AC	12/04/2017	Emergency Fire Pump Engine (422 hp)	17.21	Particulate matter, filterable (FPM)	Certified engine	0.2	G / KWH
FL-0367	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-001-AC	07/27/2018	Emergency Fire Pump Engine (347 HP)	17.21	Particulate matter, filterable (FPM)	Operate and maintain the engine according to the manufacturer's written instructions	0.2	G/KW-HOUR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
FL-0371	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-003-AC (PSD-FL-444A)	06/07/2021	Emergency Fire Pump Engine (347 HP)	17.21	Particulate matter, total (TPM)	Not Specified	0.2	G/KW-HOUR
IL-0129	CPV THREE RIVERS ENERGY CENTER	IL	16060032	07/30/2018	Firewater Pump Engine	17.21	Particulate matter, total (TPM)	Not Specified	--	---
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Firewater Pump Engine	17.21	Particulate matter, total (TPM)	Not Specified	0.2	G/KW-HR
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Fire Water Pump Engine	17.21	Particulate matter, total (TPM)	Not Specified	0.2	GRAMS
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Firewater Pump Engine	17.21	Particulate matter, total 10 µ (TPM10)	Not Specified	0.2	G/KW-HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KS-0030	MID-KANSAS ELECTRIC COMPANY, LLC - RUBART STATION	KS	C-13309	03/31/2016	Compression ignition RICE emergency fire pump	17.21	Particulate matter, total (TPM)	Not Specified	0.15	G/HP-HR
LA-0301	LAKE CHARLES CHEMICAL COMPLEX ETHYLENE 2 UNIT	LA	PSD-LA-779	05/23/2014	Firewater Pump Nos. 1-3 (EQTs 997, 998, & 999)	17.21	Particulate matter, total 10 µ (TPM10)	Compliance with 40 CFR 60 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage	0.17	LB/HR
LA-0306	TOPCHEM POLLOCK, LLC	LA	PSD-LA-815	12/20/2016	Pump Engines DFP-16-1 (EQT036)	17.21	Particulate matter, total 2.5 µ (TPM2.5)	Meet NSPS Subpart IIII Limitations and Good Combustion Practices	0.09	LB/H
LA-0306	TOPCHEM POLLOCK, LLC	LA	PSD-LA-815	12/20/2016	Pump Engine DFP-16-2 (EQT037)	17.21	Particulate matter, total 2.5 µ (TPM2.5)	Meet NSPS Subpart IIII Limitations and Good Combustion Practices	0.09	LB/H
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Firewater Pump Engines	17.21	Particulate matter, total 10 µ (TPM10)	Complying with 40 CFR 60 Subpart IIII	0.15	G/BHP-HR
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Firewater Pump 1	17.21	Particulate matter, filterable 10 µ (FPM10)	Not Specified	0.09	LB/H
LA-0314	INDORAMA LAKE CHARLES FACILITY	LA	PSD-LA-813	08/03/2016	Diesel Firewater pump engines (6 units)	17.21	Particulate matter, total 10 µ (TPM10)	complying with 40 CFR 63 subpart ZZZZ	--	---
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	firewater pump engines (8 units)	17.21	Particulate matter, total 10 µ (TPM10)	Complying with 40 CFR 60 Subpart IIII	--	---
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39A	17.21	Particulate matter, total 10 µ (TPM10)	Compliance with 40 CFR 60 Subpart IIII.	0.2	g/kW-hr

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39B	17.21	Particulate matter, total 10 µ (TPM10)	Compliance with 40 CFR 60 Subpart IIII	0.2	g/kW-hr
LA-0370	WASHINGTON PARISH ENERGY CENTER	LA	PSD-LA-829(M-1)	04/27/2020	Emergency Fire Pump Engine (EQT0021, ENG-1)	17.21	Particulate matter, total 10 µ (TPM10)	The use of low sulfur fuels and compliance with 40 CFR 60 Subpart IIII	0.04	LB/HR
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Fired Water Pump Engine	17.21	Particulate matter, total 10 µ (TPM10)	Compliance with 40 CFR 60 Subpart IIII standards, good combustion practices, and the use of ultra-low sulfur diesel fuel.	0.15	G/HP-HR
LA-0397	WESTLAKE ETHYLENE PLANT	LA	PSD-LA-813(M3)	04/29/2022	Emergency Generators and Fire Water Pumps (EQT0027 - EQT0032, EQT0044, EQT0045)	17.21	Particulate matter, total 10 µ (TPM10)	Compliance with applicable requirements of 40 CFR 60 Subpart IIII	--	---
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-01 - Firewater Pump Engine No. 1	17.21	Particulate matter, total 2.5 µ (TPM2.5)	Compliance with 40 CFR 60 Subpart IIII	0.2	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-02 - Firewater Pump Engine No. 2	17.21	Particulate matter, total 2.5 µ (TPM2.5)	Compliance with 40 CFR 60 Subpart IIII	0.2	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-03 - Firewater Pump Engine No. 3	17.21	Particulate matter, total 2.5 µ (TPM2.5)	Compliance with the requirements of 40 CFR 60 Subpart IIII	0.06	LB/HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0402	DESTREHAN OIL PROCESSING FACILITY	LA	PSD-LA-855	12/13/2023	HLK39 - Emergency Diesel Fire Pump Engine (EQT0094)	17.21	Particulate matter, total 10 µ (TPM10)	Compliance with 40 CFR 60 Subpart IIII	0.14	LB/H
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	01/30/2014	Fire Pump Engine	17.21	Particulate matter, total 10 µ (TPM10)	Not Specified	0.15	GM/BHP-H
MD-0041	CPV ST. CHARLES	MD	PSC CASE NO. 9280	04/23/2014	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	Particulate matter, filterable (FPM)	EXCLUSIVE USE OF ULTRA LOW SULFUR FUEL AND GOOD COMBUSTION PRACTICES	0.15	G/HP-H
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	Particulate matter, filterable (FPM)	EXCLUSIVE USE OF ULSD FUEL, GOOD COMBUSTION PRACTICES, LIMITED HOURS OF OPERATION, AND DESIGNED TO ACHIEVE EMISSION LIMITS	0.15	G/HP-H
MD-0043	PERRYMAN GENERATING STATION	MD	PSC CASE NO. 9136		EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	Particulate matter, total 10 µ (TPM10)	GOOD COMBUSTION PRACTICES, LIMITED HOURS OF OPERATION, AND EXCLUSIVE USE OF ULSD	0.17	G/HP-H
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	06/09/2014	5 EMERGENCY FIRE WATER PUMP ENGINES	17.21	Particulate matter, filterable (FPM)	EXCLUSIVE USE OF ULSD FUEL, GOOD COMBUSTION PRACTICES AND DESIGNED TO ACHIEVE EMISSION LIMITS	0.15	G/BHP-H
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	06/09/2014	5 EMERGENCY FIRE WATER PUMP ENGINES	17.21	Particulate matter, total 10 µ (TPM10)	EXCLUSIVE USE OF ULSD FUEL, GOOD COMBUSTION PRACTICES AND DESIGNED TO ACHIEVE EMISSION LIMITS	0.17	G/BHP-H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	Particulate matter, total 10 µ (TPM10)	EXCLUSIVE USE OF ULTRA LOW SULFUR FUEL AND GOOD COMBUSTION PRACTICES.	0.18	G/HP-H
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	EMERGENCY DIESEL ENGINE FOR FIRE WATER PUMP	17.21	Particulate matter, filterable (FPM)	EXCLUSIVE USE OF ULTRA LOW SULFUR FUEL AND GOOD COMBUSTION PRACTICES	0.2	G/KW-H
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	DIESEL-FIRED FIRE PUMP ENGINE	17.21	Particulate matter, filterable (FPM)	EXCLUSIVE USE OF ULTRA LOW SULFUR DIESEL FUEL AND GOOD COMBUSTION PRACTICES	0.2	G/KW-H
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUFPENGINE (Emergency engine--diesel fire pump)	17.21	Particulate matter, filterable (FPM)	Good combustion practices and meeting NSPS Subpart IIII requirements.	0.15	G/BHP-H
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUFPENGINE (Emergency engine--diesel fire pump)	17.21	Particulate matter, total 10 µ (TPM10)	Good combustion practices and meeting NSPS Subpart IIII requirements	0.57	LB/H
MI-0424	HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	MI	107-13C	12/05/2016	EUFPENGINE (Emergency engine--diesel fire pump)	17.21	Particulate matter, filterable (FPM)	Good combustion practices.	0.22	G/HP-H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0424	HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	MI	107-13C	12/05/2016	EUFPENGINE (Emergency engine--diesel fire pump)	17.21	Particulate matter, total 10 µ (TPM10)	Good combustion practices.	0.09	LB/MMBTU
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (South Plant): Fire pump engine	17.21	Particulate matter, filterable (FPM)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.15	G/BHP-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (South Plant): Fire pump engine	17.21	Particulate matter, total 10 µ (TPM10)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.66	LB/H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (North Plant): Fire pump engine	17.21	Particulate matter, filterable (FPM)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.15	G/BHP-H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (North Plant): Fire pump engine	17.21	Particulate matter, total 10 µ (TPM10)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.66	LB/H
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUFPENGINE: Fire pump engine	17.21	Particulate matter, filterable (FPM)	State of the art combustion design	0.2	G/KW-H
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUFPENGINE: Fire pump engine	17.21	Particulate matter, total 10 µ (TPM10)	State of the art combustion design	0.13	LB/H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUFPENGINE (North Plant): Fire Pump Engine	17.21	Particulate matter, total 2.5 µ (TPM2.5)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.66	LB/H
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUFPENGINE (North Plant): Fire Pump Engine	17.21	Particulate matter, filterable (FPM)	Diesel particulate filter, good combustion practices and meeting NSPS Subpart IIII requirements.	0.15	G/B-HP-H
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUFPENGINE (South Plant): Fire pump engine	17.21	Particulate matter, filterable (FPM)	Diesel particulate filter, Good Combustion Practices and meeting NSPS Subpart IIII requirements	0.15	G/B-HP-H
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUFPENGINE (South Plant): Fire pump engine	17.21	Particulate matter, total 10 µ (TPM10)	Diesel particulate filter, Good Combustion Practices and meeting NSPS Subpart IIII requirements	0.66	LB/H
MS-0092	EMBERCLEAR GTL MS	MS	0040-00055	05/08/2014	firewater pumps, diesel	17.21	Particulate matter, total (TPM)	Not Specified	--	---
NJ-0081	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068 -(BOP120002)	03/07/2014	Emergency diesel fire pump	17.21	Particulate matter, filterable (FPM)	Use of Ultra low sulfur distillate oil	0.15	G/B-HP-H
NJ-0084	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068/BOP150001	03/10/2016	Emergency Diesel Fire Pump	17.21	Particulate matter, filterable (FPM)	use of ULSD a clean burning fuel, and limited hours of operation	0.1	LB/H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
NJ-0085	MIDDLESEX ENERGY CENTER, LLC	NJ	19149/PCP150001	07/19/2016	EMERGENCY DIESEL FIRE PUMP	17.21	Particulate matter, filterable (FPM)	Use of Ultra Low Sulfur Diesel (ULSD) Oil a clean burning fuel and limited hours of operation	0.108	LB/H
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Emergency Fire Pump Engine (P003)	17.21	Particulate matter, total (TPM)	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	0.09	LB/H
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency fire pump engine (P004)	17.21	Particulate matter, total 10 µ (TPM10)	State-of-the-art combustion design	0.07	LB/H
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency fire pump engine (P004)	17.21	Particulate matter, total 10 µ (TPM10)	State-of-the-art combustion design	0.1	LB/H
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Fire Pump Diesel Engine (P008)	17.21	Particulate matter, total 10 µ (TPM10)	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	0.02	LB/H
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Fire Pump Diesel Engine (P008)	17.21	Particulate matter, total 2.5 µ (TPM2.5)	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	0.02	LB/H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency fire pump engine (P004)	17.21	Particulate matter, total 10 µ (TPM10)	Ultra low sulfur diesel fuel	0.1	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency fire pump engine (P004)	17.21	Particulate matter, total 10 µ (TPM10)	Ultra low sulfur diesel fuel	0.1	LB/H
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Fire Pump (P006)	17.21	Particulate matter, total (TPM)	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII. Good combustion practices per the manufacturer's operating manual	0.13	LB/H
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Emergency diesel-fueled fire pump (P006)	17.21	Particulate matter, total 10 µ (TPM10)	Comply with NSPS 40 CFR 60 Subpart IIII	0.1	LB/H
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Fire Pump (P004)	17.21	Particulate matter, total (TPM)	Good combustion practices (ULSD) and compliance with 40 CFR Part 60, Subpart IIII	0.11	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Firewater Pumps (P005 and P006)	17.21	Particulate matter, total (TPM)	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII and employ good combustion practices per the manufacturer's operating manual	0.13	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	275 hp (205 kW) Diesel-Fired Emergency Fire Pump Engine	17.21	Particulate matter, total (TPM)	Certified to meet the standards in Table 4 of 40 CFR Part 60, Subpart IIII and good combustion practices	0.2	G/KW-H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
PA-0310	CPV FAIRVIEW ENERGY CENTER	PA	11-00536A	09/02/2016	Emergency Fire Pump Engine	17.21	Particulate matter, total (TPM)	Not Specified	0.15	G/BHP-HR
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Fire Pump	17.21	Particulate matter, filterable (FPM)	Not Specified	0.15	G/B-HP-H
VA-0325	GREENSVILLE POWER STATION	VA	52525		DIESEL-FIRED WATER PUMP 376 bph (1)	17.21	Particulate matter, total 10 µ (TPM10)	Ultra Low Sulfur Diesel/Fuel (15 ppm max)	0.3	G/HP-H
VA-0328	C4GT, LLC	VA	52588	04/26/2018	Emergency Fire Water Pump	17.21	Particulate matter, filterable (FPM)	good combustion practices and the use of ultra low sulfur diesel (S15 ULSD) fuel oil with a maximum sulfur content of 15 ppmw.	15	G/HP/HR
WI-0263	WISCONSIN POWER & LIGHT - NEENAH GENERATING STATION	WI	14-DMM-200	02/15/2016	Fire pump (process P05)	17.21	Particulate matter, total (TPM)	Good combustion practices, use diesel fuel with sulfur content < 15 ppm, and operate <500 hr/yr	--	---
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Fire Pump (P06)	17.21	Particulate matter, total (TPM)	Operation limited to 500 hours/year, sulfur content of diesel fuel oil fired may not exceed 15 ppm, and shall be operated and maintained according to the manufacturer's recommendations.	0.15	G/HP-H
WI-0302	WPL- RIVERSIDE ENERGY CENTER	WI	19-DMM-153	02/28/2020	Diesel-Fired Fire Pump Engine (P04)	17.21	Particulate matter, total (TPM)	Good combustion practices, use diesel fuel oil with sulfur content of no greater than 0.0015% by weight	0.11	LB/H
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Fire Pump Engine	17.21	Particulate matter, filterable 2.5 µ (FPM2.5)	Limited to 100 Hours/year.	---	---

Attachment 2
Bay Area Air Quality Management District Summary

					BACT Determination		Typical Technology	
Source Type	**Classification**	**Primary Fuel**	**Reference [a]**	**Date of Reference**	**Feasible/ Cost Effective**	**Achieved in Practice**	**Feasible/ Cost Effective**	**Achieved in Practice**
Diesel-Fired Emergency Engine	> 50 BHP and < 1,000 BHP Output	Diesel	BAAQMD	12/22/2020	Not Specified	0.15 g/bhp-hr	Not Specified	Any engine or technology demonstrated, certified or verified to achieve the applicable standard.
Process-Generated Emissions	All	Not Specified	BAAQMD	6/16/1995	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process-Generated Emissions	All	Not Specified	BAAQMD	10/25/1991	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process-Generated Emissions	All	Not Specified	BAAQMD	1/10/1992	No Determination	Exhaust vented to combustion chamber followed by wet scrubber w/ particulate control efficiency $\geq$99%	Not Applicable	BAAQMD Approved Design and Operation

Notes:
a. Data sources include:
BAAQMD - Bay Area Air Quality Management District
(https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook);

Attachment 3
Semiconductor Permit Review Summary

Source Type	Permit Emission Unit Description	Permittee	State	Permit ID	Issue Date	Pollutant	Control Technology	Permit Limit
Semiconductor Process Tool Emissions	Semiconductor Manufacturing Fab Processes	Global Foundries	NY	5-4140-00189/00004	11/20/2018	PM	Not Specified	Emission Limit: 0.050 gr/scf of Exhaust
Semiconductor Process Tool Emissions	Semiconductor Manufacturing Fab Processes	Global Foundries	NY	5-4140-00189/00004	11/20/2018	PM	Not Specified	Emission Limit: 0.050 gr/scf of Exhaust
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	PM PM_{10} $PM_{2.5}$	Wet Scrubbers	42.6 tons per rolling, 12-month period Opacity < 20% as 6-minute average PE < 0.020 lb/MMBtu of actual heat input for each indirect-fired burner $PM/PM_{10}/PM_{2.5}$ emissions shall not exceed 1.7 lb/hr from all RCTOs controlling these emission units combined Combined $PM/PM_{10}/PM_{2.5}$ emssions from scrubbers shall not exceed 7.9 lb/hr; $PM/PM_{10}/PM_{2.5}$ < 0.04 lb/hr for each trimix system

Source Type	Permit Emission Unit Description	Permittee	State	Permit ID	Issue Date	Pollutant	Control Technology	Permit Limit
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	PM PM_{10} $PM_{2.5}$	Wet Scrubbers	20.3 tons per rolling, 12-month period Opacity < 20% as 6-minute average PE < 0.020 lb/MMBtu of actual heat input for each indirect-fired burner PM/PM_{10}/$PM_{2.5}$ emissions shall not exceed 1.7 lb/hr from all RCTOs controlling these emission units combined Combined PM/PM_{10}/$PM_{2.5}$ emssions from scrubbers shall not exceed 7.9 lb/hr; PM/PM_{10}/$PM_{2.5}$ < 0.04 lb/hr for each trimix system
Semiconductor Process Tool Emissions	Wafer Fabrication in Building B323 and B323A Collapse Chip Connection (C4) Plating Operation in B320 R&D and Post-Fab Activities	OnSemi	NY	3-1328-00025/01029	11/28/2023	PM	--	Emissions Limit: 0.050 gr/dscf (USEPA Reference Test Method 5)
Semiconductor Process Tool Emissions	Semiconductor Fab Process Tools	Intel Corp	OR	34-2681-ST-01	1/22/2016	PM PM_{10} $PM_{2.5}$	Wet Electrostatic Precipitators (WESPs)	---
Semiconductor Process Tool Emissions	Semiconductor Fab Tool Processes	TSMC Arizona Corporation	AZ	P0008497	11/4/2022	$PM_{2.5}$ PM_{10}	Good Combustion Practices in POU Abatement Devices	---

Attachment 4
BACT Economic Feasibility Evaluation

Ionizing Wet Scrubber (IWS) for Acid Scrubber - Cost Analysis Per Scrubber
Total Capital Investment (based on cost of
Reduction of PM Emissions)

Item	Basis	Value
Direct Costs		
(1) Purchased equipment		
Cost of IWS	Information based on a similar Micron facility[1]	$3,000,000
Cost of IWS Fan	Information based on a similar Micron facility[1]	$80,000
Number of Acid Scrubbers	Fab 1 and Fab 2 Permit Application 2 Data	72
Number of IWS for Acid Scrubbers	Assuming 1 IWS for every Acid Scrubber[2]	72
(a) Total Equipment		$3,080,000
(b) Instrumentation (0.1 x [1a])	EAPCCM[3], Section 6, Page 3-46, Table 3.16	$308,000
(c) Sales taxes (0.03x [1a])	EAPCCM, Section 6, Page 3-46, Table 3.16	$92,400
(d) Freight (0.05x [1a])	EAPCCM, Section 6, Page 3-46, Table 3.16	$154,000
Total Purchased Equipment Cost, PEC	(1)(a) though (1)(d)	$3,634,400
(2) Direct Installation		
(a) Foundation (0.04 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$145,376
(b) Handling (0.5 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$1,817,200
(c) Electrical (0.08 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$290,752
(d) Piping (0.01 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$36,344
(e) Insulation (0.02 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$72,688
(f) Painting (0.02 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$72,688
Direct Installation Cost, DC	(2)(a) though (2)(f)	$2,435,048
TOTAL DIRECT COSTS, TDC	(1) and (2)	$6,069,448
Indirect Costs		
(3) Engineering (0.2 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$726,880
(4) Construction (0.2 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$726,880
(5) Contractor fees (0.1 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$363,440
(6) Start-up (0.01 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$36,344
(7) Performance test (0.01 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$36,344
(8) Model Study (0.02 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$72,688
(9) Contingencies (0.03 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$109,032
TOTAL INDIRECT COSTS, TIC	(3) through (9)	$2,071,608
Project Contingency		
(10) Project Contigency ((TDC + TIC)*0.15))	Conservative Assumption	$1,221,158
TOTAL CAPITAL INVENSTMENT		
TOTAL CAPITAL INVESTMENT (TCI)		**$9,362,214**

Ionizing Wet Scrubber (IWS) for Acid Scrubber - Cost Analysis Per Scrubber
Cost Effectiveness Analysis
Reduction of PM Emissions

Item	Basis	Cost ($)
A. TOTAL CAPITAL INVENSTMENT		
Total Capital Investment, TCI	See previous page for detailed estimate	$9,362,214
B. Direct Annual Costs		
(1) Operating Labor[4]		
(a) Operator	$= \frac{.5h}{shift} \times \frac{3\ shifts}{day} \times \frac{365\ days}{year} \times \frac{\$50}{hr}$	$27,375
(b) Supervisor	= 0.15 x (1)(a)	$4,106
Annual Labor Cost, AC_{labor}	(1)(a) and (1)(b)	$31,481
(2) Maintenance		
(a) Labor	$= \frac{.5h}{shift} \times \frac{3\ shifts}{day} \times \frac{365\ days}{year} \times \frac{\$50}{hr}$	$27,375
(b) Material	= 100% of Maintenance Labor	$27,375
Maintenance Labor and Materials	(2)(a) and (2)(b)	$54,750
(3) Utilities[5,6,7,8,9,10]		
(a) Electricity - Pump	$= \frac{.746 \times \frac{132.5\ gal}{min} \times 75\ ft \times 29.92\ in\ Hg \times \frac{8760\ h}{yr} \times \frac{\$0.07}{kWh}}{3{,}690 \times 90\%}$	$40,955
(b) Electricity - Operating	*Not Included*	$0
(c) *Water Consumption (gal/year)*	$= \frac{5\ gal}{min\ kacfm} \times \frac{kacfm}{1000\ acfm} \times 26{,}500\ acfm \times \frac{60\ min}{h} \times \frac{8760\ h}{yr}$	*69,642,000*
Water	$= Water\ Consumption(gal/yr) \times \frac{\$2.01}{1{,}000\ gal}$	$139,980
(d) Wastewater	EAPCCM[2], Section 6, Page 3-50, Section 3.4.1.9	$121,874
Annual Utilities Cost, AC_{util}	(3)(a) through (3)(d)	$302,809
TOTAL DIRECT ANNUAL COSTS	(1) through (3)	$389,041
C. Indirect Annual Costs		
(4) Overhead (0.6 x (AC_{labor} + Maintenance Labor and Materials))	EAPCCM, Section 6, Page 3-58, Table 3.21	$51,738.75
(5) Administrative charges (0.02 x TCI)	EAPCCM, Section 6, Page 3-58, Table 3.21	$187,244
(6) Property Tax (0.01 x TCI)	EAPCCM, Section 6, Page 3-58, Table 3.21	$93,622
(7) Insurance (0.01 x TCI)	EAPCCM, Section 6, Page 3-58, Table 3.21	$93,622
(8) Capital Recovery (CRFx TCI)[11]	EAPCCM, Section 6, Page 3-58, Table 3.21	$1,100,060
TOTAL INDIRECT ANNUAL COSTS	(4) through (8)	$1,526,288
TOTAL ANNUAL COST (1987 USD) = (B+C) = (Direct Annual Costs) + (Indirect Annual Costs)		**$1,915,328**
TOTAL ANNUAL COST (2023 USD)[12] = Total Annual Cost (1987 USD) x (2023 CEPCI/1987 CEPCI)		**$4,668,242**
Cost Effectiveness		
Particulate Emissions without IWS[13]	tpy/stack PM	0.11
Particulate Emissions reductions with IWS	tpy/stack PM, 99% control[14]	0.10
Cost Effectiveness Per Unit	**$/tons PM**	**$44,882,349**

[1] Email from Gavin Moody dated February 14, 2024. Cost per IWS is $3 million USD. Cost per IWS fan is $80,000 USD.
[2] Assuming 1 IWS per scrubber is a conservative estimate of the minimum cost to install and operate the IWSs
[3] EAPCCM = EPA Air Pollution Control Cost Manual, Previous Version Section 6, Chapter 3, September 1999 - https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution
[4] 0.5 hours of labor per shift for operation and maintenance assumed. Assumed supervisor cost to be 15% of operator cost. Calculations use 8,760 hours/yr operation.
[5] Utilities calculations are based on EAPCCM, Section 6, Subsection 3.4.1.4, 3.4.1.6, 3.4.1.9.
[6] Design exhaust flow for IWS is 26,500 acfm.
[7] Water consumption is estimated at 5 gal/min kacfm as per Section 3.4.1.6, page 3-49 of EAPCCM. For 26,500 acfm flow, this equates to 132.5 gal/min. Assumed 75ft fluid head and 90% pump efficiency.
[8] Electricity price is industrial average for 2023 from NYSERDA. https://www.nyserda.ny.gov/Energy-Prices/Electricity/Monthly-Avg-Electricity-Industrial
[9] Water price is taken from https://www.ocwa.org/wp-content/uploads/2022/01/Rate-Schedule-1A-1B_2022.pdf
[10] A median wastwater treatment cost of $1.75/gal (1987 $) is conservatively used.
[11] The CRF assumed 20 year equipment life and a 10% interest rate.
[12] CEPCI = Chemical Engineering Plant Cost Index. 1987 value from https://www.chemengonline.com/Assets/File/CEPCI_2002.pdf | 2023 Value from https://toweringskills.com/financial-analysis/cost-indices/
[13] 25% safety factor applied to process PM emissions; distributed equally between 64 stacks.
[14] EPA, Air Pollution Control Technology Fact Sheet, Wet Electrostatic Precipitator (ESP)- Wire-Plate Type, EPA-452/F-03-030. (https://www3.epa.gov/ttnchie1/mkb/documents/fwespwpl.pdf).

Ionizing Wet Scrubber (IWS) for Ammonia Scrubber - Cost Analysis Per Scrubber
Total Capital Investment (based on cost of
Reduction of PM Emissions)

Item	Basis	Value
Direct Costs		
(1) Purchased equipment		
Cost of IWS	Information based on a similar Micron facility[1]	$3,000,000
Cost of IWS Fan	Information based on a similar Micron facility[1]	$80,000
Number of Ammonia Scrubbers	Fab 1 and Fab 2 Permit Application 2 Data	24
Number of IWS for Ammonia Scubbers	Assuming 1 IWS for every Ammonia Scrubber[2]	24
(a) Total Equipment		$3,080,000
(b) Instrumentation (0.1 x [1a])	EAPCCM[3], Section 6, Page 3-46, Table 3.16	$308,000
(c) Sales taxes (0.03x [1a])	EAPCCM, Section 6, Page 3-46, Table 3.16	$92,400
(d) Freight (0.05x [1a])	EAPCCM, Section 6, Page 3-46, Table 3.16	$154,000
Total Purchased Equipment Cost, PEC	(1)(a) though (1)(d)	$3,634,400
(2) Direct Installation		
(a) Foundation (0.04 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$145,376
(b) Handling (0.5 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$1,817,200
(c) Electrical (0.08 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$290,752
(d) Piping (0.01 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$36,344
(e) Insulation (0.02 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$72,688
(f) Painting (0.02 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$72,688
Direct Installation Cost, DC	(2)(a) though (2)(f)	$2,435,048
TOTAL DIRECT COSTS, TDC	(1) and (2)	$6,069,448
Indirect Costs		
(3) Engineering (0.2 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$726,880
(4) Construction (0.2 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$726,880
(5) Contractor fees (0.1 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$363,440
(6) Start-up (0.01 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$36,344
(7) Performance test (0.01 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$36,344
(8) Model Study (0.02 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$72,688
(9) Contingencies (0.03 x PEC)	EAPCCM, Section 6, Page 3-46, Table 3.16	$109,032
TOTAL INDIRECT COSTS, TIC	(3) through (9)	$2,071,608
Project Contingency		
(10) Project Contigency ((TDC + TIC)*0.15))	Conservative Assumption	$1,221,158
TOTAL CAPITAL INVENSTMENT		
TOTAL CAPITAL INVESTMENT (TCI)		**$9,362,214**

Ionizing Wet Scrubber (IWS) for Ammonia Scrubber - Cost Analysis Per Scrubber
Cost Effectiveness Analysis
Reduction of PM Emissions

Item	Basis	Cost ($)
A. TOTAL CAPITAL INVENSTMENT		
Total Capital Investment, TCI	See previous page for detailed estimate	$9,362,214
B. Direct Annual Costs		
(1) Operating Labor[4]		
(a) Operator	$= \frac{.5h}{shift} \times \frac{3\ shifts}{day} \times \frac{365\ days}{year} \times \frac{\$50}{hr}$	$27,375
(b) Supervisor	= 0.15 x (1)(a)	$4,106
Annual Labor Cost, AC_{labor}	(1)(a) and (1)(b)	$31,481
(2) Maintenance		
(a) Labor	$= \frac{.5h}{shift} \times \frac{3\ shifts}{day} \times \frac{365\ days}{year} \times \frac{\$50}{hr}$	$27,375
(b) Material	= 100% of Maintenance Labor	$27,375
Maintenance Labor and Materials	(2)(a) and (2)(b)	$54,750
(3) Utilities[5,6,7,8,9,10]		
(a) Electricity - Pump	$= \frac{.746 \times \frac{132.5\ gal}{min} \times 75\ ft \times 29.92\ in\ Hg \times \frac{8760\ h}{yr} \times \frac{\$0.07}{kWh}}{3{,}690 \times 90\%}$	$40,955
(b) Electricity - Operating	*Not Included*	$0
(c) *Water Consumption (gal/year)*	$= \frac{5\ gal}{min\ kacfm} \times \frac{kacfm}{1000\ acfm} \times 26{,}500\ acfm \times \frac{60\ min}{h} \times \frac{8760\ h}{yr}$	*69,642,000*
Water	$= Water\ Consumption(gal/yr) \times \frac{\$2.01}{1{,}000\ gal}$	$139,980
(d) Wastewater	EAPCCM[2], Section 6, Page 3-50, Section 3.4.1.9	$121,874
Annual Utilities Cost, AC_{util}	(3)(a) through (3)(d)	$302,809
TOTAL DIRECT ANNUAL COSTS	(1) through (3)	$389,041
C. Indirect Annual Costs		
(4) Overhead (0.6 x (AC_{labor} + Maintenance Labor and Materials))	EAPCCM, Section 6, Page 3-58, Table 3.21	$51,738.75
(5) Administrative charges (0.02 x TCI)	EAPCCM, Section 6, Page 3-58, Table 3.21	$187,244
(6) Property Tax (0.01 x TCI)	EAPCCM, Section 6, Page 3-58, Table 3.21	$93,622
(7) Insurance (0.01 x TCI)	EAPCCM, Section 6, Page 3-58, Table 3.21	$93,622
(8) Capital Recovery (CRFx TCI)[11]	EAPCCM, Section 6, Page 3-58, Table 3.21	$1,100,060
TOTAL INDIRECT ANNUAL COSTS	(4) through (8)	$1,526,288
TOTAL ANNUAL COST (1987 USD) = (B+C) = (Direct Annual Costs) + (Indirect Annual Costs)		**$1,915,328**
TOTAL ANNUAL COST (2023 USD)[12] = Total Annual Cost (1987 USD) x (2023 CEPCI/1987 CEPCI)		**$4,668,242**
Cost Effectiveness		
Particulate Emissions without IWS[13]	tpy/stack PM	0.06
Particulate Emissions reductions with IWS	tpy/stack PM, 99% control[14]	0.06
Cost Effectiveness Per Unit	**$/tons PM**	**$78,455,814**

[1] Email from Gavin Moody dated February 14, 2024. Cost per IWS is $3 million USD. Cost per IWS fan is $80,000 USD.
[2] Assuming 1 IWS per scrubber is a conservative estimate of the minimum cost to install and operate the IWSs
[3] EAPCCM = EPA Air Pollution Control Cost Manual, Previous Version Section 6, Chapter 3, September 1999 - https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution
[4] 0.5 hours of labor per shift for operation and maintenance assumed. Assumed supervisor cost to be 15% of operator cost. Calculations use 8,760 hours/yr operation.
[5] Utilities calculations are based on EAPCCM, Section 6, Subsection 3.4.1.4, 3.4.1.6, 3.4.1.9.
[6] Design exhaust flow for IWS is 26,500 acfm.
[7] Water consumption is estimated at 5 gal/min kacfm as per Section 3.4.1.6, page 3-49 of EAPCCM. For 26,500 acfm flow, this equates to 132.5 gal/min. Assumed 75ft fluid head and 90% pump efficiency.
[8] Electricity price is industrial average for 2023 from NYSERDA. https://www.nyserda.ny.gov/Energy-Prices/Electricity/Monthly-Avg-Electricity-Industrial
[9] Water price is taken from https://www.ocwa.org/wp-content/uploads/2022/01/Rate-Schedule-1A-1B_2022.pdf
[10] A median wastwater treatment cost of $1.75/gal (1987 $) is conservatively used.
[11] The CRF assumed 20 year equipment life and a 10% interest rate.
[12] CEPCI = Chemical Engineering Plant Cost Index. 1987 value from https://www.chemengonline.com/Assets/File/CEPCI_2002.pdf | 2023 Value from https://toweringskills.com/financial-analysis/cost-indices/
[13] 25% safety factor applied to process PM emissions; distributed equally between 24 stacks.
[14] EPA, Air Pollution Control Technology Fact Sheet, Wet Electrostatic Precipitator (ESP)- Wire-Plate Type, EPA-452/F-03-030. (https://www3.epa.gov/ttnchie1/mkb/documents/fwespwpl.pdf).

APPENDIX L. GHG BACT ANALYSIS

This appendix presents the best available control technology (BACT) determinations for the control of greenhouse gas (GHG) emissions from the emission sources at the Proposed Air Permit Project. Micron has reviewed the RACT/BACT/LAER Clearinghouse (RBLC), documentation from the Bay Area Air Quality Management District (BAAQMD), and relevant semiconductor fab permits to identify appropriate control technologies and/or limits for GHG emission source categories. The analysis to determine BACT is described in Section 5.4 of the Micron Clay Air Permit Application. As the add-on control technologies and other control mechanisms are similar for many of the sources that Micron operates, types of control technologies identified are summarized in Section 1.1 of this appendix. Not all technologies are applicable to all emission sources, and as such, source-specific considerations for each source category are discussed in the subsequent sections.

This BACT evaluation addresses GHGs that may be emitted from the Proposed Air Permit Project (i.e., carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) from combustion and other GHGs, including fluorinated GHG (F-GHG) compounds and sulfur hexafluoride (SF_6)) as one category of GHG. This aligns with GHG as the New Source Review (NSR) contaminant that is subject to regulation for the Proposed Air Permit Project. Refer to Section 3.4.9.3 of the Micron Clay Air Permit Application narrative for additional details of this NSR determination. If there are differences between individual GHGs that affect emission control technology or the determination of BACT, they are noted throughout this appendix.

Emission sources include:

- Natural gas-fired boilers;
- Natural gas-fired water bath vaporizers;
- Diesel-fired emergency generator engines;
- Diesel-fired emergency fire pump engine;
- Semiconductor process tools and thermal oxidation systems that emit GHGs;
- Use of heat transfer fluids (HTFs) that contain GHGs; and
- Use of Circuit Breakers that contain SF_6.

1.1 Available Technology Summary

The technologies identified to mitigate GHG emissions are described in the following subsections.

1.1.1 Good Design and Combustion Practices for Fuel-Fired Equipment

An efficient design in combustion devices significantly reduces GHG emissions by ensuring that a higher percentage of the fuel is converted into usable energy, thus reducing the total fuel required to achieve the purpose of the fuel-fired equipment and also reducing emissions of other non-GHG air contaminants. For this source category, good combustion practices are generally considered to be implementing the manufacturer's recommendations, which may include a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

The specific practices available for each source category are discussed in the subsequent sections.

1.1.2 Tool-Level Thermal Oxidation Systems

Thermal oxidation is used as a part of point-of-use (POU) control devices, which are used in conjunction with certain semiconductor process tools (e.g., plasma etch process tools) to mitigate emissions of fluorinated GHG by thermally treating exhaust streams from process tools that utilize F-GHG. These POU control devices also use wet scrubbing systems to control the resultant acid gases.

Thin films process tools often include process equipment exhaust conditioners (PEECs) as required safety equipment to manage process gases that are pyrophoric, flammable, toxic, or incompatible with other process gases or the ductwork. Thin films PEECs may incidentally manage GHG emissions that are comingled with these hazardous materials.

1.1.3 Centralized Regenerative Catalytic Systems

The use of catalytic oxidation via centralized regenerative catalytic systems (RCS) may control emissions of F-GHGs by combining exhausts from several plasma etch process tools rather than operating tool-level thermal-based oxidation systems described in Section 1.1.2 of this analysis. This technology is an alternative to numerous individual POU control devices and would allow treatment of F-GHG process gases emitted from plasma etch process tools in a centralized control device.

1.1.4 Plasma-Based Oxidation

One potential alternative to a burn-wet style oxidation system is an electrically powered "plasma-wet" oxidation system. Instead of using natural gas combustion to oxidize exhaust, plasma-wet oxidation systems create a plasma environment in which these molecules in the exhaust can dissociate.

1.1.5 High-Temperature Thermal Wet Scrubbers

One potential alternative to burn-wet style oxidation system is an electrically-powered, high-temperature thermal wet scrubber. Instead of using natural gas combustion to oxidize exhaust, high-temperature thermal wet scrubbers use electricity to heat exhaust streams to temperatures suitable for oxidation.

1.1.6 Process Chemical Substitution

Process chemical substitution in semiconductor manufacturing affects direct use of F-GHG and involves utilizing alternative materials or process chemicals that contain compounds with a lower global warming potential (GWP). To reduce carbon dioxide equivalent (CO_2e) emissions, both factors that determine CO_2e (i.e., mass of GHG and its GWP) must be evaluated. Process chemical substitution in semiconductor manufacturing is evaluated in two different manners in this analysis: (1) processes that have direct contact with semiconductor wafers (e.g., fluorinated process gases), and (2) processes that do not have direct contact with semiconductor wafers (e.g., chemical vapor deposition (CVD) chamber cleaning). Generally, there is more opportunity to evaluate alternatives where the materials do not have direct contact with semiconductor wafers due to the reduced potential impact on the semiconductor manufacturing process.

One example of chemical substitution in the semiconductor industry is through use of alternative substances. As mentioned above, certain fluorinated compounds that are F-GHG are used in the plasma etching processes which remove small quantities of silicon and/or other material as the wafer is etched. The selection of a fluorinated compound used for a particular substrate wafer and process step impacts the effectiveness of the etching process. The potential for emissions of CO_2e from this process is based on the fluorinated compound(s) selected, their GWP, the efficiency of converting the fluorinated compound(s) into F^- ion to etch the wafer and other byproduct F-GHGs. F-GHGs that are not converted to F^- ion within the process are exhausted from the process tool, through thermal oxidation systems to the atmosphere.

In addition, nitrogen trifluoride (NF_3) is utilized in CVD remote plasma clean technologies to replace less efficient CVD in-situ chamber cleaning or thermal cleaning technologies for thin film and diffusion tools. For additional description of this operation, refer to Section 1.4.1.1 of the Micron Clay Air Permit Application related to Thin Films/Diffusion. This can result in substantial reductions in the F-GHG emissions on a CO_2e basis.

1.1.7 Operating Limitations

Limiting the hours of operation for engines, water bath vaporizers, and boilers reduces GHG emissions by decreasing the overall time the equipment runs and consumes fuel.

1.1.8 Good Design and Operation Practices for HTFs

Several HTFs that are GHGs are used in transfer lines and equipment. Good design and operation practices related to the use of GHG-based HTFs include following manufacturer recommendations on the types of valves and fittings and transfer lines to use for connections between equipment. However, due to the nature of these transfer lines, there are no standardized practices as manufacturer recommendations only apply when interfacing with their equipment. Micron has developed a global program to monitor heat transfer fluid volumes at the equipment level for nontypical increases in usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas. Based on these data, Micron identifies areas of inefficient usage, evaluates ways to minimize potential emissions, and implements emissions minimizations measures. These efforts are beyond the manufacturer's recommendations.

1.1.9 Manufacturing Process Optimization

Micron is proposing to install semiconductor process equipment, or process tools, as discussed within the Micron Clay Air Permit Application. Certain tools require F-GHG to achieve the intended process. For example, fluorine ions (F^-) are generated from the use of F-GHGs in the plasma/dry etching and cleaning processes which removes small quantities of silicon and/or other material from the semiconductor devices and by-products formed in the process equipment. Additional details are provided in Section 1.4 of the Micron Clay Air Permit Application.

This method to achieve BACT involves optimizing the operation of process tools and processes to utilize the GHGs efficiently while considering the complexity of semiconductor device manufacturing. Examples of these efforts may include optimizing process tool operating cycles and efficient utilization of process chemicals.

1.1.10 Carbon Capture and Storage

CCS is a set of technologies that can reduce GHG emissions to atmosphere through capturing CO_2 from emission sources, transporting it to a suitable location and sequestering it in subsurface formations.

An effective CCS system would require three elements:

- Separation technology for the CO_2 exhaust stream (i.e., "carbon capture" technology),
- Transportation of CO_2 to a storage site, and
- A viable location for long-term storage of CO_2.

These three elements work in series. Consequently, to execute a CCS program as BACT, all three elements must be feasible.

CO_2 Capture

CCS involves post-combustion capture of CO_2 from the emission units and sequestration of the CO_2 in some fashion. Carbon capture is typically accomplished with low pressure scrubbing of CO_2 from the exhaust stream with solvents (e.g., amines and ammonia), solid sorbents, or membranes. CO_2 must be compressed from near-atmospheric pressure in the stack to pipeline pressure (around 2,000 psia) prior to transportation to an appropriate sequestration site. CO_2 capture is likely feasible for sources emitting CO_2 in large amounts and high-purity CO_2 streams, such as fossil fuel-fired power plants, cement plants, and ammonia production facilities.

CO_2 Transport

CO_2 that has been captured and compressed is subsequently transported to a site designated for long-term geologic storage or use in enhanced oil recovery (EOR). Pipelines are expected to be the most economical and efficient method of transporting CO_2 for commercial purposes. Once constructed, pipelines reduce uncertainty associated with logistics, fuel costs, and reliance on other infrastructure that could increase the cost of CO_2 transportation. The history of transporting CO_2 via pipelines in the United States spans over 40 years.

As of 2019, there were approximately 32 liquid CO_2 pipeline operators under USDOT regulatory authority in the United States according to the Pipeline and Hazardous Materials Safety Administration (PHMSA). This distribution network consists of approximately 5,200 miles of pipe transporting supercritical fluid CO_2 and a significantly smaller amount (~60 miles) of gas CO_2 pipelines. A report delivered to Congress by the Council of Environmental Quality on CCS identifies priorities including the establishment of an interstate CO_2 pipeline network modeled by the Princeton Net-Zero America study covering portions of the Central States and Midwest regions, but there are no proposed routes in New York at the time of Air Permit Application 2.[1]

CO_2 Storage

[1] Council on Environmental Quality Report to Congress on Carbon Capture, Utilization, and Sequestration (2021, June). Retrieved from https://www.whitehouse.gov/wp-content/uploads/2021/06/CEQ-CCUS-Permitting-Report.pdf

CO_2 storage refers to the process of injecting CO_2 into subsurface formations for long-term sequestration. CO_2 storage is currently happening across the U.S. and around the world. To be considered suitable for sequestration, sites must have suitable geology. For stable storage of CO_2, sequestration reservoirs must be at least 2,500 feet below the ground surface and generally must have a porosity greater than 5% with adequate permeability to allow for flow between pores. Additionally, there must be a layer of impermeable rock above the sequestration reservoir, referred to as a "cap rock" to prevent migration and potential escape of CO_2.

1.1.11 Use of Different Medium in Circuit Breakers

SF_6 has been the preferred insulating medium in electrical switchgear since the 1950s due to its dielectric strength, arc quenching capability, and thermal stability. These characteristics allow for the use of small circuit breakers at high voltages; however, due to the high GWP of SF_6, researchers have been exploring lower GWP alternatives. Currently gas mixtures containing C4-FN (C4) or C5-FK (C5), Synthetic Air, or air and CO_2 are considered to be the most viable alternatives.

C4 and C5 are mixed with nitrogen (N_2), air and/or CO_2 to create a stable insulating medium. Synthetic air consists of a mixture of 20% oxygen and 80% nitrogen. Both alternatives have a lower GWP when compared to SF_6 and are generally considered feasible in low voltage applications; however, such technologies are not available in the US market for medium and high voltage applications. [2]

1.1.12 Guaranteed Low Leak Rate Circuit Breakers

The use of guaranteed low leak rate circuit breakers would reduce fugitive GHG emissions. For circuit breakers that use SF_6 gas for insulation, the leakage rate of present designs are less than 0.5%.

1.1.13 Leak Detection and Alarms for Circuit Breakers

The use of leak detection systems (including alarms) for circuit breakers minimizes GHG emissions by identifying such leaks and allowing the operator to promptly implement appropriate maintenance and repair.

1.1.14 Control Technologies Not Evaluated

Some control technologies have been omitted from the BACT evaluation due to various considerations. These control technologies, and the reasons for their omission, are summarized in Table 1-1 and in the subsequent sections of this BACT evaluation.

[2] Moving Toward SF6-Free High Voltage Circuit Breakers

Table 1-1. Summary of Control Technologies Not Evaluated

Emission Source Category	Technology	Reasoning
All Source Categories	Use of Alternate Fuels	The use of different fuels or raw materials that would redefine the project is out of the scope of BACT evaluations. Where different fuel specifications within the fuel type (i.e., use of ULSD) are feasible for the project, they have been identified above in Section 1.1 and are evaluated in the sections following this table.
Natural Gas-Fired Combustion Devices	Low NO_X Burners (LNBs) / Ultra-Low-NO_X Burners (ULNBs)	LNBs and ULNBs are primarily designed to minimize the formation of NO_X during the combustion process. In some cases, the addition of NO_X control systems may reduce combustion efficiency, resulting in an increase of fuel use and GHG emissions.[3]
Heat Transfer Fluids	POU Control Devices	Generally, fluorinated HTFs do not exhaust through process tools and, therefore, are not abated by POU control devices.

1.2 Natural Gas-Fired Boilers

Natural gas-fired boilers are heating systems used to generate hot water or steam for maintaining precise temperature control for various stages of production, ensuring the efficient operation of machinery. Micron is proposing to use efficient units that are specifically designed to meet the Proposed Air Permit Project's thermal requirements while minimizing energy consumption and emissions.

The BACT analysis for GHG emissions from natural gas-fired boilers is presented in this section.

1.2.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing GHG emissions from the proposed natural gas-fired boilers:

- Good design and combustion practices
- Operating hour limitations; and
- CCS.

1.2.2 Step 2. Eliminate Technically Infeasible Options

CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, natural gas processing, and iron and steel manufacturing. In alignment with this, the EPA recently finalized the NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units which requires the implementation of CCS for

[3] AP-42 Vol. I, Chapter 1.4: Natural Gas Combustion, Section 1.4.3.

certain existing and new EGUs.[4] The NSPS is applicable to fossil-fired EGUs that have heat input ratings above 250 MMBtu/hr and which serve generators capable of generating greater than 25 MW of electricity.

The boilers at the Proposed Air Permit Project operate intermittently to maintain precise temperature control for various stages of production, ensuring the efficient operation of machinery, and are not considered electric generating units. While the technology for the post-combustion capture of CO_2 may be available in some applications, the process has not been demonstrated for natural gas-fired boilers rated at less than 50 MMBtu/hr as proposed in the Proposed Air Permit Project. The EPA's RBLC database does not include any CCS GHG BACT determinations for natural gas-fired boilers of any size. Recovery and purification of CO_2 from boiler flue gas would require significant additional processing to achieve the necessary CO_2 concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.[5]

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from the natural gas-fired boilers and is not considered further in this analysis.

1.2.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.2.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.2.5 Step 5. Select BACT

Micron intends to purchase natural gas-fired boilers designed to meet a CO_2 emission limit of 117 pounds per million British thermal unit (lb/MMBtu). This is the lowest emission limitation identified as BACT in the RBLC search which also aligns with the CO_2 emission factor from 40 CFR 98 Table C-1. Additionally, based on the analysis presented above, Micron also proposes the use of efficient design and combustion practices as BACT for natural gas-fired boilers. Micron will comply the manufacturer's recommendations for good combustion and maintenance practices, which may include a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and

[4] NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units

[5] EPA. (2010, August). Report of the Interagency Task Force on Carbon Capture and Storage.

- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 6,000 hours per year for each boiler.

A BACT limit must not be higher than any other applicable state or federal regulation. The boilers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for GHG for natural gas-fired steam generating units.

1.3 Natural Gas-Fired Water Bath Vaporizers

This Permit Application 2 separates "natural gas-fired combustion equipment" into boilers and water bath vaporizers. Natural gas-fired water bath vaporizers are used in the semiconductor industry to provide a reliable and efficient source of high-purity nitrogen gas. These water bath vaporizers use natural gas to heat water that is used to vaporize liquified nitrogen used in semiconductor manufacturing.

The BACT analysis for GHG emissions from natural gas-fired water bath vaporizers is presented in this section.

1.3.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing GHG emissions from the proposed natural gas-fired water bath vaporizers:

- Good design and combustion practices
- Operating hour limitations; and
- CCS.

1.3.2 Step 2. Eliminate Technically Infeasible Options

CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, natural gas processing and iron and steel manufacturing. In alignment with this, the EPA recently finalized the NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units which requires the implementation of CCS for certain existing and new EGUs.[6] The NSPS is applicable to fossil-fired EGUs that have heat input ratings above 250 MMBtu/hr and which serves generators capable of generating greater than 25 MW of electricity.

The water bath vaporizers at the Proposed Air Permit Project operate intermittently to provide a reliable and efficient source of high-purity nitrogen gas. The water bath vaporizers provide the necessary supply of liquified gases to the fab when demand cannot be met by routing gas directly from an on-site air separations unit. The intermittent nature of the operation increases inefficiencies associated with the potential capture of CO_2 from the exhaust stream.

[6] NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units

Additionally, while the technology for the post-combustion capture of CO_2 may be available in some applications, the process has not been demonstrated for natural gas-fired water bath vaporizers. The EPA's RBLC database does not include any CCS GHG BACT determinations for natural gas-fired water bath vaporizers of any size. Recovery and purification of CO_2 from water bath vaporizer flue gas would require significant additional processing to achieve the necessary CO_2 concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.[7]

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from the natural gas-fired water bath vaporizers and is not considered further in this analysis.

1.3.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.3.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.3.5 Step 5. Select BACT

Micron intends to purchase natural gas-fired boilers designed to meet a CO_2 emission limit of 117 lb/MMBtu. This is the lowest emission limitation identified as BACT in the RBLC search which also aligns with the CO_2 emission factor from 40 CFR 98 Table C-1. Additionally, based on the analysis presented above, Micron also proposes the use of efficient design and combustion practices as BACT for natural gas-fired vaporizers. Micron will comply with the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 8,000 hours per year for all water bath vaporizers combined, with no more than four units operating at a time.

[7] EPA. (2010, August). Report of the Interagency Task Force on Carbon Capture and Storage.

A BACT limit must not be higher than an applicable New Source Performance Standard (NSPS) emission limit. The water bath vaporizers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for GHG for natural gas-fired steam generating units.

1.4 Diesel-Fired Emergency Generator Engines

The Proposed Air Permit Project will utilize diesel-fired emergency generator engines to ensure that critical life safety and process safety systems receive uninterrupted power during power outages. These units will not be designed to run manufacturing operations during major electrical outages and instead will allow equipment and processes to shut down gradually as necessary, protecting sensitive manufacturing operations, preventing unsafe conditions from forming in the fabs, reducing emissions of process gases directly to the atmosphere, and protecting employee safety.

1.4.1 Step 1. Identify All Control Technologies

The control methods bulleted below have been identified for reducing GHG emissions from the proposed diesel-fired emergency generators.

- Good design and combustion practices;
- Operating hour limitations; and
- CCS.

1.4.2 Step 2. Eliminate Technically Infeasible Options

CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, and iron and steel manufacturing. In alignment with this, the EPA recently finalized the NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units which requires the implementation of CCS for certain existing and new EGUs.[8] The NSPS is applicable to fossil-fired EGUs that have heat input ratings above 250 MMBtu/hr and which serves a generators capable of generating greater than 25 MW of electricity.

The emergency generator engines operate infrequently to support the fabs to safely shutdown in the event of loss of power and reduce process gases vented to the atmosphere. The intermittent nature of the operation increases inefficiencies associated with the potential capture of CO_2 from the exhaust stream.

Additionally, while the technology for the post-combustion capture of CO_2 may be available in some applications, the process has not been demonstrated for diesel-fired emergency generator engines as proposed in the Proposed Air Permit Project. The EPA's RBLC database does not include any CCS GHG BACT determinations for emergency generator engines of any size. Recovery and purification of CO_2 from emergency engine flue gas would require significant additional processing to achieve the necessary CO_2

[8] NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units

concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.[9]

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from the diesel-fired emergency generator engines and is not considered further in this analysis.

1.4.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.4.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.4.5 Step 5. Select BACT

Micron intends to purchase diesel-fired emergency generators designed to meet CO_2 emissions limits of 163 lb/MMBtu. This is the lowest emission limitation identified as BACT in the RBLC search which also aligns with the CO_2 emission factor from AP-42 Table 3.3-1. Additionally, based on the analysis presented above, Micron also proposes the use of efficient design and combustion practices as BACT for diesel-fired emergency generator engines. Micron will comply with the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Minimizing engine's idle time at startup;
- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 100 hours per year for each engine.

1.5 Diesel-Fired Emergency Fire Pump Engine

The Proposed Air Permit Project will include one diesel-fired emergency fire pump engine to provide a reliable power source in the event of a fire occurring during a power outage when the electric fire pump would not be available.

[9] EPA. (2010, August). Report of the Interagency Task Force on Carbon Capture and Storage.

1.5.1 Step 1. Identify All Control Technologies

The control methods bulleted below have been identified for reducing GHG emissions from the proposed diesel-fired emergency fire pumps.

- Good design and combustion practices;
- Operating hour limitations; and
- CCS.

1.5.2 Step 2. Eliminate Technically Infeasible Options

CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, and iron and steel manufacturing. In alignment with this, the EPA recently finalized the NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units which requires the implementation of CCS for certain existing and new EGUs. The NSPS is applicable to fossil-fired EGUs that have heat input ratings above 250 MMBtu/hr and which serves a generators capable of generating greater than 25 MW of electricity.

The emergency fire pump engine will operate infrequently to provide reliable power in the event of a power outage. The intermittent nature of the operation increases inefficiencies associated with the potential capture of CO_2 from the exhaust stream.

Additionally, while the technology for the post-combustion capture of CO_2 may be available in some applications, the process has not been demonstrated for diesel-fired emergency fire pump engines as proposed in the Proposed Air Permit Project. The EPA's RBLC database does not include any CCS GHG BACT determinations for emergency fire pump engines of any size. Recovery and purification of CO_2 from emergency engine flue gas would require significant additional processing to achieve the necessary CO_2 concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from the diesel-fired emergency fire pump engines and is not considered further in this analysis.

1.5.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.5.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.5.5 Step 5. Select BACT

Micron intends to purchase diesel-fired emergency fire pump engine designed to meet CO_2 emissions limits of 163 lb/MMBtu. This is the lowest emission limitation identified as BACT in the RBLC search which also aligns with the CO_2 emission factor from AP-42 Table 3.3-1. Additionally, based on the analysis presented above, Micron also proposes the use of efficient design and combustion practices as BACT for diesel-fired emergency fire pump engines. Micron will comply with the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Minimizing engine's idle time at startup;
- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 500 hours per year.

1.6 Semiconductor Process Tools and PEECS

High-purity silicon wafers serve as the fundamental components for all semiconductor products that will be manufactured at the Proposed Air Permit Project, and wafers undergo numerous process steps in clean room environments to construct intricate semiconductor devices. During semiconductor fabrication and cleaning, several fluorinated process gases that are F-GHG are utilized. Fluorinated GHGs are used in semiconductor fabs because they are essential to the fabrication of modern semiconductors, provide uniquely effective process performance when etching, and are a reliable source of fluorine ion which is required for cleaning semiconductor process chambers. N_2O also is used as a process gas. Finally, a small amount of CO_2 and CH_4 are used as a process input material, but direct emissions of CO_2 and CH_4 from this use accounts for a minimal (<0.10% as 100-year CO_2e) impact on fab GHG emissions and not considered further in this evaluation.[10]

These high-purity gases are used in several different process steps:

- Dry etching and wafer cleaning process tools use plasma-generated fluorine ion with exposed wafer surface (e.g., dielectric, silicon, metals) or to remove residual material from wafer surfaces.
- Process chambers that are used for depositing thin films are cleaned periodically using fluorine ion that is generated in a chamber separate from the tool and then transferred into the tool to achieve the cleaning process. Hence, this is referred to as "remote cleaning."
- Additional process chambers are cleaned periodically using fluorine ions that are generated in the same process chamber. These processes are "in-situ cleaning," or "thermal cleaning."
- The thin film process tools and diffusion process tools use N_2O primarily for deposition.

[10] Refer to Appendix F of the permit application, Table 6-1 for CO_2 and CH_4 usage and Table 1-1 for total GHG emissions on a 100-year CO_2e basis.

Tool-level thermal oxidation systems that utilize natural gas are used to oxidize F-GHGs exhausted from the manufacturing processes. Due to natural gas combustion within these thermal oxidation systems, GHGs products of combustion are generated. Thin films PEECs are part are considered to be a part of the emission source and have therefore been considered as a part of the BACT analysis. POU control devices are not considered to be a part of the emission source, but rather are classified as control devices and are therefore excluded from this analysis.

1.6.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing GHG emissions from the proposed semiconductor process tools and thermal oxidation systems:

- Good design and combustion practices for thermal oxidation systems;
- Centralized RCS;
- Process chemical substitution;
- Process optimization;
- Use of tool-level thermal oxidation systems;
- Process chemical substitution through use of NF_3 remote plasma cleaning; and
- CCS.

1.6.2 Step 2. Eliminate Technically Infeasible Options

In some cases, the control technologies listed in Step 1 are infeasible for use for the Proposed Air Permit Project. These instances have been discussed further in the following sections.

1.6.2.1 Infeasibility of Process Chemical Substitution

Process chemical substitution in semiconductor manufacturing requires careful consideration of the gases' performance, safety implications, and overall reduction potential in GHG emissions. The CVD chamber cleaning process has been identified as an opportunity for chemical substitution. For CVD chamber clean processes, NF_3 remote chamber cleaning has been demonstrated in practice to emit significantly less overall CO_2e emissions due to the process' high utilization and conversion rate as described in Section 1.1.6.

However, replacement of high-GWP gases with gases that present lower or no GWP in process tools that have direct contact with the wafers has not proven feasible due to the complexity of the wafer fabrication process, including in plasma etch process tools from which F-GHGs are emitted. Processing requirements for high-aspect ratio plasma etching continue to become more stringent, requiring both fluorine ion to etch and the right carbon-to-fluorine ratio to ensure successful etching results. While a significant amount of research has been conducted on alternative etchants and other raw materials, the chemicals that have been tested have not been found to be viable by Micron in the manufacturing environment due to excess polymerization, lack of etch selectivity, difficulties in delivering gases to the process chamber, and potentially increased employee exposure and safety risks. Therefore, process chemical substitution beyond what has already been demonstrated in practice on a commercial scale is considered technically infeasible.

1.6.2.2 Use of RCS With Metal Etch Process Tools

Metal etch tools, which constitute a subset of plasma etch tools that etch metal substrates, can generate metal oxide particulate matter in ductwork. The presence of metal oxide particulate in the exhaust would result in the fouling of the catalytic oxidation portion of an RCS unit. For this reason, the use of a centralized RCS is considered technically infeasible for the control of F-GHG from metal etch tools.

1.6.2.3 Plasma-Based Oxidation

GHG emissions are generated from combustion that occurs within thin films PEECs. Micron continues to explore alternatives to combustion-based thermal oxidation systems (i.e., "burn/wet" devices) to reduce the GHG emissions that are created through combustion. One potential alternative to a combustion-based thermal oxidation system is an electrically-powered "plasma/wet" oxidation system. Instead of using natural gas combustion to oxidize materials in the process exhaust, plasma/wet oxidation systems create a plasma environment in which materials can dissociate.

Micron is evaluating installing plasma-wet PEECs; however, the plasma technology is less proven for use in conjunction with the thin films tools exhausting to PEECs than it is with the plasma etch tools routing to POUs. One of the main compounds generated in thin films tools that PEECs are intended to manage is F_2. In a burn-wet style oxidation system, F_2 is efficiently converted into hydrogen fluoride (HF) in the burner, which is then removed in the second stage of the system. Fluorine gas itself is not effectively dissolved into water, so it must be managed in the burner in order to be removed from the exhaust to prevent safety issues. In a plasma-wet PEEC, there is a lack of free hydrogen ions in the plasma environment as compared to the combustion zone of a burn-wet PEEC. Therefore, F_2 is not as easily converted to HF, and can linger in the exhaust at the outlet of the system and be emitted.

For this reason, plasma-wet style PEECs are not considered a feasible alternative to burn-wet style PEECs at this time for the Proposed Air Permit Project.

1.6.2.4 High-Temperature Thermal Wet Scrubbers-

As mentioned in 1.6.2.3 above, Micron continues to explore alternatives to combustion-based thermal oxidation systems (i.e., "burn/wet" devices) to reduce the GHG emissions that are created through combustion. Thermal devices that use electricity to heat exhaust streams to temperatures suitable for oxidation are another potential alternative to burn/wet devices. The same concerns with using plasma-wet thin films PEECs, such as reduced ability to mitigate F_2 in the exhaust and high electricity demand, apply to electric-powered high-temperature thermal wet scrubbers.

Additionally, while Micron is aware that an international fab has stated that a 90% reduction in nitrous oxide associated with thin films process tools has been achieved through the use of high-temperature thermal wet scrubbers, this claim has not been substantiated by a vendor guarantee. Micron expects that the potential control efficiency associated with high temperature thermal wet scrubbers is equivalent to that of the burn-wet units discussed further in Section 1.6.5.

For these reasons, electric-powered high-temperature thermal PEECs are not considered a feasible alternative to burn-wet style PEECs for the Proposed Air Permit Project.

1.6.2.5 Carbon Capture and Storage Technology

As discussed in Section 1.1.10, CCS has been demonstrated in practice and is generally considered to be available for facilities emitting CO_2 in large amounts, and for facilities with high-purity CO_2 streams. Such facilities include fossil fuel-fired power plants, cement plants, ammonia production, ethanol production, and iron and steel manufacturing. While CO_2 is emitted from the semiconductor process tools and PEECs, the majority of GHG emissions on a CO_2e-basis are from N_2O, CF_4, and NF_3. CO_2 is expected to make up less than 2% of the CO_2e emissions emitted from the semiconductor process tools and PEECs. This is significantly lower than the CO_2 exhaust concentration expected from sources currently utilizing CCS. The membranes used in the CCS technology are very sensitive to chemicals and could potentially be fouled when used for these combustion exhausts.

Recovery and purification of CO_2 from the exhaust gas would require significant additional processing to achieve the necessary CO_2 concentration and purity for effective sequestration. The compression of CO_2 requires a large auxiliary power load, which is expected to result in the use of additional fuel (and associated additional CO_2 emissions) to generate this needed electricity.[11]

As such, CCS is not considered technically or environmentally feasible for reducing GHG emissions from semiconductor process tools and PPECs and is not considered further in this analysis.

1.6.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all technically feasible identified control technologies to meet BACT control technology requirements. As a result, ranking the remaining control technologies is unnecessary.

1.6.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 5, Micron is proposing to use all identified control technologies to achieve BACT control technology requirements. BACT-level control efficiency for one type of process tool (plasma etch) is achieved using the same control technology and implementing specific work practices. As a result, evaluating the most effective controls is unnecessary.

1.6.5 Step 5. Select BACT

The remaining technically feasible technologies include:

- Good design and combustion practices for tool-level thermal oxidation systems;
- Manufacturing process optimization;
- Use of tool-level thermal oxidation systems;
- Use of catalytic oxidation through a centralized RCS for the non-metal plasma etch process tools; and
- Process chemical substitution through use of NF_3 remote plasma cleaning.

---

[11] EPA. (2010, August). Report of the Interagency Task Force on Carbon Capture and Storage.

1.6.5.1 Plasma Etch and Thin Films Process Tools

In the RBLC search results and other semiconductor permits reviewed as part of this BACT analysis, it was observed that GHG control requirements for semiconductor manufacturing processes commonly indicated that thermal oxidation-based devices have been utilized as a control technology to achieve BACT. As such, GHG BACT for metal etch and thin films process tools has currently been determined to be tool-level thermal oxidation systems that are used to oxidize GHG compounds. For non-metal plasma etch tools, GHG BACT has been determined to be the use of catalytic oxidation via centralized RCS.

In addition, one permit was identified in the RBLC search (RBLC ID WI-0287 and permit ID 18-JJW-036) in Attachment 1 to this GHG BACT analysis that indicated 75% control of GHG was achieved for plasma etch processes. In their 2019 Refinement to the 2006 the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (the "2019 Refinement"),[12] the IPPC established default emission factors and default destruction and removal efficiencies (DREs) for multiple process tools. The DREs that apply to the plasma etch process are listed in Table 6.17 of the 2019 Refinement. As illustrated on Appendix F to the Proposed Air Permit Project application, Table 4-1, plasma etch processes will emit compounds listed on IPCC's 2019 Refinement Table 6.17, including CF_4, CH_3F, C_2F_6 and other F-GHGs. As demonstrated in Table 6.16 of the 2019 Refinement, combustion is a suitable means to achieve the default DREs.[13] Table 6.17 of the same report illustrates that the default DREs for all GHG compounds listed and emitted from the process exceeds 75%. Methane is emitted from the plasma etch process but is not listed on Table 6.17. However, it is assumed that methane in the process tool exhaust will be combusted at an efficiency higher than 75% in a properly operating POU control device. Therefore, BACT for plasma etch processes is designated as following the work practice standards established by the IPPC in the 2019 Refinement. Following these work practices will confirm that the IPCC's 2019 Refinement Table 6.17 default DREs for emissions of GHG from plasma etch process tools will be met.

To demonstrate that the default DREs apply to a specific process, the 2019 Refinement articulates work practice standards that a facility must meet to confirm that the default DREs are met for POU control devices and the centralized RCS.

Micron is proposing the following work practice standards for POU control devices and the centralized RCS to demonstrate compliance with the default DREs for the plasma etch process:

- Obtain POU control device and RCS supplier DRE certification that states each can at a minimum meet default DREs or higher.
- Maintain a site maintenance plan that meets the POU control device and RCS supplier's installation, operation, and maintenance requirements.

---

[12] 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 6 – Electronics Industry Emissions.

[13] As described in Section 1.5.2.2 of this GHG BACT analysis, Micron may elect to employ centralized RCS system(s) to control GHG if the technology is demonstrated in practice in the future. The RCS technology would be considered "New Technology" in the context of Table 6.16 and, as such, the RCS would also be able to demonstrate compliance with the proposed BACT work practice standards if the conditions of Table 6.16 were met by Micron's vendors.

- Track uptime of POU control devices and RCS when fab processes are running. DRE is assumed 0% (unless demonstrated otherwise) when these devices/systems are not running per site maintenance plan while process is running.
- Certify annually that each POU control device and RCS claiming default DRE followed the site maintenance plan.

In summary, Micron is proposing GHG BACT as the following for plasma etch and thin films process tools:

- Use of tool-level thermal oxidation systems that are used to oxidize F-GHGs.
- In addition, achieving BACT-level GHG destruction and removal efficiency for plasma etch will be achieved by meeting work practice standards listed above that align with 2019 IPPC work practice standards to meet the default DREs listed in the 2019 Refinement Table 6.17.

Micron will optimize the operation of semiconductor fab equipment and processes to utilize the GHG raw materials as efficiently as possible. This may include optimizing tool operating cycles and efficient utilization of process chemicals.

For cleaning CVD chambers between production cycles, NF_3 will replace the use of carbon-based F-GHGs except in limited cases where in-situ or thermal cleaning are technically required.

1.6.5.2 Thin Films PEECs

Given the diverse processes and complexity of semiconductor manufacturing, Micron is proposing to comply with good combustion and maintenance practices as a work practice standard to achieve BACT for GHG generated through combustion of natural gas used to mitigate emissions from semiconductor process operations in lieu of a formal limit. Micron will comply with the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

1.7 Use of Heat Transfer Fluids

Fluorinated HTFs refer primarily to F-GHG-containing materials that are used to regulate the temperature of semiconductor process tools and are a necessary component of safe and effective manufacturing in the industry. HTFs serve as coolants in chillers, removing excess heat during manufacturing processes. Through all these processes, HTFs may emit the F-GHGs used fugitively inside the fab through leaking components in the transfer lines and equipment.

Note that these chillers use engineered HTFs, which transfer energy efficiently without undergoing a refrigerant phase change cycle, which distinguishes these HTFs from refrigerants regulated by 40 CFR 82.

The following sections address the BACT analysis for the proposed HTFs to be used at the Proposed Air Permit Project.

1.7.1 Step 1. Identify All Control Technologies

Good operating and maintenance practices have been identified as potential control technologies for reducing GHG emissions from the proposed HTFs. Good operation and maintenance practices for HTFs include regular evaluation of consumption records to confirm efficient usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas.

Chemical substitution to utilize HTFs that have a lower GWP is also a potential control technology. Micron is evaluating which alternative low-GWP HTFs are technically viable to meet the heat transfer needs of each desired application.

1.7.2 Step 2. Eliminate Technically Infeasible Options

The control technologies identified in Step 1 for the use of HTFs are technically feasible.

1.7.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All control technologies identified are considered feasible and can be used in combination. As discussed in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.7.4 Step 4. Evaluate the Most Effective Controls and Document

All control technologies identified are considered feasible and can be used in combination. As discussed in Step 5, Micron is proposing to use all identified control technologies to achieve BACT. As a result, evaluating the most effective controls is unnecessary, and the next step is to select BACT.

1.7.5 Step 5. Select BACT

Micron is proposing BACT for the proposed HTFs to be the use of good design and maintenance practices and will continue to evaluate the opportunity to use the low-GWP HTFs that are technically viable to meet the heat transfer needs of each desired application and will use the alternative low-GWP HTFs identified through this evaluation. Good operating and maintenance practices include regular evaluation of consumption records to confirm efficient usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas.

Due to the nature of the good operating and maintenance practices for the HTF distribution system, Micron is not proposing to meet an emission limit for operation of the systems that utilize HTFs.

1.8 Circuit Breakers

Micron plans to install circuit breakers rated at 38 kV and 420 kV at the Proposed Air Permit Project. SF_6 is the primary insulating medium used in electric switchgear; however, SF_6 is a GHG and as such a BACT analysis for the proposed circuit breakers has been completed. Note that Micron also intends to use air-insulated circuit breakers rated at 15kV and below which has been excluded from the BACT analysis.

1.8.1 Step 1. Identify All Control Technologies

The control methods bulleted below have been identified for reducing GHG emissions from the proposed circuit breakers.

- Use of a different medium in circuit breakers;
- Use of manufacturer-guaranteed low leak rate circuit breakers; and
- Leak detection systems (with alarms).

1.8.2 Step 2. Eliminate Technically Infeasible Options

For 38 kV circuit breakers, while alternative insulating mediums, including mixtures of air and CO_2, are available, there are significant operational safety, reliability, and maintenance constraints associated with their use. These circuit breakers have potential arc flash risk during operations and maintenance and testing activities, as well as fire and smoke risks when exposed to atmospheric conditions. These air insulated units are also subject to environmental factors such as dust, humidity, and liquid leaks and therefore, would require frequent shutdown maintenance and would not meet reliability requirement for the operations of the Proposed Air Permit Project. For these reasons, circuit breakers utilizing alternative insulating mediums are considered technically infeasible.

There are significant technical barriers in high-voltage applications, including the proposed 420 kV circuit breakers. When compared to SF_6, alternatives such as synthetic air provide limited dielectric strength, resulting in the need for a 25% larger equipment footprint and also possess maintenance risks as discussed above for the 38kV units. While C4 and C5 provide similar performance and equipment footprint as traditional SF_6 gas, they may be categorized as per-and polyfluoroalkyl substances (PFAS), depending on the definition used. Regulations restricting the use of intentionally-added PFAS have recently been proposed at the state and federal level, and further regulation is possible. Micron is also evaluating ways to minimize uses of PFAS. For these reasons, circuit breakers utilizing alternative insulating mediums are considered technically and environmentally infeasible.

In addition, non-SF_6 gas insulated switchgears are not available yet in the US market. Micron is working closely with Original Equipment Manufacturers to perform feasibility studies as soon as one becomes available.

The NYSDEC adopted 6 NYCRR Part 495, Sulfur Hexafluoride Standards and Reporting, in December 2024, which includes a program to phasedown the use of SF_6 in gas insulated equipment used by the electricity sector, an emissions limit for gas insulated equipment owners, limitations on the use of SF_6, and reporting requirements for certain users and suppliers of SF_6 and other fluorinated greenhouse gases. Part 495 proposes a periodic phase out plan for SF_6 gas insulated equipment starting January 1, 2028, for equipment rated equal to 38kV and continuing through January 1, 2033, for equipment rated above 245kV. The delayed phase out of high voltage equipment aligns with the conclusion that at the time of this Permit Application 2, alternative insulating mediums are not technically feasible. Micron will continue to evaluate SF_6 alternatives available in the future and will comply with the applicable phase out requirements.

1.8.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to evaluate the most effective controls.

1.8.4 Step 4. Evaluate the Most Effective Controls and Document

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, evaluating the most effective controls is unnecessary and the next step is to select BACT.

1.8.5 Step 5. Select BACT

Based on the analysis presented above, for the circuit breakers rated at 38 kV and 420 kV, Micron proposes the use of manufacturer-guaranteed circuit breakers with SF_6 leak rates less than 0.5% and the use of leak detection systems (with alarms).

Attachment 1
RACT/BACT/LAER Clearinghouse Search Results

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/09/2015	PACKAGE BOILER	13.310	Carbon Dioxide Equivalent (CO2e)	Not Specified	34,189	T/YR
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/09/2015	2 CALP LINE BOILERS	13.310	Carbon Dioxide Equivalent (CO2e)	Not Specified	34,189	T/YR
AR-0159	BIG RIVER STEEL LLC	AR	2305-AOP-R4	04/05/2019	BOILER, PICKLE LINE	13.310	Nitrous Oxide (N2O)	GOOD OPERATING PRACTICES MINIMUM BOILER EFFICIENCY 75%	0.0002	LB/MMBTU
AR-0159	BIG RIVER STEEL LLC	AR	2305-AOP-R4	04/05/2019	BOILER, ANNEALING PICKLE LINE	13.310	Nitrous Oxide (N2O)	GOOD OPERATING PRACTICES MINIMUM BOILER EFFICIENCY 75%	0.0002	LB/MMBTU
AR-0159	BIG RIVER STEEL LLC	AR	2305-AOP-R4	04/05/2019	BOILERS SN-26 AND SN-27, GALVANIZING LINE	13.310	Nitrous Oxide (N2O)	GOOD OPERATING PRACTICES MINIMUM BOILER EFFICIENCY 75%	0.0002	LB/MMBTU
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	02/14/2019	SN-233 Galvanizing Line Boilers	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	121	LB/MMBTU
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Auxiliary Boiler (AB-3)	13.310	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	117	LB/MMBTU
KS-0029	THE EMPIRE DISTRICT ELECTRIC COMPANY	KS	C-12987	07/14/2015	Auxiliary boiler	13.310	Carbon Dioxide Equivalent (CO2e)	Not Specified	9,521.5	TONS PER YEAR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Pickle Line #2 Boiler #1 & #2 (EP 21-04 & EP 21-05)	13.310	Carbon Dioxide Equivalent (CO2e)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements.	12,675	TONS/YR
MI-0420	DTE GAS COMPANY--MILFORD COMPRESSOR STATION	MI	185-15	06/03/2016	FGAUXBOILERS	13.310	Carbon Dioxide Equivalent (CO2e)	Use of pipeline quality natural gas and energy efficiency measures.	6,155	T/YR

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0426	DTE GAS COMPANY - MILFORD COMPRESSOR STATION	MI	185-15A	03/24/2017	FGAUXBOILERS (6 auxiliary boilers EUAUXBOIL2A, EUAUXBOIL3A, EUAUXBOIL2B, EUAUXBOIL3B, EUAUXBOIL2C, EUAUXBOIL3C)	13.310	Carbon Dioxide Equivalent (CO2e)	Use of pipeline quality natural gas and energy efficiency measures.	7,324	T/YR
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion controls/natural gas combustion	4,008	T/YR
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion controls/natural gas combustion	4,456	T/YR
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	use of natural gas, good combustion controls	4,502	T/YR
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Natural gas as the sole fuel	7,845	T/YR
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Auxiliary Boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practices and pipeline quality natural gas	2,817.6	T/YR
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	02/06/2019	Startup boiler (B001)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practices and the use of natural gas	1,784	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	13.310	Carbon Dioxide	Good combustion practices and the use of natural gas	106,048	T/YR

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OR-0050	TROUTDALE ENERGY CENTER, LLC	OR	26-0235	03/05/2014	Auxiliary boiler	13.310	Carbon Dioxide Equivalent (CO2e)	Clean fuels	117	LB CO2/MMBTU
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Auxiliary Boiler	13.310	Carbon Dioxide Equivalent (CO2e)	Not Specified	44,107	TON
TX-0772	PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT)	TX	118901, GHGPSDTX108 AND PSDTX1	11/06/2015	Commercial/Institutional-Size Boilers/Furnaces	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practice to ensure complete combustion.	6,850	T/YR
WI-0266	GREEN BAY PACKAGING, INC. - SHIPPING CONTAINER DIVISION	WI	18-DMM-077	09/06/2018	Natural gas-fired boiler (Boiler B01)	13.310	Carbon Dioxide Equivalent (CO2e)	Good combustion practices, use only natural gas, equip with Low NOx burners and flue gas recirculation	160	LBCO2E/1000 LB STEAM
WI-0303	GREEN BAY PACKAGING INC.- GB MILL DIV.	WI	20-DMM-055	07/14/2020	Natural Gas-Fired Boiler (B01)	13.310	Carbon Dioxide Equivalent (CO2e)	Only burn natural gas, good combustion practices, low NOx burner, and flue gas recirculation.	16,771	T/Y
WI-0306	WPL- RIVERSIDE ENERGY CENTER	WI	19-POY-212	02/28/2020	Temporary Boiler (B98A)	13.310	Carbon Dioxide Equivalent (CO2e)	Combust only pipeline quality natural gas.	118	LB CO2/MMBTU
WV-0031	MOCKINGBIRD HILL COMPRESSOR STATION	WV	R14-0033	06/14/2018	WH-1 - Boiler	13.310	Carbon Dioxide Equivalent (CO2e)	Limited to natural gas; and tune-up the boiler once every five years.	--	--
WY-0075	CHEYENNE PRAIRIE GENERATING STATION	WY	MD-16173	07/16/2014	Auxiliary Boiler	13.310	Carbon Dioxide Equivalent (CO2e)	good combustion practices and energy efficiency	12,855	TONS

Process IDs: 12.31, 13.31, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input <50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
SC-0183	NUCOR STEEL - BERKELEY	SC	0420-0060-DX	5/4/2018	Pickle Line Equipment (pickle line no. 3 boilers)	19.600	Carbon Dioxide Equivalent (CO2e)	Use of natural gas and efficient combustion technology through good combustion practices	15,965	TPY

Process IDs: ---
Other Search Criteria: Process Name Contains "Vaporizer"
Process Description: Natural Gas Combustion Equipment
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Air Separation Plant Water Vaporizer	81.290	Carbon Dioxide Equivalent (CO2e)	Good operating practices	117	LB/MMBTU
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 13-01 - Water Bath Vaporizer	19.900	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan and implement design standards.	11,404	TON/YR
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Unit Water Bath Vaporizer (2 indirect burners) (EP 23-01)	19.600	Carbon Dioxide Equivalent (CO2e)	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements.	15,032	TONS/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	13.310	Carbon Dioxide	Good combustion practices and the use of natural gas	28,200	T/YR
WV-0034	WEST VIRGINIA STEEL MILL	WV	R14-0039	05/05/2022	Water Bath Vaporizer	81.290	Carbon Dioxide Equivalent (CO2e)	PNG Good Combustion Practices	1,288	LB/HR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
AK-0082	POINT THOMSON PRODUCTION FACILITY	AK	AQ1201CPT03	01/23/2015	Emergency Camp Generators	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	2,332	TONS/YEAR
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Black Start and Emergency Internal Combustion Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	2,781	TPY
AR-0163	BIG RIVER STEEL LLC	AR	2305-AOP-R6	06/09/2019	Emergency Engines	17.110	Carbon Dioxide	Good Combustion Practices	163	LB/MMBTU
AR-0163	BIG RIVER STEEL LLC	AR	2305-AOP-R6	06/09/2019	Emergency Engines	17.110	Methane	Good Combustion Practices	0.0061	LB/MMBTU
AR-0163	BIG RIVER STEEL LLC	AR	2305-AOP-R6	06/09/2019	Emergency Engines	17.110	Nitrous Oxide (N2O)	Good Combustion Practices	0.0013	LB/MMBTU
AR-0177	NUCOR STEEL ARKANSAS	AR	1139-AOP-R27	11/21/2022	SN-230 Galvanizing Line No, 2 Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	163	LB/MMBTU
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Emergency Generators	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	164	LB/MMBTU
IL-0114	CRONUS CHEMICALS, LLC	IL	13060007	09/05/2014	Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Tier IV standards for non-road engines at 40 CFR 1039.102, Table 7.	432	TPY
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Emergency Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	225	TONS/YEAR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Emergency Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	508	TONS/YEAR
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Emergency Generator Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	160	TONS/YEAR
IN-0173	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.110	Carbon Dioxide	GOOD COMBUSTION PRACTICES	526.39	G/BHP-H
IN-0180	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.110	Carbon Dioxide	GOOD COMBUSTION PRACTICES	526.39	G/B-HP-H
IN-0263	MIDWEST FERTILIZER COMPANY LLC	IN	129-36943-00059	03/23/2017	EMERGENCY GENERATORS (EU014A AND EU-014B)	17.110	Carbon Dioxide	GOOD COMBUSTION PRACTICES	1,044	TON/12 CONSEC. MONTH
IN-0317	RIVERVIEW ENERGY CORPORATION	IN	T147-39554-00065	06/11/2019	Emergency generator EU-6006	17.110	Carbon Dioxide Equivalent (CO2e)	Tier II diesel engine	811	TONS
IN-0324	MIDWEST FERTILIZER COMPANY LLC	IN	129-44510-00059	05/06/2022	emergency generator EU 014a	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	1,044	TON/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
IN-0359	NUCOR STEEL	IN	107-45480-00038	03/30/2023	Emergency Generator (CC-GEN1)	17.110	Carbon Dioxide Equivalent (CO2e)	Good engineering design and manufacturer's recommended operating and maintenance procedures.	163.6	LB/MMBTU
IN-0365	MAPLE CREEK ENERGY LLC	IN	T153-45909-00056	06/19/2023	Emergency generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	625	TONS PER YEAR
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Emergency Generator (400 kW)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	180	TONS
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Emergency Generator (1000 kW)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	389	TONS
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Emergency Generator (2000 kW)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	778	TONS
IN-0371	WABASH VALLEY RESOURCES, LLC	IN	167-45208-00091	01/11/2024	Ammonia Plant Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices	219	TONS
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-02 - North Water System Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-03 - South Water System Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-07 - Air Separation Plant Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-01 - Caster Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
LA-0288	LAKE CHARLES CHEMICAL COMPLEX	LA	PSD-LA-778	05/23/2014	Emergency Diesel Generators (EQT 629, 639, 838, 966, 1264)	17.110	Carbon Dioxide Equivalent (CO2e)	Comply with 40 CFR 60 Subpart IIII; operate the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	56	TPY
LA-0292	HOLBROOK COMPRESSOR STATION	LA	PSD-LA-769(M-1)	01/22/2016	Emergency Generators No. 1; No. 2	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	77	TPY
LA-0296	LAKE CHARLES CHEMICAL COMPLEX LDPE UNIT	LA	PSD-LA-779	05/23/2014	Emergency Diesel Generators (EQTs 622, 671, 773, 850, 994, 995, 996, 1033, 1077, 1105, 1202)	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with 40 CFR 60 Subpart IIII; operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage.	56	TPY

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0305	LAKE CHARLES METHANOL FACILITY	LA	PSD-LA-803(M1)	06/30/2016	Diesel Engines (Emergency)	17.110	Carbon Dioxide Equivalent (CO2e)	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Emergency Generator Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--
LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	06/30/2017	DEG1-13 - Diesel Fired Emergency Generator Engine (EQT0012)	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with NSPS Subpart IIII	84	TPY
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Generator 1	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	--	--
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 1	17.110	Carbon Dioxide Equivalent (CO2e)	Proper design and operation; energy efficiency measures	--	--
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 2	17.110	Carbon Dioxide Equivalent (CO2e)	Proper design and operation; energy efficiency measures	--	--
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	emergency generator engines (6 units)	17.110	Carbon Dioxide Equivalent (CO2e)	good combustion practices	--	--

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
LA-0317	METHANEX - GEISMAR METHANOL PLANT	LA	PSD-LA-761(M4)	12/22/2016	Emergency Generator Engines (4 units)	17.110	Carbon Dioxide Equivalent (CO2e)	complying with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	--	--
LA-0331	CALCASIEU PASS LNG PROJECT	LA	PDS-LA-805	09/21/2018	Large Emergency Engines (>50kW)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion of Practices and Good Operation and Maintenance Practices	1,481	T/YR
LA-0364	FG LA COMPLEX	LA	PSD-LA-812	01/06/2020	Emergency Generator Diesel Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with the limitations imposed by 40 CFR 63 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	--	--
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Generator Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	74.21	KG/MM BTU
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	06-22 - AO-5 Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Use of good combustion practices and compliance with NSPS Subpart IIII	--	--
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	53-22 - PAO Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Use of good combustion practices, compliance with NSPS Subpart IIII	--	--
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	01/30/2014	Emergency Engine/Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	162.85	LB/MMBTU

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0421	GRAYLING PARTICLEBOARD	MI	59-16	08/26/2016	Emergency Diesel Generator Engine (EUEMRGRICE in FGRICE)	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion and design practices.	223	T/YR
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUEMENGINE (Diesel fuel emergency engine)	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	928	T/YR
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	05/09/2017	EUEMRGRICE1 in FGRICE (Emergency diesel generator engine)	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion and design practices.	209	T/YR
MI-0425	GRAYLING PARTICLEBOARD	MI	59-16A	05/09/2017	EUEMRGRICE2 in FGRICE (Emergency Diesel Generator Engine)	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion and design practices.	70	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (North Plant): Emergency Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices.	383	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (South Plant): Emergency Engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices.	383	T/YR
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUEMENGINE: Emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Energy efficient design.	161	T/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD1--A 1500 HP diesel fueled emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices and energy efficiency measures.	406	T/YR
MI-0441	LBWL--ERICKSON STATION	MI	74-18	12/21/2018	EUEMGD2--A 6000 HP diesel fuel fired emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices and energy efficiency measures.	1,590	T/YR
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGEMENGINE	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	444	T/YR
MI-0447	LBWL--ERICKSON STATION	MI	74-18A	01/07/2021	EUEMGD--emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	590	T/YR
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE1 in FGRICE)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion and Design Practices	590	T/YR
MI-0448	GRAYLING PARTICLEBOARD	MI	59-16E	12/18/2020	Emergency diesel generator engine (EUEMRGRICE2 in FGRICE)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion and Design Practices	209	T/YR
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUEMENGINE (North Plant): Emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	383	T/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUEMENGINE (South Plant): Emergency engine	17.110	Carbon Dioxide Equivalent (CO2e)	Good combustion practices	383	T/YR
MI-0454	LBWL-ERICKSON STATION	MI	74-18D	12/20/2022	EUEMGD	17.110	Carbon Dioxide Equivalent (CO2e)	low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	590	T/YR
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Emergency generator (P002)	17.110	Carbon Dioxide Equivalent (CO2e)	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	474	T/YR
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	683	T/YR
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	858	T/YR
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Generator (P009)	17.110	Carbon Dioxide Equivalent (CO2e)	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	1,289	T/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	445	T/YR
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	state of the art combustion design	445	T/YR
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Generators (2 identical, P004 and P005)	17.110	Carbon Dioxide Equivalent (CO2e)	good operating practices (proper maintenance and operation)	120	T/YR
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Emergency Diesel Generator Engine (P001)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	116.8	T/YR
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Emergency Diesel Fire Pump Engine (P002)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design	40.1	T/YR
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Emergency diesel-fired generator (P007)	17.110	Carbon Dioxide Equivalent (CO2e)	Equipment design and maintenance requirements	163.6	LB/MMBTU
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Diesel Generator (P003)	17.110	Carbon Dioxide Equivalent (CO2e)	Efficient design and proper maintenance and operation	109.2	T/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Emergency Diesel-fired Generator Engine (P007)	17.110	Carbon Dioxide Equivalent (CO2e)	good operating practices (proper maintenance and operation)	200	T/YR
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	1,000 kW Emergency Generators (P008 - P010)	17.110	Carbon Dioxide Equivalent (CO2e)	good operating practices (proper maintenance and operation)	80	T/YR
OH-0379	PETMIN USA INCORPORATED	OH	P0125024	02/06/2019	Emergency Generators (P005 and P006)	17.110	Carbon Dioxide Equivalent (CO2e)	Tier IV engine Good combustion practices	3,632	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	5,051 bhp (3,768 kWm) Diesel-Fired Emergency Generators: P001 through P046	17.110	Carbon Dioxide	Good combustion practices and proper maintenance and operation	162.7	LB/MMBTU
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	2000 kW Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	81	TONS
PA-0311	MOXIE FREEDOM GENERATION PLANT	PA	40-00129A	09/01/2015	Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	44	TPY
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	183	T/YR
TX-0766	GOLDEN PASS LNG EXPORT TERMINAL	TX	116055, PSDTX1386, GHGPSDTX100	09/11/2015	Emergency Engine Generators	17.110	Carbon Dioxide Equivalent (CO2e)	Equipment specifications & work practices - Good combustion practices and limited operational hours	40	HR/YR

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
TX-0872	CONDENSATE SPLITTER FACILITY	TX	118270 PSDTX1398M1 GHGPSDTX62	10/31/2019	Emergency Generators	17.110	Carbon Dioxide Equivalent (CO2e)	Limiting duration and frequency of generator use to 100 hr/yr. Good combustion practices will be used to reduce VOC including maintaining proper air-to-fuel ratio.	--	--
TX-0939	ORANGE COUNTY ADVANCED POWER STATION	TX	166032 PSDTX1598 GHGPSDTX210	03/13/2023	EMERGENCY GENERATOR	17.110	Carbon Dioxide Equivalent (CO2e)	GOOD COMBUSTION PRACTICES, LIMITED TO 100 HR/YR	--	--
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED EMERGENCY GENERATOR 3000 kW (1)	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices/Maintenance	163.6	LB/MMBTU
VA-0333	NORFOLK NAVAL SHIPYARD	VA	60326-36	12/09/2020	One (1) emergency engine generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	2.543	LB
WI-0284	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-017	04/24/2018	Diesel-Fired Emergency Generators	17.110	Carbon Dioxide Equivalent (CO2e)	The Use of Ultra-Low Sulfur Fuel and Good Combustion Practices	--	--
WI-0286	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-022	04/24/2018	P42 -Diesel Fired Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Good Combustion Practices and The Use of Ultra-low Sulfur Fuel	--	--
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Generator (P07)	17.110	Carbon Dioxide Equivalent (CO2e)	Certified to at least meet EPA's criteria for Tier 2 reciprocating internal combustion engines and the 40 CFR 60, Subpart IIII emission limitations, operation limited to 500 hours/year, and operate and maintain generator according to the manufacturer's recommendations.	--	--

Process IDs: 17.11
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Emergency Generator	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	2,416	LB/H
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	03/17/2021	Emergency Engines	17.210	Carbon Dioxide	Good Combustion Practices	163	LB/MMBTU
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	03/17/2021	Emergency Engines	17.210	Methane	Good Combustion Practices	0.0061	LB/MMBTU
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	03/17/2021	Emergency Engines	17.210	Nitrous Oxide (N2O)	Good Combustion Practices	0.0013	LB/MMBTU
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Engines	17.210	Carbon Dioxide Equivalent (CO2e)	Good Operating Practices	164	LB/MMBTU
LA-0292	HOLBROOK COMPRESSOR STATION	LA	PSD-LA-769(M-1)	01/22/2016	Emergency Generators No. 1 & No. 2	17.110	Carbon Dioxide Equivalent (CO2e)	Not Specified	77	TPY
LA-0364	FG LA COMPLEX	LA	PSD-LA-812	01/06/2020	Emergency Generator Diesel Engines	17.110	Carbon Dioxide Equivalent (CO2e)	Compliance with the limitations imposed by 40 CFR 63 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	--	--

Process IDs: 99.011, 99.006
Other Search Criteria: ---
Process Description: Semiconductor Manufacturing
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID and Process Name

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
OH-0387	INTEL OHIO SITE	OH	P0132323	9/20/2022	Semiconductor Fabrication: P179 through P182	99.011	Carbon Dioxide Equivalent (CO2e)	Point-of-use (POU) devices that are specifically designed for fluorinated GHG and/or N_2O destruction, good combustion practices, and the use of natural gas	774,419	T/YR
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P12, P22, P18, P19, P28, P29 Organic Stripping Systems, Array/Color Filter and Cell Processes	99.006	Carbon Dioxide Equivalent (CO2e)	Regenerative Thermal Oxidizer	--	--
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P15 & P25 VOC System Array Process	99.006	Carbon Dioxide Equivalent (CO2e)	Regenerative Thermal Oxidizer	--	--
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P13 & P23 Chemical Vapor Deposition System Array Process	99.006	Carbon Dioxide Equivalent (CO2e)	Combustor, Baghouse and Wet Scrubber in series	--	--
WI-0287	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-036	4/24/2018	P14 & P24 Dry Etching System Array Process	99.006	Carbon Dioxide Equivalent (CO2e)	Combustor and Wet Scrubber in series	75	%

Process IDs: 99.999
Other Search Criteria: Process Name Contains "Circuit Breakers"
Process Description: Circuit Breakers
Date Range: 1/1/2014 - 12/5/2024
Date Conducted: 12/6/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Filtered Process Name for "Circuit Breakers"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
FL-0354	LAUDERDALE PLANT	FL	0110037-013-AC	08/25/2015	Circuit Breakers	99.999	Sulfur Hexafluoride	Limitation on leaks	0.5	% PER YEAR
FL-0355	FORT MYERS PLANT	FL	0710002-022-AC	09/10/2015	Circuit breakers	99.999	Sulfur Hexafluoride	Limitation on leak of SF6 from circuit breakers	0.5	PERCENT
FL-0356	OKEECHOBEE CLEAN ENERGY CENTER	FL	0930117-001-AC	03/09/2016	Circuit breakers	99.999	Sulfur Hexafluoride	Leak prevention. Must have manufacturer-guaranteed leak rate no more than 0.5% per year. Must be equipped with leakage detection systems and alarms.	--	--
FL-0363	DANIA BEACH ENERGY CENTER	FL	0110037-017-AC	12/04/2017	Circuit breakers (two)	99.999	Sulfur Hexafluoride	Certified leak rate < 0.5% per year	0.5	% LEAK PER YEAR
FL-0367	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-001-AC	07/27/2018	Two Circuit Breakers	99.999	Sulfur Hexafluoride	Certified leak rate < 0.5% per year	0.5	% LEAK PER YEAR
FL-0371	SHADY HILLS COMBINED CYCLE FACILITY	FL	1010524-003-AC (PSD-FL-444A)	06/07/2021	Two Circuit Breakers	99.999	Sulfur Hexafluoride	Certified leak rate < 0.5% per year	0.5	% LEAK PER YEAR
IA-0107	MARSHALLTOWN GENERATING STATION	IA	13-A-499-P	04/14/2014	circuit breakers	99.999	Sulfur Hexafluoride	Not Specified	0.5	PERCENT LOSS
IL-0129	CPV THREE RIVERS ENERGY CENTER	IL	16060032	07/30/2018	Circuit Breakers	99.999	Sulfur Hexafluoride	Not Specified	0.5	% LEAK RATE
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Circuit Breakers	99.999	Sulfur Hexafluoride	Not Specified	0.5	PERCENT LEAK RATE
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Circuit Breakers	99.999	Sulfur Hexafluoride	Not Specified	0.5	PERCENT LEAK RATE
IN-0294	ST. JOSEPH ENERGY CENTER, LLC	IN	141-39839-00579	08/08/2018	Circuit Breakers SF6	99.999	Sulfur Hexafluoride	Not Specified	--	--

Process IDs: 99.999
Other Search Criteria: Process Name Contains "Circuit Breakers"
Process Description: Circuit Breakers
Date Range: 1/1/2014 - 12/5/2024
Date Conducted: 12/6/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Filtered Process Name for "Circuit Breakers"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
KS-0029	THE EMPIRE DISTRICT ELECTRIC COMPANY	KS	C-12987	07/14/2015	Insulated circuit breaker	99.999	Carbon Dioxide Equivalent (CO2e)	Installation of modern, totally enclosed SF6 circuit breakers with density (leak detection) alarms and a guaranteed loss rate of < 0.5 % by weight per year.	6.9	TONS PER YEAR
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Circuit Breakers	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed pressure design with a low pressure detection system with an alarm to limit SF6 leak rate to 0.5 % per year.	85	T/YR
MD-0041	CPV ST. CHARLES	MD	PSC CASE NO. 9280	04/23/2014	CIRCUIT BREAKERS	99.999	Sulfur Hexafluoride	Not Specified	--	--
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	CIRCUIT BREAKERS	99.999	Sulfur Hexafluoride	INSTALLATION OF STATE-OF-THE-ART CIRCUIT BREAKERS THAT ARE DESIGNED TO MEET ANSI C37.013 OR EQUIVALENT TO DETECT AND MINIMIZE SF6 LEAKS	--	--
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	CIRCUIT BREAKERS	99.999	Carbon Dioxide Equivalent (CO2e)	GHG BACT FOR THE CIRCUIT BREAKERS SHALL BE INSTALLATION OF STATE-OF-THE-ART CIRCUIT BREAKERS THAT ARE DESIGNED TO MEET ANSI C37.013 OR EQUIVALENT TO DETECT AND MINIMIZE SF6 LEAKS	--	--
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	CIRCUIT BREAKERS	99.999	Sulfur Hexafluoride	Not Specified	--	--

Process IDs: 99.999
Other Search Criteria: Process Name Contains "Circuit Breakers"
Process Description: Circuit Breakers
Date Range: 1/1/2014 - 12/5/2024
Date Conducted: 12/6/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Filtered Process Name for "Circuit Breakers"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	CIRCUIT BREAKERS	99.999	Carbon Dioxide Equivalent (CO2e)	GHG BACT FOR THE CIRCUIT BREAKERS SHALL BE INSTALLATION OF STATE-OF-THE-ART CIRCUIT BREAKERS THAT ARE DESIGNED TO MEET ANSI C37.013 OR EQUIVALENT TO DETECT AND MINIMIZE SF6 LEAKS	--	--
MD-0046	KEYS ENERGY CENTER	MD	PSC CASE NO. 9297	10/31/2014	CIRCUIT BREAKERS	99.999	Sulfur Hexafluoride	Not Specified	--	--
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Circuit breakers with SF6	99.999	Sulfur Hexafluoride	low pressure alarms and low pressure lockout system	6	LB/12MO
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Circuit breakers with SF6	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	79.8	TONS
PA-0310	CPV FAIRVIEW ENERGY CENTER	PA	11-00536A	09/02/2016	Circuit breakers	99.999	Sulfur Hexafluoride	State-of-the-art sealed enclosed-pressure circuit breakers with leak detection	1500	PPM
TX-0749	GOLDEN SPREAD ELECTRIC COOPERATIVE, ANTELOPE STATION	TX	PSD-TX-1358-GHG	06/02/2014	Fugitive Emissions from SF6 Circuit Breakers	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--
TX-0753	GUADALUPE GENERATING STATION	TX	PSD-TX-1310-GHG	12/02/2014	Fugitive SF6 Circuit Breaker Emissions	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--
TX-0757	INDECK WHARTON ENERGY CENTER	TX	PSD-TX-1374-GHG	05/12/2014	Fugitive SF6 Circuit Breaker Emissions	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--
TX-0758	ECTOR COUNTY ENERGY CENTER	TX	GHGPSDTX1366	08/01/2014	Fugitive SF6 Circuit Breaker Emissions	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	--	--

Process IDs: 99.999
Other Search Criteria: Process Name Contains "Circuit Breakers"
Process Description: Circuit Breakers
Date Range: 1/1/2014 - 12/5/2024
Date Conducted: 12/6/2024 - 12/09/2024
Notes & Filtering: Filtered for Process ID; Filtered Process Name for "Circuit Breakers"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Pollutant	Control Technology Definition	Emission Limit	
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	CIRCUIT BREAKERS (3)	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed pressure type breaker and leak detector	19	T/YR
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	CIRCUIT BREAKERS (11)	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed pressure type breaker and leak detection	1032	T/YR
VA-0328	C4GT, LLC	VA	52588	04/26/2018	Circuit Breakers - 6	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed-pressure design with low-pressure detection system (with alarm).	--	--
VA-0332	CHICKAHOMINY POWER LLC	VA	52610-1	06/24/2019	Circuit Breakers	99.999	Carbon Dioxide Equivalent (CO2e)	Enclosed-pressure design with low-pressure detection system (with alarm).	--	--
WI-0299	WPL- RIVERSIDE ENERGY CENTER	WI	19-POY-151	08/20/2020	Sulfur Hexafluoride Containing Circuit Breakers and Transformers (F90)	99.999	Sulfur Hexafluoride	Not Specified	0.5	% LEAK RATE, BY WGHT
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Low-Side Generator Enclosed Pressure SF6 Circuit Breakers (F03)	99.999	Carbon Dioxide Equivalent (CO2e)	Not Specified	0.5	% BY WEIGHT/YEAR
TX-0939	ORANGE COUNTY ADVANCED POWER STATION	TX	166032 PSDTX1598 GHGPSDTX210	3/13/2023	CIRCUIT BREAKER FUGITIVES	15.210	Carbon Dioxide Equivalent (CO2e)	State-of-the-art circuit breakers that are gas-tight and require minimal SF6 are used. An AVO monitoring program is used to detect circuit breaker leaks.	--	--

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
AK-0083	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT06	01/06/2015	Diesel Fired Well Pump	17.21	Limited Operation of 168 hr/yr.	37.2	TONS/YEAR
AK-0084	DONLIN GOLD PROJECT	AK	AQ0934CPT01	06/30/2017	Fire Pump Diesel Internal Combustion Engines	17.21	Good Combustion Practices	216	TPY (COMBINED)
AK-0085	GAS TREATMENT PLANT	AK	AQ1524CPT01	08/13/2020	Three (3) Firewater Pump Engines and two (2) Emergency Diesel Generators	17.21	Good combustion practices and limit operation to 500 hours per year per engine	163.6	LB/MMBTU
AK-0086	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT07	03/26/2021	Diesel Fired Well Pump	17.21	Good Combustion Practices and Limited Use	164	LB/MMBTU
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Water Pumps	17.21	Good Operating Practices	164	LB/MMBTU
AR-0180	HYBAR LLC	AR	2470-AOP-R0	04/28/2023	Emergency Water Pumps	17.21	Good combustion practices	164	LB/MMBTU
FL-0354	LAUDERDALE PLANT	FL	0110037-013-AC	08/25/2015	Emergency fire pump engine, 300 HP	17.21	Lowest-emitting available fuel	---	---
ID-0021	MAGNIDA	ID	P-2013.0030	04/21/2014	FIRE WATER PUMP ENGINE	17.21	Not Specified	22.6	LBS.

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
IL-0129	CPV THREE RIVERS ENERGY CENTER	IL	16060032	07/30/2018	Firewater Pump Engine	17.21	Not Specified	---	---
IL-0130	JACKSON ENERGY CENTER	IL	17040013	12/31/2018	Firewater Pump Engine	17.21	Not Specified	241	TONS/YEAR
IL-0133	LINCOLN LAND ENERGY CENTER	IL	18040008	07/29/2022	Fire Water Pump Engine	17.21	Not Specified	92	TONS/YEAR
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Firewater Pump Engine	17.21	Not Specified	25	TONS/YEAR
KS-0030	MID-KANSAS ELECTRIC COMPANY, LLC - RUBART STATION	KS	C-13309	03/31/2016	Compression ignition RICE emergency fire pump	17.21	Not Specified	2.6	G/HP-HR
LA-0301	LAKE CHARLES CHEMICAL COMPLEX ETHYLENE 2 UNIT	LA	PSD-LA-779	05/23/2014	Firewater Pump Nos. 1-3 (EQTs 997, 998, & 999)	17.21	Compliance with 40 CFR 60 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage	10	TPY
LA-0306	TOPCHEM POLLOCK, LLC	LA	PSD-LA-815	12/20/2016	Pump Engines DFP-16-1 (EQT036)	17.21	Good Combustion Practices	13	T/YR
LA-0306	TOPCHEM POLLOCK, LLC	LA	PSD-LA-815	12/20/2016	Pump Engine DFP-16-2 (EQT037)	17.21	Good Combustion Practices	13	T/YR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Firewater Pump Engines	17.21	Not Specified	---	---
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Firewater Pump 1	17.21	Good combustion practices	---	---
LA-0314	INDORAMA LAKE CHARLES FACILITY	LA	PSD-LA-813	08/03/2016	Diesel Firewater pump engines (6 units)	17.21	Not Specified	---	---
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	firewater pump engines (8 units)	17.21	good combustion practices	---	---
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39A	17.21	Good Combustion Practices	28	T/YR
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39B	17.21	Good Combustion Practices	28	T/YR
LA-0370	WASHINGTON PARISH ENERGY CENTER	LA	PSD-LA-829(M-1)	04/27/2020	Emergency Fire Pump Engine (EQT0021, ENG-1)	17.21	Good combustion practices in order to comply with 40 CFR 60 Subpart IIII	9	TPY
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Fired Water Pump Engine	17.21	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	74.21	KG/MM BTU
LA-0402	DESTREHAN OIL PROCESSING FACILITY	LA	PSD-LA-855	12/13/2023	HLK39 - Emergency Diesel Fire Pump Engine (EQT0094)	17.21	Good Combustion Practices	12	T/YR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MA-0039	SALEM HARBOR STATION REDEVELOPMENT	MA	NE-12-022	01/30/2014	Fire Pump Engine	17.21	Not Specified	162.85	LB/MMBTU
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices	13.58	T/YR
MI-0424	HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	MI	107-13C	12/05/2016	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices.	55.6	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (South Plant): Fire pump engine	17.21	Good combustion practices.	85.6	T/YR
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (North Plant): Fire pump engine	17.21	Good combustion practices.	85.6	T/YR
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUFPENGINE: Fire pump engine	17.21	Energy efficient design	86	T/YR
MI-0445	INDECK NILES, LLC	MI	75-16B	11/26/2019	EUFPENGINE (Emergency engine-diesel fire pump	17.21	Good combustion practices	13.58	T/YR
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUFPENGINE (North Plant): Fire Pump Engine	17.21	Good combustion practices	85.6	T/YR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUFPENGINE (South Plant): Fire pump engine	17.21	Good combustion practices.	85.6	T/YR
OH-0363	NTE OHIO, LLC	OH	P0116610	11/05/2014	Emergency Fire Pump Engine (P003)	17.21	Emergency operation only, < 500 hours/year each for maintenance checks and readiness testing designed to meet NSPS Subpart IIII	75	T/YR
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency fire pump engine (P004)	17.21	Efficient design	41	T/YR
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency fire pump engine (P004)	17.21	Efficient design	90	T/YR
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Fire Pump Diesel Engine (P008)	17.21	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	123	T/YR
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency fire pump engine (P004)	17.21	Efficient design	87	T/YR
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	87	T/YR
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Fire Pump (P006)	17.21	good operating practices (proper maintenance and operation)	29	T/YR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0376	IRONUNITS LLC - TOLEDO HBI	OH	P0123395	02/09/2018	Emergency diesel-fueled fire pump (P006)	17.21	Equipment design and maintenance requirements	163.6	LB/MMBTU
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Fire Pump (P004)	17.21	Efficient design and proper maintenance and operation	18.67	T/YR
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Firewater Pumps (P005 and P006)	17.21	good operating practices (proper maintenance and operation)	23	T/YR
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	275 hp (205 kW) Diesel-Fired Emergency Fire Pump Engine	17.21	Good combustion practices and proper maintenance and operation	162.7	LB/MMBTU
OK-0164	MIDWEST CITY AIR DEPOT	OK	2009-394-C(M-2)PSD	01/08/2015	Diesel-Fueled Fire Pump Engines	17.21	1. Good Combustion Practices. 2. Efficient Design.	44	TONS PER YEAR
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Fire pump engine	17.21	Not Specified	9	TON
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Fire Pump	17.21	Not Specified	91.3	T/YR
TX-0753	GUADALUPE GENERATING STATION	TX	PSD-TX-1310-GHG	12/02/2014	Fire Water Pump Engine	17.21	Not Specified	15.71	TPY CO2E

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
TX-0757	INDECK WHARTON ENERGY CENTER	TX	PSD-TX-1374-GHG	05/12/2014	Firewater Pump Engine	17.21	Not Specified	5.34	TPY CO2E
TX-0758	ECTOR COUNTY ENERGY CENTER	TX	GHGPSDTX1366	08/01/2014	Firewater Pump Engine	17.21	Not Specified	5	TPY CO2E
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED WATER PUMP 376 bph (1)	17.21	Good Combustion Practices/Maintenance	104	T/YR
VA-0328	C4GT, LLC	VA	52588	04/26/2018	Emergency Fire Water Pump	17.21	good combustion practices and the use of ultra low sulfur diesel (S15 ULSD) fuel oil with a maximum sulfur content of 15 ppmw.	1040	T/YR
WI-0292	GREEN BAY PACKAGING INC. MILL DIVISION	WI	19-DMM-001	04/01/2019	P37 Diesel-Fired Emergency Fire Pump	17.21	Hours of Operation	200	HOURS
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Fire Pump (P06)	17.21	Be certified by manufacturer to EPA's criteria for Tier 3 reciprocating internal combustion engines and to the 40 CFR 60, Subpart IIII emission limitations, operation limited to 500 hours/year, and operate and maintain according to the manufacturer's recommendations.	---	---
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Fire Pump Engine	17.21	Not Specified	309	LB/H
WY-0076	ROCK SPRINGS FERTILIZER COMPLEX	WY	MD-14824	07/01/2014	Fire Water Pump Engine	17.21	limited to 500 hours of operation per year	58	T/YR

Attachment 2
Semiconductor Permit Review Summary

Summary of Semiconductor Manufacturing Permits

Source Type	Permit Emission Unit Description	Permittee	State	Permit ID	Issue Date	Pollutant	Control Technology	Permit Limit
Semiconductor Process Tool Emissions	Semiconductor Fab Tool Processes	Intel Corp	AZ	P0009315	1/11/2016	GHG	POU Abatement Devices	---
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	GHG	POU Abatement Devices	---
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	GHG	POU Abatement Devices	---
Semiconductor Process Tool Emissions	Semiconductor Fabrication	Intel Corp	OH	P0132323	9/20/2022	CO2e		774,419 tons per rolling, 12-month period
Semiconductor Process Tool Emissions	Wafer Fabrication in Building B323 and B323A Collapse Chip Connection (C4) Plating Operation in B320 R&D and Post-Fab Activities	OnSemi	NY	3-1328-00025/01029	11/28/2023	GHG	All sources of per fluorinated gases (F-gases) are equipped with point-of-use (POU) abatement.	--

APPENDIX M. VOC LAER ANALYSIS

This appendix presents the lowest achievable emission rate (LAER) determinations for the control of volatile organic compound (VOC) emissions from the emission sources at the Proposed Air Permit Project. Micron has reviewed the RACT/BACT/LAER Clearinghouse (RBLC), documentation from the Bay Area Air Quality Management District (BAAQMD), and relevant semiconductor fab permits to identify appropriate technologies and/or limits for emission source categories. Additional details of the full search are provided in Section 5.4 of the Micron Clay Air Permit Application. As the add-on control technologies and other control mechanisms are similar for many of the sources that Micron operates, types of control technologies identified are summarized in Section 1.1 of this appendix. Not all technologies are applicable to all emission sources, and as such, source-specific considerations for each source category are discussed in the subsequent sections.

Emission sources evaluated in this LAER analysis include:

- Natural gas-fired boilers;
- Natural gas-fired water bath vaporizers;
- Diesel-fired emergency generator engines;
- Diesel-fired emergency fire pump engine;
- Semiconductor process tools and other process and support operations that emit VOC;
- Volatile organic liquid storage tanks;
- Wastewater Treatment Processes;
- Use of Heat Transfer Fluids; and
- Lab Process Emissions

At the time of the Permit Application 1, Micron had not undertaken detailed design of the Proposed Air Permit Project's wastewater treatment (WWTP). Based on the current WWTP design details for the Permit Application 2, the VOC LAER evaluation has been completed in Section 1.7 of this appendix.

1.1 Available Technology Summary

The technologies identified to mitigate VOC emissions are described in the following subsections.

1.1.1 Tier 4 Compliant Emergency Generator Engines

Engines meeting Tier 4 emission standards are designed with a focus on reducing emissions, including VOC, to meet stringent environmental and regulatory standards. These engines utilize various engineering and technological advancements to minimize VOC emissions while maintaining performance and efficiency.

1.1.2 Good Combustion and Maintenance Practices for Fuel-Fired Equipment

Good combustion and maintenance practices are essential for operating fuel-fired equipment efficiently and effectively while minimizing VOC emissions. For this source category, good combustion practices are generally considered to be implementing the manufacturer's recommendations which may include a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Minimizing emergency generator engine idle time at startup;
- Conducting operator training; and
- Conducting periodic maintenance.

1.1.3 Oxidation Catalyst, Catalytic Controls, or Catalytic Oxidation Systems

Catalytic oxidation (also known as catalytic controls or catalytic incineration) can be used to oxidize an oxidizable compound in an air stream, including VOC. As such, the use of catalytic oxidation is an effective method for reducing VOC emissions.[1]

1.1.4 VOC Capture and Control Systems

VOC capture and control systems are designed to control VOC emissions by intercepting and containing or treating air contaminants before they are released into the atmosphere. In these systems, the exhaust stream is directed to treatment units, such as adsorption beds or condensation systems, where VOCs are removed or recovered before clean air is released into the environment. Capture systems employ various types of technologies to effectively collect and contain VOC emissions, including different types of adsorption materials as well as systems with recovery or regeneration.

While there are several adsorption material options, zeolite or carbon-based adsorption systems are most often used. The choice between zeolite and activated carbon for capturing VOC emissions depends on various factors, including the specific characteristics of the VOCs, the process conditions, and the overall objectives of the emission control system. Zeolite rotary concentrators are particularly favored in the semiconductor industry due to their high adsorption capacity, energy efficiency, and ability to handle fluctuating VOC concentrations.

In the semiconductor industry, zeolite rotary concentrators are strategically placed on process vent streams that generate VOCs, and the concentrator's rotating wheel adsorbs VOCs from the air stream. Then, the zeolite rotor rotates into a desorption zone where the captured compounds are released in a lower flowrate, higher concentration stream and collected for further treatment or recovery. Increasing the concentration of VOC in the stream prior to treatment reduces the energy and quantity of fuel required for effective treatment. Zeolite-based adsorption systems coupled with a recuperative thermal oxidation system, referred to collectively as rotor-concentrator thermal oxidizers (RCTOs), are commonly used in the semiconductor industry to treat VOC.

1.1.5 Tool-Level Thermal Oxidation Systems

In thermal oxidation systems, VOC-laden process exhaust is heated to high temperatures, causing the air contaminants to combust and convert into carbon dioxide (CO_2) and water vapor. Point-of-use (POU) control

[1] EPA Cost reports and Guidance for Air Pollution Regulations, Section 3 – VOC Controls, Chapter 2 - Incinerators and Oxidizers", U.S. Environmental Protection Agency, EPA-450/3-79-006.

devices mitigate emissions of certain process gases (e.g., fluorinated greenhouse gases [F-GHG]), some of which are also classified as VOCs.

Thin films process tools often include process equipment exhaust conditioners (PEECs) as required safety equipment to manage process gases that are pyrophoric, flammable, toxic, or incompatible with other process gases or the ductwork. Thin films PEECs may incidentally manage VOC emissions that are comingled with these hazardous materials.

1.1.6 Centralized Regenerative Catalytic Systems

The use of catalytic oxidation via centralized regenerative catalytic systems (RCS) may control emissions of F-GHGs, some of which are also classified as VOCs, by combining exhausts from several plasma etch process tools rather than operating tool-level thermal-based oxidation systems described in Section 1.1.5 of this analysis.

1.1.7 Process Chemical Substitution

Chemical substitution in semiconductor manufacturing involves using alternative chemicals with lower VOC emissions. For instance, selecting photoresists and developers with lower VOC content and opting for alternative cleaning solvents and etchants can significantly reduce the release of VOC-containing compounds.

1.1.8 Use of Ultra-Low-Sulfur Diesel for Emergency Generator Engines

The utilization of ultra-low-sulfur diesel (ULSD) in diesel-fired engines effectively controls VOC emissions through reduced sulfur-related VOCs and by promoting cleaner combustion and more efficient utilization of fuel.

1.1.9 Operating Limitations

Limiting the hours of operation for engines, water bath vaporizers, and boilers reduces VOC emissions by decreasing the overall time the equipment runs and consumes fuel.

1.1.10 Good Operating and Maintenance Practices for Storage Tanks

Good operating and maintenance practices for volatile organic liquid (VOL) storage tanks and waste organic tanks that contain or contact hazardous wastes reduce VOC emissions by ensuring proper tank sealing, regular inspections to detect and repair leaks promptly, and implementing preventive maintenance to minimize equipment failures and emissions.

1.1.11 Efficient Tank Design to Minimize VOC Emissions

For the purposes of VOL storage tanks, efficient design to reduce VOC emissions is typically based on the size of the storage tank. For tanks $\leq$20,000 gallons storage capacity, the RBLC search indicated that closed tanks equipped with submerged fill pipes represent the best available control design technology. The RBLC results also included painting tanks a light color, which is understood to reduce solar insolation and therefore reduce the impacts of diurnal breathing of the tank (also referred to as standing losses).[2] This applies to tanks located outside and subject to solar insolation.

1.1.12 Waste Minimization and Efficient Design

Reducing the generation of the waste at the source reduces the VOC loading of the wastewater and thus lowers VOC emissions generated in the wastewater treatment process. Additionally, the use of a biological treatment unit results in the degradation of VOC in the wastewater and reduces VOCs.

1.1.13 Flaring of Wastewater Treatment Emissions

Flaring is a combustion control process in which gases are piped to a remote, usually elevated, location and burned in an open flame in the open air using a specially designed burner tip, auxiliary fuel, and steam or air to promote mixing for nearly complete destruction. It is commonly used for control in the petroleum and petrochemical industry.[3]

1.1.14 Steam Stripper and Condenser

Steam stripping involves the fractional distillation of wastewater to remove VOC from the wastewater stream. The steam heat comes in contact with wastewater and vaporizes VOCs, which are further condensed and separated.

1.1.15 Air Stripping

Air stripping involves using vapor-liquid equilibrium to increase the transfer rate of VOC into the vapor phase. The demonstrated applications for the air stripper include the treatment of contaminated ground water, landfill leachate, and contaminated drinking water.

1.1.16 Control Technologies Not Evaluated

Some control technologies have been omitted from the LAER evaluation due to various considerations. These control technologies, and the reasons for their omission, are summarized in Table 1-1.

Table 1-1. Summary of Control Technologies Not Evaluated

Emission Source Category	Technology	Reasoning
All Source Categories	Use of Alternate Fuels	The use of different fuel or raw material that would redefine the Proposed Air Permit Project are out of the scope of BACT and LAER evaluations. Where different fuel specifications within the fuel type (i.e., use of ULSD) are feasible for the project, they have been identified above in Section 1.1 and are evaluated in the sections following this table.

[2] AP-42 Vol. I, Chapter 7: Liquid Storage Tanks, Section 7.1.3.1 Routine Losses From Fixed Roof Tanks, June 2020.

[3] EPA Guidance "Control of Volatile Organic Compound Emissions from Industrial Wastewater". Accessed January 2025, https://www.epa.gov/sites/production/files/2020-09/documents/199404_voc_nrid_industrial_wastewateract.pdf

Emission Source Category	Technology	Reasoning
Natural Gas-Fired Combustion Devices	Low-NO_X Burners (LNB) / Ultra Low-NO_X Burners (ULNB)	LNBs and ULNBs are used to reduce NO_X emissions and are not used to reduce VOC emissions. In some cases, they may lead to an increase of VOC emissions due to reduced combustion efficiency; therefore, they are not evaluated further in this LAER analysis.[4]
	Flue Gas Recirculation (FGR)	FGR is used to reduce NO_X emissions and is not used to reduce VOC emissions. In some cases, it may lead to an increase of VOC emissions due to reduced combustion efficiency; therefore, it is not evaluated further in this LAER analysis.[5]
Diesel-Fired Emergency Generator Engines and Diesel-Fired Emergency Fire Pump Engine	Turbocharger	EPA documentation suggests that turbocharging does not impact VOC emissions for fuel-fired engines; therefore, this technology is not evaluated further.[6]
Diesel-Fired Emergency Generator Engines and Diesel-Fired Emergency Fire Pump Engine	Intercooler/Aftercooler	EPA documentation suggests that intercoolers and aftercoolers do not impact VOC emissions for fuel-fired engines; therefore, this technology is not evaluated further.[7]
Semiconductor Process Tools, PEECs, and Cleaning Operations	Wet Scrubbers	The primary purpose of wet scrubbers is to control acid and alkaline gases, not VOC emissions. Further, use of wet scrubbing systems to specifically control VOC emissions from semiconductor process tools has not been demonstrated in practice in the semiconductor industry. For these reasons, this control technology is not evaluated further in this LAER evaluation.
	Catalytic Oxidation	The use of a catalytic oxidizer to control VOC emissions from semiconductor process tools and PEECs has not been demonstrated on a commercial scale. Further, catalytic oxidation poses significant catalyst poisoning and plugging problems. For example, PM generated through combustion of silicon-containing compounds, which can be oxidized to silicon dioxide in the preheater, would quickly foul the catalyst. Therefore, it is not discussed further here.

4 AP-42 Vol. I, Chapter 1.4: Natural Gas Combustion.

5 Ibid.

6 AP-42 Vol. I, Chapter 3.3: Gasoline And Diesel Industrial Engines.

7 Ibid.

Emission Source Category	Technology	Reasoning
Volatile Organic Liquid Storage Tanks	Catalytic Oxidation	Based on the resources reviewed described in the introduction to this appendix, the use of a catalytic oxidizer to control VOC emissions from organic liquid storage tanks has not been demonstrated in practice on a commercial scale. Therefore, it is not discussed further here.
	Wet Scrubbers	In the semiconductor industry, exhaust gases from storage tanks may be routed to centralized wet scrubbers, depending on the composition of the material stored within the tank. The primary purpose of these centralized wet scrubbers is to control acid and alkaline gases, not VOC emissions. There have not been any use cases of VOC control using wet scrubbers on storage tanks in the semiconductor industry. For these reasons, this control technology is not evaluated further.
	Stage I Vapor Recovery	Stage I Vapor Recovery generally applies to filling gasoline storage vessels for motor vehicle fuel dispensing facilities. Since this does not relate to the semiconductor fab operations at the Proposed Air Permit Project, it is not evaluated further.[8]
Volatile Organic Liquid Storage Tanks	Flare	Flaring is a combustion control process in which gases are piped to a remote, usually elevated, location and burned in an open flame in the open air using a specially designed burner tip, auxiliary fuel, and steam or air to promote mixing for nearly complete destruction. It is commonly used in the petroleum and petrochemical industry[9] where vent streams are variable in VOC concentration and flow, and use of a flare to control VOC emissions from storage tanks has not been demonstrated in practice in the semiconductor industry; therefore, it is not discussed further here.
Wastewater Treatment Plant	Catalytic Oxidation	Based on the resources reviewed described in the introduction to this appendix, the use of a catalytic oxidizer to control VOC emissions from wastewater treatment plants has not been demonstrated in practice on a commercial scale. Therefore, it is not discussed further here.

[8] TCEQ Guidance on Stage I Vapor Recovery.
[9] EPA Chapter 2: Incinerators and Oxidizers, November 2017.

Emission Source Category	Technology	Reasoning
	Combustion in Boiler and/or Process Heater	Organic vapors could be destructed through combustion in a boiler or process heater by either premixing the vapors with a gaseous fuel prior to combustion in the burner or by firing the organic vapor through a separate retrofit burner. The use of process gas as fuel would redefine the scope of the Proposed Air Permit Project and is therefore out of the scope of BACT and LAER evaluations. Further, while this technique has been demonstrated in practice for vent gases from chemical manufacturing, petroleum refining, and pulp and paper manufacturing process units, it has not been demonstrated in practice for the semiconductor industry based on the resources reviewed described in the introduction to this appendix.

1.2 Natural Gas-Fired Boilers

Natural gas-fired boilers are heating systems used to generate hot water or steam for maintaining precise temperature control for various stages of production, ensuring the efficient operation of machinery. Micron is proposing to use efficient units that are specifically designed to meet the Proposed Air Permit Project's thermal requirements while minimizing energy consumption and emissions.

The LAER analysis for VOC emissions from natural gas-fired boilers is presented in this section.

1.2.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing VOC emissions from the proposed natural gas-fired boilers:

- Good combustion and maintenance practices;
- Oxidation catalysts; and
- Operating hour limitations.

In addition to identifying specific control technologies, Micron has identified potentially relevant numerical emission limits that could be considered LAER for natural gas-fired boilers. Proposed LAER emission limits are discussed further in Step 4.

1.2.2 Step 2. Eliminate Technically Infeasible Options

For oxidation catalysts to be effective, waste gases must be heated by auxiliary burners to approximately 600 to 800°F before entering the catalyst bed. The maximum design exhaust temperature of the catalyst is typically 1,000 – 1,250°F.[10] Since the typical exhaust temperature of natural gas-fired boilers is between

[10] EPA Air Pollution Control Technology Fact Sheet for Catalytic Incinerators (EPA-452/F-03-018).

350 – 500°F, which is below the operating range for an oxidation catalyst, additional auxiliary fuel would be required to heat the stream to the required temperature, creating additional combustion emissions. Therefore, the use of an oxidation catalyst is not considered feasible.

1.2.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking remaining control technologies by control effectiveness is unnecessary and the next step is to select LAER.

1.2.4 Step 4. Select LAER

Micron intends to purchase natural gas-fired boilers designed to meet a VOC emission limit of 0.0017 lb/MMBtu as LAER. This is the lowest emission limitation identified in the RBLC search conducted. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results. Micron will also implement the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

In addition, Micron proposes an operating hours limit of 6,000 hours per year for each boiler.

Note that the emission limit identified is different than Permit Application 1 due the separation of "natural gas-fired combustion equipment" into boilers and water bath vaporizers.

A LAER limit must not be higher than an applicable New Source Performance Standard (NSPS) emission limit. The boilers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for VOC for natural gas-fired steam generating units.

1.3 Natural Gas-Fired Water Bath Vaporizers

This Permit Application 2 separates "natural gas-fired combustion equipment" into boilers and water bath vaporizers. Natural gas-fired water bath vaporizers are used in the semiconductor industry to provide a reliable and efficient source of high-purity nitrogen gas. These water bath vaporizers use natural gas to heat water that is used to vaporize liquified nitrogen used in semiconductor manufacturing.

The LAER analysis for VOC emissions from natural gas-fired water bath vaporizers is presented in this section.

1.3.1 Step 1. Identify All Control Technologies

The following control methods have been identified reducing VOC emissions from the proposed natural gas-fired water bath vaporizers:

- Good combustion and maintenance practices;
- Oxidation catalysts; and
- Operating hour limitations.

In addition to identifying specific control technologies, Micron has identified potentially relevant numerical emission limits that could be considered LAER for natural gas-fired water bath vaporizers. Proposed LAER emission limits are discussed further in Step 4.

1.3.2 Step 2. Eliminate Technically Infeasible Options

For oxidation catalysts to be effective, waste gases must be heated by auxiliary burners to approximately 600 to 800 °F before entering the catalyst bed. The maximum design exhaust temperature of the catalyst is typically 1,000 – 1,250 °F.[11] This is outside of the range of the proposed natural gas-fired water bath vaporizers, and, therefore, additional auxiliary fuel would be required to heat the stream to the required temperature, creating additional combustion emissions. Additionally, there are no instances of oxidation catalysts being used in practice to control VOC emissions from water bath vaporizers of any size based on the RBLC search conducted. Therefore, the use of an oxidation catalyst is not considered feasible.

1.3.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All remaining control technologies identified are considered technically feasible and can be used in combination. As a result, ranking the remaining control technologies by control effectiveness is unnecessary and the next step is to select LAER.

1.3.4 Step 4. Select LAER

Micron intends to purchase natural gas-fired water bath vaporizers designed to meet a VOC emission limit of 0.0054 lb/MMBtu as LAER. This is the lowest emission limitation identified in the RBLC search conducted. Refer to Attachments 1 through 3 of this Appendix for complete documentation of the search results.

Micron will also implement the manufacturer's recommendations for good combustion and maintenance practices, including a combination of the following:

- Optimizing the air-fuel ratio;
- Maintaining proper insulation;
- Establishing proper combustion zone temperature control;
- Conducting operator training; and
- Conducting periodic maintenance.

---

[11] EPA Air Pollution Control Technology Fact Sheet for Catalytic Incinerators (EPA-452/F-03-018).

In addition, Micron proposes an operating hours limit of 8,000 hours per year for all water bath vaporizers (combined) with no more than four units operating at a time.

Note that the emission limit identified is different than Permit Application 1 due to the separation of "natural gas-fired combustion equipment" into boilers and water bath vaporizers.

A LAER limit must not be higher than an applicable New Source Performance Standard (NSPS) emission limit. The water bath vaporizers will be affected facilities under 40 CFR Part 60 Subpart Dc (NSPS Subpart Dc), "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units." However, NSPS Subpart Dc does not include an emission limit for VOC for natural gas-fired steam generating units.

1.4 Diesel-Fired Emergency Generator Engines

The Proposed Air Permit Project will utilize diesel-fired emergency generator engines to ensure that critical life safety and process safety systems receive uninterrupted power during power outages. These units will not be designed to run manufacturing operations during major electrical outages and instead will allow equipment and processes to shut down gradually as necessary, protecting sensitive manufacturing operations, preventing unsafe conditions from forming in the fabs, reducing emissions of process gases directly to the atmosphere, and protecting employee safety.

1.4.1 Step 1. Identify All Control Technologies

Diesel-fired emergency generator engine technology and associated emission standard requirements are well known and are considered by many regulatory entities to meet LAER. These standards are based on the engine's maximum power capacity and the year in which the engine was manufactured. Currently, the EPA has implemented the Tier 4 Final emission standards for non-road diesel engines, which set stringent limits for newly-manufactured units.[12] EPA has also set limitations for stationary internal combustion engines under 40 CFR Part 60 Subpart IIII (NSPS Subpart IIII), "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." For engines with certain power capacity and manufacture year, NSPS Subpart IIII references the engine standards established for nonroad engines under 40 CFR 1039.

In addition, the following control methods have been identified for reducing VOC emissions from the proposed diesel-fired emergency generator engines:

- Good combustion and maintenance practices;
- Operating hour limitations; and
- Use of ULSD.

1.4.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 for diesel-fired emergency generator engines are technically feasible.

[12] 40 CFR 1039.101

1.4.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 4, Micron is proposing to use all identified control technologies to achieve LAER. As a result, ranking the remaining control technologies is unnecessary.

1.4.4 Step 4. Select LAER

The following control technologies are proposed to achieve LAER for diesel-fired emergency generator engines:

- Purchase of an engine compliant with Tier 4 emission standards;
- Good combustion and maintenance practices, including a combination of the following:
  - Minimizing engine idle time at startup;
  - Optimizing the air-fuel ratio;
  - Maintaining proper insulation;
  - Establishing proper combustion zone temperature control;
  - Conducting operator training; and
  - Conducting periodic maintenance
- Operating hour limitations; and
- Use of ULSD.

A LAER limit must not be higher than an applicable NSPS emission limit. The diesel-fired generators will be affected facilities under 40 CFR Part 60 Subpart IIII (NSPS Subpart IIII), "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." NSPS Subpart IIII provides non-methane hydrocarbon (NMHC) emission standards for various engine power and displacement categories. However, these emission standards are less stringent than the diesel Tier 4 Final emission standards.

Therefore, Micron is proposing the Tier 4 Final emission standards outlined in Table 1-2 as the LAER VOC limits for diesel-fired emergency generator engines and will procure new engines for the Proposed Air Permit Project that meet these standards. Control technologies to achieve Tier 4 Final emission standards may vary depending on the engine manufacturer and may include the use of catalytic oxidation, where that technology is available and appropriate. In addition, Micron will fire only ULSD in the diesel-fired emergency generator engines and proposes an operating hours limit of 100 hours per year for each engine.

Table 1-2. 40 CFR §1039.101
Tier 4 Final Exhaust Emission Standards After the 2014 Model Year, g/kW-hr (g/bhp-hr)

Maximum Engine Power	Application	NMHC Emission Standard	NO_X + NMHC Emission Standard
kW <19	All	---	7.5
19 ≤ kW <56	All	---	4.7
56 ≤ kW <130	All	0.19	---
130 ≤ kW ≤560	All	0.19	---
	Generator Sets	0.19 (0.14)	---
kW >560	All Except Generator Sets	0.19	---

1.5 Diesel-Fired Emergency Fire Pump Engine

The Proposed Air Permit Project will include one diesel-fired emergency fire pump engine to provide a reliable power source in the event of a fire occurring during a power outage when the electric fire pump would not be available.

1.5.1 Step 1. Identify All Control Technologies

Diesel-fired emergency fire pump engine technology and associated emission standard requirements are well known and are considered by many regulatory entities to meet LAER. These standards are based on the fire pump engine's maximum power capacity and the year in which the engine was manufactured. EPA has set limitations for stationary internal combustion engines, including fire pump engines, under NSPS Subpart IIII. The EPA has also implemented Tier emission standards (Tier 1 – Tier 4 Final) for non-road diesel engines, which set stringent limits for newly manufactured units. Based on the RBLC search conducted, as well as input from Micron's equipment vendors, Tier 4 compliant fire pump engines are not available. As such, the most stringent emission standards are Tier 3, which align with NSPS IIII emission standards for the proposed fire pump engine for VOC.

In addition, the following control methods have been identified for reducing VOC emissions from the proposed diesel-fired emergency generator engines:

- Good combustion and maintenance practices;
- Operating hour limitations; and
- Use of ULSD.

1.5.2 Step 2. Eliminate Technically Infeasible Options

All of the control technologies identified in Step 1 for diesel-fired emergency generator engines are technically feasible.

1.5.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

All control technologies identified are considered technically feasible and can be used in combination. As discussed further in Step 4, Micron is proposing to use all identified control technologies to achieve LAER. As a result, ranking the remaining control technologies is unnecessary.

1.5.4 Step 4. Select LAER

The following control technologies are proposed to achieve LAER for diesel-fired emergency generator engines:

- Purchase of an engine compliant with emission standards;
- Good combustion and maintenance practices, including a combination of the following:
  - Minimizing engine idle time at startup;
  - Optimizing the air-fuel ratio;
  - Maintaining proper insulation;
  - Establishing proper combustion zone temperature control;

- Conducting operator training; and
- Conducting periodic maintenance
- ► Operating hour limitations; and
- ► Use of ULSD.

A LAER limit must not be higher than an applicable NSPS emission limit. The diesel-fired emergency fire pump engine will be an affected facility under NSPS Subpart IIII. NSPS Subpart IIII provides NMHC emission standards for various engine power and displacement categories. For the capacity of the proposed diesel-fired emergency fire pump engine, NSPS IIII emission standards align with Tier 3 emission standards.

Therefore, Micron is proposing compliance with the NSPS IIII and Tier 3 emission standard (which is inclusive of NO_X and NMHC) of 3.0 grams per brake horsepower-hour (g/bhp-hr) as LAER for the diesel-fired emergency fire pump engine. Control technologies to achieve the emission standard may vary depending on the engine manufacturer and may include the use of catalytic oxidation, where that technology is available and appropriate. In addition, Micron will fire only ULSD in the diesel-fired emergency fire pump engine and proposes an operating hours limit of 500 hours per year.

1.6 Semiconductor Process Tools, PEECs, and Cleaning Operations

Micron is proposing to install semiconductor process equipment, or "tools", as discussed within the Micron Clay Air Permit Application. VOC-containing materials are utilized in these semiconductor fab process tools and emitted through various operations, including VOC-containing solvents in photoresist operations, gases and liquid precursors in deposition processes, etching and stripping chemicals, cleaning solutions, solvents, measurement processes and more. Micron is also proposing to use isopropanol (IPA) for cleaning of tools, workspaces, and other surfaces within the semiconductor fab. Methanol will also be used for a specific cleaning application as part of the photolithography process. Micron will also employ heat transfer fluids (HTFs) (some of which are VOCs) in closed loop process chillers to cool process equipment. As cleaning solvents and HTFs will be used throughout the fab, much of the VOC emissions generated from the IPA and HTF usage will originate in the cleanroom environment and be drawn through various cleanroom exhaust systems, including process and general exhaust. For that reason, cleaning is evaluated as part of the total VOC emissions in addition to those contributed by directly processing wafers in tools. Methanol used for cleaning as part of the photolithography process will exhaust to the solvent exhaust only and will be considered part of process tool emissions in this analysis.

Thin films PEECs generate VOC emissions through natural gas combustion and oxidation of process materials which are routed to process exhaust stacks.

Micron is also proposing to utilize a Spin On Dielectric (SOD) process which generates waste containing organic compounds. Micron will utilize a SOD waste collection and neutralization system to stabilize the waste to reduce its gas-producing potential before shipment to a Treatment, Storage, and Disposal Facility (TSDF).

The LAER analysis for VOC emissions from all the semiconductor processes mentioned above is presented in this section.

1.6.1 Step 1. Identify All Control Technologies

Upon review of the RBLC database, BAAQMD LAER guidance, and relevant semiconductor air permits, the following control methods have been identified for reducing VOC emissions from the proposed semiconductor manufacturing process tools and their associated emissions:[13]

- Good combustion and maintenance practices for thermal oxidation systems;
- Centralized RCS;
- VOC capture and control systems;
- Use of tool-level thermal oxidation systems; and
- Chemical substitution.

1.6.2 Step 2. Eliminate Technically Infeasible Options

VOC emissions control for semiconductor processes is complex. Some of the emissions control technologies identified are considered infeasible. These are discussed in the following sections.

1.6.2.1 VOC Capture and Control Systems

Capture systems without recovery/regeneration generate a considerable amount of waste and require frequent maintenance. Fixed-bed adsorbent-based systems without regeneration capacity have a finite adsorption capacity, meaning they can only adsorb a certain mass of VOCs before becoming saturated. These systems require frequent replacement or disposal, leading to increased waste generation and operational costs. Further, these systems would rely on either process downtime or redundant systems to ensure continuous control of VOC emissions. For these reasons, fixed-bed capture systems with no regeneration are considered technically infeasible.

Capture systems with liquid recovery via refrigeration or condensation systems which condense VOC in a vent stream are only functional for high-concentration VOC streams, typically in excess of 5,000 parts per million by volume (ppmv).[14] Exhaust VOC concentrations resulting from the Proposed Air Permit Project are expected to be significantly less than 5,000 ppmv and therefore capture systems with liquid recovery are not considered a feasible control option.

Capture systems relying on adsorption can be used for high-volumetric air flow streams over a range of inlet concentrations.[15] Adsorption based control equipment with recovery/regeneration is considered to be feasible.

---

[13] As acknowledged in the introduction to the BAAQMD BACT guidance, BAAQMD's definition of BACT is more stringent than the federal definition of BACT and aligns more closely with the federal definition of LAER. As such, BAAQMD LAER is used in place of BAAQMD BACT throughout this analysis.

[14] EPA Air Pollution Control Cost Manual, Sixth Edition, EPA/452/B-02-001, Section 3.1, Chapter 2 Refrigerated Condensers, January 2017

[15] EPA Air Pollution Control Cost Manual, Sixth Edition, EPA/452/B-02-001, Section 3.1, Chapter 1 Carbon Adsorbers, October 2018

A summary of different types of capture systems along with a summary of their infeasibility is discussed further in Table 1-4.

Table 1-4. Examples of Adsorption Systems and Feasibility Determination

System Type	Feasibility	Infeasibility Discussion
Fixed-Bed Capture Systems (No Regeneration)	Infeasible	▶ Finite Adsorption Capacity ▶ Significant Waste Generation ▶ Frequent Maintenance
Capture Systems with Liquid Recovery via Condensation	Infeasible	▶ Low VOC Concentration in Vent Stream
Capture Systems Equipped with Adsorption and Recovery/Regeneration (RCTO)	Feasible	▶ N/A

1.6.2.2 Chemical Substitution

The VOC chemicals that are used in Micron's technologies are based on multiyear process development. Each chemical serves a very specific role in the process (e.g., cleaning residue, adding layers to semiconductor wafers, etc.) and, in some cases, chemicals react to form other chemicals or control equipment forms VOC as byproducts. Micron is always evaluating the opportunity to optimize process chemical selection for its function and to minimize environmental effects, and the current plans for the proposed operations include use of chemicals that Micron has determined will minimize potential environmental effects and that can be used in fab operations. Micron has not identified any additional material substitutions at this time and thus has concluded that chemical substitution is not technically feasible for the Proposed Air Permit Project. However, Micron will continue to explore opportunities to utilize alternative processes and raw materials that result in lower VOC emissions.

1.6.2.3 Use of RCS With Metal Etch Process Tools

Metal etch tools, which constitute a subset of plasma etch tools that etch metal substrates, can generate metal oxide particulate matter in ductwork. The presence of metal oxide particulate in the exhaust would result in the fouling of the catalytic oxidation portion of an RCS unit. For this reason, the use of a centralized RCS is considered technically infeasible for the control of F-GHG from metal etch tools.

1.6.2.4 Exhaust Stream Incompatibilities

Some of the VOCs emitted from the process tools or created through combustion in thermal oxidation devices pose additional hazards, including toxicity, varying levels of acidity, and more. These air contaminants would have properties that would make it infeasible to combine certain exhaust streams. In addition, the process requires exhaust streams to be routed to control device(s) appropriate for the air contaminant to effectively control the primary air contaminants generated, such as wet scrubbers and process tool-specific control devices.

1.6.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

The use of all remaining control technologies is considered technically feasible. As discussed in more detail in Step 4, Micron is proposing to use a combination of all technically feasible control technologies to comply with the control efficiency limits identified as LAER. As a result, ranking the remaining control technologies is unnecessary.

1.6.4 Step 4. Select LAER

California's BAAQMD has adopted stringent limits for photolithography process tools, based on using highly efficient controls that are appropriate for processes and emissions sources. The BAAQMD defines LAER for photolithography operations as described in the bullets below. Note that the term photoresist is used in the BAAQMD's LAER determination rather than photolithography; however, it is understood that these terms are intended to refer to the same process tools as photolithography utilizes photoresist material. [16]

- ≥98.5% destruction/recovery efficiency if inlet VOC ≥2,000 ppmv (as methane);
- ≥97% efficiency if inlet VOC ≥200 to <2,000 ppmv (as methane);
- ≥90% efficiency if inlet VOC <200 ppmv (as methane); or
- ≤10 ppmv (as methane) at outlet.

These BAAQMD LAER limits were found to be the most stringent emission limitations achieved in practice. These limits, or similar but less prescriptive limits, have been incorporated into the permits of semiconductor manufacturing facilities reviewed as part of this LAER evaluation. Micron is therefore proposing compliance with these limits as LAER for VOC.

The following control technologies have been determined to be feasible for semiconductor process tool and PEEC VOC emissions:

- Good combustion and maintenance practices for thermal oxidation systems;
- Adsorption-based VOC capture and control systems; and
- Use of tool-level thermal oxidation systems.

The semiconductor industry standard for emission control of exhaust streams from process operations where VOC is the primary contaminant is a zeolite-based rotor concentrator capture system coupled with a recuperative thermal oxidizer system (e.g., an RCTO). This provides better adsorption effectiveness for process-generated VOCs, the capacity to recuperate waste combustion heat in heat exchangers, and the operating temperature flexibility for the proposed processes. For process exhaust streams where the primary constituent to be controlled is VOC, Micron will utilize a zeolite-based adsorption system coupled with a recuperative thermal oxidation system.

[16] As acknowledged in the introduction to the BAAQMD BACT guidance, BAAQMD's definition of BACT is more stringent than the federal definition of BACT and aligns more closely with the federal definition of LAER. As such, BAAQMD LAER is used in place of BAAQMD BACT throughout this analysis.

VOC capture and control systems employing adsorbent material, such as carbon, without subsequent combustion, are a technically feasible option for VOC control. Per the EPA Air Pollution Control Cost Manual, carbon adsorption is suitable for relatively dilute exhaust streams, however, the Manual does not provide clarification on what is considered to be dilute. The Manual does indicate that "carbon adsorbers can achieve high VOC removal efficiencies of 95 to 99 percent at input VOC concentrations of between 500 and 2,000 ppm in air".[17] This aligns with LAER limits proposed above.

Cleaning operations are required throughout semiconductor fabs, including for process tools, workspaces, and other surfaces. Because some, but not all, of the operations in which cleaning is necessary are routed to emissions control devices, it is very difficult to estimate the capture efficiency for cleaning operations. As a result, it is assumed that the VOC emissions from cleaning will be emitted through all process stacks and general exhaust stacks, not specifically routed to a VOC control device. The resulting VOC concentration from cleaning will be less than 1 ppmv in stack discharges due to the high exhaust flow rates.

1.6.4.1 Achieving Compliance with LAER Limits

Given the significant variability in processes and emissions across the fab, Micron will use a combination of technologies and work practice standards to achieve specified destruction and removal efficiencies (DRE) and/or the concentration-based (10 ppmv as methane) emission limits. These limits will apply to all semiconductor process operations and fab general exhausts. Control technologies may include combustion-based oxidation devices, such as RCTOs. Work practices include the implementation of good combustion and maintenance practices for combustion-based control devices and management of VOC-generating operations to limit VOC emissions, and/or operation and maintenance practices. In certain cases, work practice standards to limit VOC emission generation may be used without VOC emission control equipment in place.

1.6.4.2 Compliance Demonstration for all Semiconductor Manufacturing Process Exhaust Stacks

Compliance will be demonstrated for each type of exhaust stream and associated air pollution control devices (i.e., Acid Scrubbers, Ammonia Scrubbers) by performance testing a representative number of exhaust stacks and control device(s). When planning a stack testing campaign, Micron will propose the representative number and location of control devices to be tested in a stack test protocol submitted to the NYSDEC. If more than one of the same type of control device is tested in a given testing campaign, the average result of the test results of similar exhaust stacks, or the applicable equation below (RCTO Calculation 1 or 2), will be calculated as the compliance measurement. Initial compliance demonstration will be completed within 180 days after the date of startup of the first phase of semiconductor process operations. Ongoing compliance demonstrations will be completed once every five years following the initial compliance demonstration.

[17] Ibid.

1.6.4.2.1 Compliance Demonstration for Semiconductor Process Exhaust to RCTOs

Emissions from each RCTO will be vented through two (2) stacks, one (1) at the outlet of the thermal oxidizer (TO) that will contain the controlled emission stream and products of natural gas combustion, and one (1) for the rotor concentrators that will exhaust VOC emissions that were not collected by the zeolite. To demonstrate compliance with the LAER limits for RCTOs equipped with two stacks, Micron is proposing to use one or both of the following calculations to demonstrate compliance based on a mass and volumetric flow balance (calculation 1) and/or a mass balance (calculation 2).

RCTO Calculation 1: Concentration (ppmv) based compliance demonstration. The following calculation methodology will be used to demonstrate compliance using a flow averaging of VOC concentrations in the inlet duct and outlet stacks.

$$Combined\ ppmv\ = \frac{(TO\ ppmv\ \times\ TO\ scfm) + (Concentrator\ ppmv\ \times\ Concentrator\ scfm)}{(TO\ scfm + Concentrator\ scfm)}$$

Where:

- TO ppmv is the average concentration of total VOC in the TO exhaust stack measured over the course of the performance test by an appropriate EPA stack test method;
- TO scfm is the average volumetric flow rate of the TO exhaust stack measured over the course of the performance test as measured by EPA Methods 1 – 4;
- Concentrator ppmv is the average concentration of VOC in the stack that exhausts emissions from the rotor concentrator(s) measured over the course of the performance test by an appropriate EPA stack test method, and;
- Concentrator scfm is the average volumetric flow rate of the stack that exhausts emissions from the rotor concentrator(s) measured over the course of the performance test as measured by EPA Methods 1 – 4.

RCTO Calculation 2: Mass-based DRE compliance demonstration. The following calculating methodology will be used to demonstrate compliance by calculating a DRE on a mass basis using the two measured exhaust mass flow rates and the measured inlet mass flow rate.

$$\%\ DRE = \frac{(Duct\ Inlet\ Mass - (TO\ Outlet\ Mass + Concentrator\ Outlet\ Mass))}{Duct\ Inlet\ Mass} \times 100\%$$

Where:

- Duct inlet mass is the total mass of VOC determined to flow through the inlet duct to the control device during the performance test;
- TO outlet mass is the total mass of VOC determined to be emitted from the TO exhaust stack during the performance test; and

- Concentrator outlet mass is the total mass of VOC determined to be emitted from the stack that exhausts emissions from the rotor concentrator(s) during the performance test.

The total mass of VOC determinations made using Calculation 2 will be determined using EPA stack test methods that appropriate to measure the concentration VOC in the duct/stack, and the flow rate of the duct/stack as measured by EPA Methods 1 – 4.

For both Calculation 1 and Calculation 2 compliance demonstrations, Micron will submit test-specific EPA Methods to NYSDEC for approval prior to conducting compliance performance tests. Measurements are to be taken during a stack test that is no shorter than 60 minutes in duration.

1.7 Volatile Organic Liquid Storage

Micron is proposing to install fixed roof organic liquid storage tanks at the Proposed Air Permit Project. The bulk storage tanks will hold both raw materials that contain volatile organic liquids, such as IPA, tetramethyl ammonium hydroxide (TMAH), and propylene glycol methyl ether acetate (PGMEA), as well as waste organic liquids. VOC emissions from storage tanks primarily occur through evaporation and changes in temperature and pressure.

The following sections address the LAER analysis for the organic liquid storage tanks to be installed at the Proposed Air Permit Project.

1.7.1 Step 1. Identify All Control Technologies

The following control methods have been identified for reducing VOC emissions from the organic liquid storage tanks:

- Good operating and maintenance practices;
- Efficient equipment design to minimize VOC emissions;
- VOC capture and control systems; and
- Thermal oxidation systems.

1.7.2 Step 2. Eliminate Technically Infeasible Options

Some of the emissions control technologies identified are considered infeasible. These instances are discussed in the following section.

1.7.2.1 VOC Capture and Control Systems

The challenges in implementing certain VOC capture and control systems on VOL storage tanks are the same as those identified in Section 1.5.2.1. The summary of different types of capture systems along with a summary of their infeasibility is repeated below in Table 1-5.

Table 1-5. Examples of Adsorption Systems and Feasibility Determination

System Type	Feasibility	Infeasibility Discussion
Fixed-Bed Capture Systems (No Regeneration)	Infeasible	▶ Finite Adsorption Capacity ▶ Significant Waste Generation ▶ Frequent Maintenance
Capture Systems with Liquid Recovery via Condensation	Infeasible	▶ Low VOC Concentration in Vent Stream
Capture Systems Equipped with Adsorption and Recovery/Regeneration (RCTO)	Feasible	▶ N/A

1.7.3 Step 3. Rank Remaining Control Technologies by Control Effectiveness

The use of all remaining control technologies is considered feasible. As discussed in more detail in Step 4, Micron is proposing to use a combination of technically feasible control technologies to comply with the control efficiency limits identified as LAER. As a result, ranking the remaining control technologies is unnecessary.

1.7.4 Step 4. Select LAER

The BAAQMD LAER Guideline for fixed roof organic liquid storage tanks with capacities less than 20,000 gallons has indicated that vapor recovery systems with an overall system efficiency $\geq$ 95% control is LAER.[18] This represents the most stringent limitation identified as achieved in practice during this LAER evaluation and as such, Micron is proposing to achieve $\geq$ 95% overall reduction of VOC emissions from storage tanks as LAER. The following control technologies have been determined to be feasible for organic liquid storage tanks:

- Good operating and maintenance practices;
- Efficient tank design to minimize VOC emissions;
- Adsorption-based VOC capture and control systems; and
- Thermal oxidation systems.

To achieve $\geq$95% overall reduction of VOC emissions, Micron is proposing to use good operating and maintenance practices and procure storage tanks that are efficiently designed to reduce the potential for VOC emissions. This includes VOL containing tanks that are:

- Equipped with a submerged fill system to reduce emissions that occur during filling activities; and
- Located indoors or painted a light color or white when located outside to reduce emissions that occur due to standing losses.

[18] BAAQMD Best Available Control Technology (BACT) Guideline, Section 4, Storage Tanks – Fixed Roof, Organic Liquids, <20,000 gal. Accessed March 2024, https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook

At the time of Permit Application 1, the detailed design for Fab 1 and Fab 2 were in the early stages of development and control decisions were not made at the time of its submittal. However, for this Permit Application 2, Micron proposes the following to control VOC emissions from the VOL tanks in the HPM and FAB buildings:

- Ammonia Scrubber to control TMAH emissions; and
- RCTOs for all the other tanks

Lastly, certain volatile organic liquid waste storage tanks are expected to contain hazardous waste. These tanks would be equipped with nitrogen blanketing, conservation vents, and adequately sized pressure relief valves, so there are expected to be no emissions except for during upset conditions. These practices would minimize emissions of hazardous wastes with organic concentrations of at least 10 percent from storage tanks and equipment. Therefore, Micron is proposing these practices to achieve the LAER.

1.8 Wastewater Treatment Plant

Micron is proposing to install a wastewater treatment plant as a part of the Proposed Air Permit Project to treat high fluoride wastewater, industrial wastewater, and hydrocarbon in wastewater generated from the semiconductor process tools. The primary constituents in the influent wastewater contributing to VOC emissions from the process will be IPA, 1,2,4-Triazole, and N-Methyl-2-Pyrrolidone and other organic compounds. The facility discharges a portion of the treated wastewater to the nearest waterbody using the outfalls located at the Proposed Air Permit Project and reuses some of the treated wastewater and stored in the reclaimed water tank.

The emissions profile for VOC emissions from wastewater treatment plants is specific to the influent wastewater constituents and varies greatly based on the industry. For this reason, non-semiconductor industries including petroleum refining (which includes benzene, phenols and oils) and organics manufacturing like ethylene oxide and methanol were excluded from the RBLC search conducted for this LAER analysis.

In addition to the RBLC search, Micron reviewed the air permits for a representative selection of semiconductor fabs that manufacture 300-mm wafers within the United States as described in Section 5.4.4 of this Permit Application 2.

1.8.1 Step 1. Identify All Control Technologies

A review of the EPA’s RBLC database did not identify any entries of facilities that utilize control technology to abate VOC emissions that are generated from wastewater treatment plants in the semiconductor industry.

Micron also reviewed relevant semiconductor air permits to evaluate if any control technologies are currently being utilized to abate VOC emissions from wastewater treatment plants. During the review of these permits, it was determined that no add - on control devices are currently installed to abate such VOC emissions.

Nevertheless, Micron has evaluated the following control technologies which have been identified to potentially control VOC emissions from wastewater treatment plants in other industries:

- Flares;
- Steam strippers/condensers;
- Air strippers;
- Waste minimization; and
- Efficient wastewater treatment plant design to minimize VOC emissions.

1.8.2 Step 2. Eliminate Technically Infeasible Options

VOC emissions control in the treatment of wastewater from semiconductor processes is complex. Some of the emissions control technologies identified are considered infeasible. These are discussed in the following sections.

1.8.2.1 Air and Steam Stripping

Air and steam stripping have not been demonstrated in practice in the semiconductor industry. The primary purpose of both processes is to strip out volatile organic constituents from the wastewater, increasing the transfer rate into the vapor phase. While such technologies have been listed as control for wastewater treatment processes for some industries, the control applies to VOC content in the wastewater itself, and not to air emissions. To effectively reduce VOC emissions, the exhaust from the air or steam stripper would need to be routed to a secondary control device. For this reason, air and steam stripping are considered technically infeasible as controls for VOC emissions from the wastewater treatment plant.

1.8.2.2 Flaring

Flares have not been demonstrated in practice in the semiconductor industry. To implement flares as control for the wastewater treatment plant, the VOC containing exhaust stream would be combined with auxiliary fuel to raise the exhaust temperature to a level allowing for the conversion to carbon dioxide and water vapor. The combustion of the auxiliary fuel would result in additional emissions of regulated pollutants, including VOCs. Additionally, the VOC emissions presented in Appendix F for the wastewater treatment process are based on conservative estimates of organics concentrations in the wastewater and that actual emissions will be much lower. At the levels expected, the concentration of VOCs in the exhaust stream will be too low for the effective operation of flares. For these reasons, flares are considered infeasible for control of VOCs from the wastewater treatment process.

1.8.3 Step 3. Rank Remaining Control Technologies

Since the use of waste minimization and efficient design are the only identified control options, evaluating the most effective controls is unnecessary, and the next step is to select LAER.

1.8.4 Step 4. Select LAER

Given the diverse processes and complexity of semiconductor manufacturing, Micron is proposing to comply with a work practice standard to achieve LAER for VOC emitted from semiconductor process equipment in lieu of a formal limit. The proposed work practice standard includes the implementation of waste minimization and efficient design of the wastewater treatment plant, including the biodegradation of VOC in the wastewater stream through the use of a biological treatment unit.

1.9 Use of Heat Transfer Fluids

Fluorinated HTFs refer primarily to materials containing F-GHGs and VOCs that are used to regulate the temperature of semiconductor process tools and are a necessary component of safe and effective manufacturing in the industry. HTFs serve as coolants in chillers, removing excess heat during manufacturing processes. Through all these processes, HTFs may emit VOCs fugitively inside the fab through leaking components in the transfer lines and equipment.

Note that these chillers use engineered HTFs, which transfer energy efficiently without undergoing a refrigerant phase change cycle, which distinguishes these HTFs from refrigerants regulated by 40 CFR Part 82.

The following sections address the LAER analysis for the proposed HTFs to be used at the Proposed Air Permit Project.

1.9.1 Step 1. Identify All Control Technologies

Good operating and maintenance practices have been identified as potential control technologies for reducing VOC emissions from the proposed HTFs. Good operation and maintenance practices for HTFs include regular evaluation of consumption records to confirm efficient usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas.

Chemical substitution to utilize HTFs that have a lower VOC composition is also a potential control technology. Micron is evaluating which alternative HTFs are technically viable to meet the heat transfer needs of each desired application.

1.9.2 Step 2. Eliminate Technically Infeasible Options

The control technologies identified in Step 1 for the use of HTFs are technically feasible.

1.9.3 Step 3. Rank Remaining Control Technologies

All control technologies identified are considered feasible and can be used in combination. As discussed in Step 4, Micron is proposing to use all identified control technologies to achieve LAER. As a result, ranking the remaining control technologies is unnecessary, and the next step is to evaluate the most effective controls.

1.9.4 Step 4. Select LAER

Micron is proposing LAER for the proposed HTFs to be the use of good design and maintenance practices. While there are no lower VOC options available at the time of this Air Permit Application, Micron will continue to evaluate the opportunity to use the HTFs with lower VOC composition that are technically viable to meet the heat transfer needs of each desired application and will use the alternative HTFs identified through this evaluation. Good operating and maintenance practices include regular evaluation of consumption records to confirm efficient usage, evaluation of transfer lines and equipment to identify areas of potential inefficient use, and maintenance and repair of those areas.

Due to the nature of the good operating and maintenance practices for the HTF distribution system, Micron is not proposing to meet an emission limit for operation of the systems that utilize HTFs.

1.10 Lab Process Emissions

The Proposed Air Permit Project includes two laboratories to support each fab with testing and quality assurance, one in each Probe building and WWT building. An inventory of projected chemicals to be used in each lab was reviewed to identify VOC and HAP compounds, as well as compounds that may react to form criteria pollutants through use in the labs.

1.10.1 Step 1. Identify All Control Technologies

A review of the EPA's RBLC database did not identify any entries of facilities that utilize add-on control technology to abate VOC emissions that are generated from laboratory operations.

Micron also reviewed relevant semiconductor air permits to evaluate if any control technologies are currently being utilized to abate VOC emissions from laboratory operations. During the review of these permits, it was determined that no add-on control devices are currently installed to abate such VOC emissions.

Good operating and maintenance practices have been identified as potential control technologies for reducing VOC emissions from lab operations. Good operation and maintenance practices for the lab operations include regular evaluation of consumption records to confirm efficient usage.

1.10.2 Step 2. Eliminate Technically Infeasible Options

The only technically feasible control technology identified in Step 1 is good operating and maintenance practices.

1.10.3 Step 3. Rank Remaining Control Technologies

Since good operating and maintenance practices are the only identified control options, evaluating the most effective controls is unnecessary, and the next step is to select LAER.

1.10.4 Step 4. Select LAER

Given the diverse processes and complexity of semiconductor manufacturing, Micron is proposing to comply with a work practice standard to achieve LAER for VOC emitted from lab operations in lieu of a formal limit. The proposed work practice standard includes good operating and maintenance practices.

Attachment 1
RACT/BACT/LAER Clearinghouse Search Results

Process IDs: 12.310, 13.310, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input ≤ 50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/09/2015	PACKAGE BOILER	13.31	GCP	0.006	LB/MMBTU
AL-0307	ALLOYS PLANT	AL	701-0007-X121-X126	10/09/2015	2 CALP LINE BOILERS	13.31	GCP	0.006	LB/MMBTU
AR-0159	BIG RIVER STEEL LLC	AR	2305-AOP-R4	04/05/2019	BOILER, PICKLE LINE	13.31	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0054	LB/MMBTU
AR-0159	BIG RIVER STEEL LLC	AR	2305-AOP-R4	04/05/2019	BOILER, ANNEALING PICKLE LINE	13.31	Combustion of Natural gas and Good Combustion Practice	0.0054	LB/MMBTU
AR-0159	BIG RIVER STEEL LLC	AR	2305-AOP-R4	04/05/2019	BOILERS SN-26 AND SN-27, GALVANIZING LINE	13.31	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0054	LB/MMBTU
AR-0171	NUCOR STEEL ARKANSAS	AR	1139-AOP-R24	02/14/2019	SN-233 Galvanizing Line Boilers	13.31	Good combustion practices	0.0055	LB/MMBTU
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-202, 203, 204 Pickle Line Boilers	13.31	Good Combustion Practice	0.0055	LB/MMBTU

Process IDs: 12.310, 13.310, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input ≤ 50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
AR-0172	NUCOR STEEL ARKANSAS	AR	1139-AOP-R26	09/01/2021	SN-202, 203, 204 Pickle Line Boilers	13.31	Good Combustion Practice	121	LB/MMBTU
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Pickle Line #2 Boiler #1 &#2 (EP 21-04 & EP 21-05)	13.31	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5	LB/MMSCF
MD-0042	WILDCAT POINT GENERATION FACILITY	MD	CPCN CASE NO. 9327	04/08/2014	AUXILLARY BOILER	13.31	THE EXCLUSIVE USE OF PIPELINE QUALITY NATURAL GAS, LIMITED HOURS OF OPERATION, AND GOOD COMBUSTION PRACTICES	0.0033	LB/MMBTU
MD-0045	MATTAWOMAN ENERGY CENTER	MD	PSC CASE. NO. 9330	11/13/2015	AUXILIARY BOILER	13.31	EXCLUSIVE USE OF NATURAL GAS, AND GOOD COMBUSTION PRACTICES	0.003	LB/MMBTU
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Auxiliary Boiler (B001)	13.31	Good combustion controls	0.2	LB/H
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Auxiliary Boiler (B001)	13.31	Good combustion controls	0.23	LB/H
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Auxiliary Boiler (B001)	13.31	Good combustion controls	0.23	LB/H

Process IDs: 12.310, 13.310, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input ≤ 50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Auxiliary Boiler (B001)	13.31	Good combustion controls	0.13	LB/H
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Auxiliary Boiler (B001)	13.31	Good combustion practices	0.16	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	13.31	Good combustion practices and the use of natural gas	4.86	T/YR
OK-0164	MIDWEST CITY AIR DEPOT	OK	2009-394-C(M-2)PSD	01/08/2015	Heaters/Boilers	13.31	1. Use pipeline-quality natural gas. 2. Good Combustion Practices. 3. Tune-ups for applicable boilers/heaters per 40CFR63, Subpart DDDDD.	153716	TONS PER YEAR
OK-0164	MIDWEST CITY AIR DEPOT	OK	2009-394-C(M-2)PSD	01/08/2015	Heaters/Boilers	13.31	1. Use pipeline-quality natural gas. 2. Good Combustion Practices w/emission rate limit of 0.005 lb/MMBTU based on AP-42 (7/1998).	7.1	TONS PER YEAR
OK-0168	SEMINOLE GNRTNG STA	OK	2010-594-C(M-2)PSD	05/05/2015	NATURAL GAS-FIRED BOILER (100MMBTUH)	13.31	NO CONTROLS FEASIBLE;GOOD COMBUSTION PRACTICES	0.0075	LB/MMBTU
OR-0050	TROUTDALE ENERGY CENTER, LLC	OR	26-0235	03/05/2014	Auxiliary boiler	13.31	Utilize Low-NOx burners and FGR.	0.005	LB/MMBTU

Process IDs: 12.310, 13.310, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input ≤ 50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	Auxiliary Boiler	13.31	Not Specified	0.005	LB/MMBTU
PA-0316	RENOVO ENERGY CENTER, LLC	PA	18-00033A	01/26/2018	Auxiliary Boiler	13.31	Not Specified	0.005	LB
SC-0192	CANFOR SOUTHERN PINE - CONWAY MILL	SC	1340-0029-CI	05/21/2019	Boiler No. 2	13.31	Work Practice Standards	0.0054	LB/MMBTU
SC-0193	MERCEDES BENZ VANS, LLC	SC	0560-0385-CA	04/15/2016	Energy Center Boilers	13.31	Annual tune ups per 40 CFR 63.7540(a)(10) are required.	5.5	LB/MMSCF
TX-0772	PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT)	TX	118901, GHGPSDTX108 AND PSDTX1	11/06/2015	Commercial/Institutional-Size Boilers/Furnaces	13.31	Good combustion practice to ensure complete combustion.	0.3	T/YR
TX-0813	ODESSA PETROCHEMICAL PLANT	TX	16963, PSDTX1478, GHGPSDTX148	11/22/2016	small Boiler	13.31	Best combustion practices	0.0005	MMBTU/HR
VA-0327	PERDUE GRAIN AND OILSEED, LLC	VA	60277	07/12/2017	(4) 27 MMBtu/hr boilers, Natural gas and No. 2 fuel oi	13.31	Not Specified	0.1	LB/HR

Process IDs: 12.310, 13.310, 19.6
Other Search Criteria: Process Name Contains "Boilers"
Process Description: Natural Gas-fired Boilers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered for Process ID; Fuel type as "Natural Gas"; Heat Input ≤ 50 MMBtu/hr

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
WI-0266	GREEN BAY PACKAGING, INC. - SHIPPING CONTAINER DIVISION	WI	18-DMM-077	09/06/2018	Natural gas-fired boiler (Boiler B01)	13.31	Good combustion practices, use only natural gas, equip boiler with Low NOx burners and flue gas recirculation	0.0055	LB/MMBTU
WI-0306	WPL- RIVERSIDE ENERGY CENTER	WI	19-POY-212	02/28/2020	Temporary Boiler (B98A)	13.31	Shall be operated for no more than 500 hours and combust only pipeline quality natural gas.	--	--
WY-0075	CHEYENNE PRAIRIE GENERATING STATION	WY	MD-16173	07/16/2014	Auxiliary Boiler	13.31	Good combustion practices	0.0017	LB/MMBTU
IN-0239	SUBARU OF INDIANA AUTOMOTIVE, INC.	IN	157-36379-00050	02/18/2016	BOILER	19.6	Not Specified	0.005	LB/MMBTU
SC-0183	NUCOR STEEL - BERKELEY	SC	0420-0060-DX	05/04/2018	Pickle Line Equipment (pickle line no. 3 boilers)	19.6	Good combustion practices	5.5	LB/MMSCF
TX-0885	METAL BEVERAGE CONTAINER OPERATIONS	TX	146824 AND N130M1	01/31/2020	Boiler 40 MMBtu/hr	19.6	GOOD COMBUSTION PRACTICES AND CLEAN FUEL	--	--

Process IDs: --
Other Search Criteria: Process Name Contains "Vaporizer"
Process Description: Natural Gas-fired Water Bath Vaporizers
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered for Fuel Type as "Natural Gas" or Equivalent

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 13-01 - Water Bath Vaporizer	19.9	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan	5.5	LB/MMSCF
KY-0115	NUCOR STEEL GALLATIN, LLC	KY	V-20-015	04/19/2021	Air Separation Unit Water Bath Vaporizer (2 indirect burners) (EP 23-01)	19.6	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5	LB/MMSCF
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	13.31	Good combustion practices and the use of natural gas	1.29	T/YR
WV-0034	WEST VIRGINIA STEEL MILL	WV	R14-0039	05/05/2022	Water Bath Vaporizer	81.29	Good Combustion Practices	0.06	LB/HR

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
AK-0082	POINT THOMSON PRODUCTION FACILITY	AK	AQ1201CPT03	01/23/2015	Emergency Camp Generators	17.11	Not Specified	0.0007	LB/HP-H
AR-0177	NUCOR STEEL ARKANSAS	AR	1139-AOP-R27	11/21/2022	SN-230 Galvanizing Line No, 2 Emergency Generator	17.11	Not Specified	0.8	G/KW-HR
FL-0347	ANADARKO PETROLEUM CORPORATION - EGOM	FL	OCS-EPA-R4015	09/16/2014	Emergency Diesel Engine	17.11	Use of good combustion practices based on the most recent manufacturer's specifications issued for engines and with turbocharger, aftercooler, and high injection pressure	--	--
IL-0114	CRONUS CHEMICALS, LLC	IL	13060007	09/05/2014	Emergency Generator	17.11	Tier IV standards for non-road engines at 40 CFR 1039.102, Table 7.	0.4	G/KW-H
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Emergency Generator Engine	17.11	Not Specified	6.4	G/KW-HR
IN-0173	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES	0.31	G/BHP-H
IN-0180	MIDWEST FERTILIZER CORPORATION	IN	129-33576-00059	06/04/2014	DIESEL FIRED EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES	0.31	G/B-HP-H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
IN-0263	MIDWEST FERTILIZER COMPANY LLC	IN	129-36943-00059	03/23/2017	EMERGENCY GENERATORS (EU014A AND EU-014B)	17.11	GOOD COMBUSTION PRACTICES	0.35	G/HP-H EACH
IN-0317	RIVERVIEW ENERGY CORPORATION	IN	T147-39554-00065	06/11/2019	Emergency generator EU-6006	17.11	Tier II diesel engine	6.4	G/KWH
IN-0324	MIDWEST FERTILIZER COMPANY LLC	IN	129-44510-00059	05/06/2022	emergency generator EU 014a	17.11	Not Specified	0.35	G/HP-HR
IN-0359	NUCOR STEEL	IN	107-45480-00038	03/30/2023	Emergency Generator (CC-GEN1)	17.11	Certified engine	0.32	G/HP-HR
KY-0109	FRITZ WINTER NORTH AMERICA, LP	KY	V-16-022 R1	10/24/2016	Emergency Generators #1, #2, & #3 (EU72, EU73 & EU74)	17.11	The permittee shall prepare and maintain for EU72, EU73, and EU74, within 90 days of startup, a good combustion and operation practices plan (GCOP) that defines, measures and verifies the use of operational and design practices determined as BACT for minimizing CO, VOC, PM, PM10, and PM2.5 emissions. Any revisions requested by the Division shall be made and the plan shall be maintained on site. The permittee shall operate according to the provisions of this plan at all times, including periods of startup, shutdown, and malfunction. The plan shall be incorporated into the plant standard operating procedures (SOP) and shall be made available for the Division's inspection. The plan shall include, but not be limited to: i. A list of combustion optimization practices and a means of verifying the practices have occurred. ii. A list of combustion and operation practices to be used to lower energy consumption and a means of verifying the practices have occurred. iii. A list of the design choices determined to be BACT and verification that designs were implemented in the final construction.	4.77	G/HP-HR (EU72 &EU73)

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-02 - North Water System Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-03 - South Water System Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-07 - Air Separation Plant Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
KY-0110	NUCOR STEEL BRANDENBURG	KY	V-20-001	07/23/2020	EP 10-01 - Caster Emergency Generator	17.11	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	--	--
LA-0288	LAKE CHARLES CHEMICAL COMPLEX	LA	PSD-LA-778	05/23/2014	Emergency Diesel Generators (EQT 629, 639, 838, 966, & 1264)	17.11	Comply with 40 CFR 60 Subpart IIII; operate the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	0.85	LB/HR
LA-0292	HOLBROOK COMPRESSOR STATION	LA	PSD-LA-769(M-1)	01/22/2016	Emergency Generators No. 1 & No. 2	17.11	Good combustion practices consistent with the manufacturer's recommendations to maximize fuel efficiency and minimize emissions	0.83	LB/HR

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0296	LAKE CHARLES CHEMICAL COMPLEX LDPE UNIT	LA	PSD-LA-779	05/23/2014	Emergency Diesel Generators (EQTs 622, 671, 773, 850, 994, 995, 996, 1033, 1077, 1105, & 1202)	17.11	Compliance with 40 CFR 60 Subpart IIII; operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage.	0.85	LB/HR
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Emergency Generator Engines	17.11	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0312	ST. JAMES METHANOL PLANT	LA	PSD-LA-780(M-1)	06/30/2017	DEG1-13 - Diesel Fired Emergency Generator Engine (EQT0012)	17.11	Compliance with NSPS Subpart IIII	0.04	LB/HR
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Generator 1	17.11	Good combustion practices	27.34	LB/H
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 1	17.11	Compliance with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	3.86	LB/H
LA-0315	G2G PLANT	LA	PSD-LA-781	05/23/2014	Emergency Diesel Generator 2	17.11	Compliance with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	3.86	LB/H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	emergency generator engines (6 units)	17.11	Complying with 40 CFR 60 Subpart IIII	--	--
LA-0331	CALCASIEU PASS LNG PROJECT	LA	PDS-LA-805	09/21/2018	Large Emergency Engines (50kW)	17.11	Good combustion and operating practices.	0.79	G/KW-H
LA-0364	FG LA COMPLEX	LA	PSD-LA-812	01/06/2020	Emergency Generator Diesel Engines	17.11	Compliance with the limitations imposed by 40 CFR 63 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures designed to maximize combustion efficiency and minimize fuel usage.	--	--
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Generator Engine	17.11	Compliance with 40 CFR 60 Subpart IIII standards, good combustion practices, and the use of ultra-low sulfur diesel fuel.	4.8	G/HP-HR
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	06-22 - AO-5 Emergency Generator	17.11	Use of good combustion practices and compliance with NSPS Subpart IIII	0.11	LB/HR
LA-0394	GEISMAR PLANT	LA	PSD-LA-647(M-9)	12/12/2023	53-22 - PAO Emergency Generator	17.11	Use of good combustion practices, compliance with NSPS Subpart IIII	0.11	LB/HR

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	EGEN - Plant Emergency Generator	17.11	Compliance with 40 CFR 60 Subpart IIII	2.29	LB/HR
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	06/09/2014	EMERGENCY GENERATOR	17.11	USE ONLY ULSD, GOOD COMBUSTION PRACTICES, AND DESIGNED TO ACHIEVE EMISSION LIMIT	4.8	G/HP-H
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUEMENGINE (Diesel fuel emergency engine)	17.11	Good combustion practices.	1.87	LB/H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (North Plant): Emergency Engine	17.11	Good combustion practices.	0.86	LB/H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUEMENGINE (South Plant): Emergency Engine	17.11	Good combustion practices	0.86	LB/H
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUEMENGINE: Emergency engine	17.11	State of the art combustion design.	1.89	LB/H
MI-0442	THOMAS TOWNSHIP ENERGY, LLC	MI	210-18	08/21/2019	FGEMENGINE	17.11	Not Specified	0.86	LB/H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUEMENGINE (North Plant): Emergency engine	17.11	Good combustion practices	0.86	LB/H
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUEMENGINE (South Plant): Emergency engine	17.11	Good combustion practices.	0.86	LB/H
NJ-0084	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068/BOP150001	03/10/2016	Diesel Fired Emergency Generator	17.11	Use of ULSD a clean burning fuel, and limited hours of operation	1	LB/H
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency generator (P003)	17.11	Not Specified	3.1	LB/H
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency generator (P003)	17.11	State-of-the-art combustion design	3.84	LB/H
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Generator (P009)	17.11	Good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	1.6	LB/H
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency generator (P003)	17.11	State-of-the-art combustion design	2	LB/H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency generator (P003)	17.11	State-of-the-art combustion design	2	LB/H
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Generators (2 identical, P004 and P005)	17.11	Certified to the meet the emissions standards in 40 CFR 89.112 and 89.113 pursuant to 40 CFR 60.4205(b) and 60.4202(a)(2). Good combustion practices per the manufacturer's operating manual.	23.21	LB/H
OH-0375	LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER	OH	P0122829	11/07/2017	Emergency Diesel Generator Engine (P001)	17.11	Good combustion design	24.71	LB/H
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Diesel Generator (P003)	17.11	Good combustion practices (ULSD) and compliance with 40 CFR Part 60, Subpart IIII	19.68	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Emergency Diesel-fired Generator Engine (P007)	17.11	certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual	37.41	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	1,000 kW Emergency Generators (P008 - P010)	17.11	certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual	14.96	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	5,051 bhp (3,768 kWm) Diesel-Fired Emergency Generators: P001 through P046	17.11	Certified to meet Tier 2 standards and good combustion practices	0.4	G/KW-H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
PA-0309	LACKAWANNA ENERGY CTR/JESSUP	PA	35-00069A	12/23/2015	2000 kW Emergency Generator	17.11	Not Specified	0.22	GM/HP-HR
PA-0311	MOXIE FREEDOM GENERATION PLANT	PA	40-00129A	09/01/2015	Emergency Generator	17.11	Not Specified	0.02	G/HP-HR
PA-0313	FIRST QUALITY TISSUE LOCK HAVEN PLT	PA	18-00030C	07/27/2017	Emergency Generator	17.11	Not Specified	3.5	G
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Generator	17.11	Not Specified	0.15	G/B-HP-H
TX-0728	PEONY CHEMICAL MANUFACTURING FACILITY	TX	118239, N200	04/01/2015	Emergency Diesel Generator	17.11	Minimized hours of operations Tier II engine	0.7	LB/H
TX-0872	CONDENSATE SPLITTER FACILITY	TX	118270 PSDTX1398M1 GHGPSDTX62	10/31/2019	Emergency Generators	17.11	Limiting duration and frequency of generator use to 100 hr/yr. Good combustion practices will be used to reduce VOC including maintaining proper air-to-fuel ratio.	0.12	G/KW HR
TX-0939	ORANGE COUNTY ADVANCED POWER STATION	TX	166032 PSDTX1598 GHGPSDTX210	03/13/2023	EMERGENCY GENERATOR	17.11	GOOD COMBUSTION PRACTICES, LIMITED TO 100 HR/YR	0.001	LB/HP HR

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED EMERGENCY GENERATOR 3000 kW (1)	17.11	Good Combustion Practices/Maintenance	6.4	G/KW
VA-0327	PERDUE GRAIN AND OILSEED, LLC	VA	60277	07/12/2017	Emergency Generator	17.11	Not Specified	0.49	LB/HR
WI-0284	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-017	04/24/2018	Diesel-Fired Emergency Generators	17.11	Good Combustion Practices	0.56	G/KWH
WI-0286	SIO INTERNATIONAL WISCONSIN, INC. - ENERGY PLANT	WI	18-JJW-022	04/24/2018	P42 -Diesel Fired Emergency Generator	17.11	Good Combustion Practices	0.56	G/KWH
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Generator (P07)	17.11	Operation limited to 500 hours/year and operate and maintain generator according to the manufacturer's recommendations	0.32	G/HP-H
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Emergency Generator	17.11	Not Specified	1.24	LB/H

Process IDs: 17.110
Other Search Criteria: Process Name Contains "Engine"
Process Description: Diesel-Fired Engines
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered Process Types, Process Name for "Emergency Engine", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input > 500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
WV-0033	MAIDSVILLE	WV	R14-0038	01/05/2022	Emergency Generator	17.11	Good Combustion Practices w/ OxCat. Applicant did not justify why an oxcat is infeasible for an emergency engine	0.46	LB/HR
AR-0168	BIG RIVER STEEL LLC	AR	2305-AOP-R7	3/17/2021	Emergency Engines	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	1.55	G/KW-HR
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	1/31/2022	Emergency Engines	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.13	G/BHP-HR
LA-0292	HOLBROOK COMPRESSOR STATION	LA	PSD-LA-769(M-1)	1/22/2016	Emergency Generators No. 1 & No. 2	17.11	Good combustion practices consistent with the manufacturer's recommendations to maximize fuel efficiency and minimize emissions	0.83	LB/HR
TX-0962	POINT COMFORT PLANT	TX	PSDTX1610, PSDTX1588M1	09/22/2023	EMERGENCY ENGINES	16.21	601 hp and 100 hours of non-emergency operation per year. Good combustion practices.	--	--

Process IDs: 42.009, 49.999
Other Search Criteria: ---
Process Description: Organic Liquid Storage Tanks and Other Evaporative Loss Sources
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Does not include equipment that is not storage tank and tanks without listed capacity; capacity ≤20,000-gallon.

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
AK-0083	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT06	01/06/2015	Two (2) Methyl-diethanol Amine (MDEA) Storage Tanks	42.009	Submerged Fill Design	0.002	TONS/YEAR
AK-0086	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT07	03/26/2021	MDEA Storage Tanks	42.009	Submerged Fill Design	0.002	TPY (COMBINED)
AR-0124	EL DORADO SAWMILL	AR	2348-AOP-R0	08/03/2015	ELEVEN OIL STORAGE TANKS SN-14	42.009	ENCLOSED TANKS, TANKS ARE LIGHT COLOR	0.3	LB/H
AR-0124	EL DORADO SAWMILL	AR	2348-AOP-R0	08/03/2015	THREE DIESEL STORAGE TANKS SN-15	42.009	TANKS ARE LIGHT COLOR	0.4	LB/H
AR-0124	EL DORADO SAWMILL	AR	2348-AOP-R0	08/03/2015	ONE GASOLINE STORAGE TANK SN-16	42.009	TANKS ARE LIGHT COLOR	0.022	LB/MBF
IN-0241	CENTRAL INDIANA ETHANOL, LLC	IN	053-35637-00062	10/26/2015	FERMENTATION	42.009	WET SCRUBBERS	98	%OVERALL CTRL EFFIC

Process IDs: 42.009, 49.999
Other Search Criteria: ---
Process Description: Organic Liquid Storage Tanks and Other Evaporative Loss Sources
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Does not include equipment that is not storage tank and tanks without listed capacity; capacity ≤20,000-gallon.

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
IN-0312	LEHIGH CEMENT COMPANY LLC	IN	093-40198-00002	06/27/2019	Diesel tanks	42.009	Good design and operating practices	--	--
IN-0312	LEHIGH CEMENT COMPANY LLC	IN	093-40198-00002	06/27/2019	Gasoline tank	42.009	Submerged fill pipe and Stage I Vapor Control	--	--
IN-0318	RIVERVIEW ENERGY CORPORATION	IN	T147-39554-00065	06/11/2019	Amine Tanks	42.009	Tanks shall use a white shell. Tanks shall use submerged filling. Tanks shall use good maintenance practices as described in the permit.	0.48	TONS
KY-0103	LOGAN ALUMINUM, INC.	KY	V-20-004	12/27/2020	EP 156 - EP160 - Cold Mill 4 Area Storage Tanks	42.009	Each tank must be equipped with a submerged fill pipe.	--	--
LA-0276	BATON ROUGE JUNCTION FACILITY	LA	PSD-LA-741(M4)	12/15/2016	Sumps (2) and Oil/Water Separators (2)	42.009	Good housekeeping practices and closed top design	--	--
LA-0363	HOLDEN WOOD PRODUCTS MILL	LA	PSD-LA-834	10/02/2019	Diesel Storage Tank	42.009	Good Tank Design and Submerged Fill Page.	14,000	GAL
LA-0363	HOLDEN WOOD PRODUCTS MILL	LA	PSD-LA-834	10/02/2019	Gasoline Storage Tank	42.009	Good Tank Design and Submerged Fill Pipe	6,000	GAL

Process IDs: 42.009, 49.999
Other Search Criteria: ---
Process Description: Organic Liquid Storage Tanks and Other Evaporative Loss Sources
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Does not include equipment that is not storage tank and tanks without listed capacity; capacity ≤20,000-gallon.

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
MN-0095	BLUE LAKE	MN	13900010-105	08/07/2024	Diesel Tank #1 (EQUI 33)	42.009	Must be constructed and operated with good tank design, including: 1 Fixed roof, 2 PRV (conservation vent), 3 Submerged fill pipe, 4 Light tank color	--	--
TX-0656	GAS TO GASOLINE PLANT	TX	PSDTX1340 AND 107764	05/16/2014	METHANOL AND WATER STORAGE TANK	42.009	HORIZONTAL FIXED ROOF WITH SUBMERGED FILL, WHITE EXTERIOR	0.12	T/YR
TX-0846	MOTOR VEHICLE ASSEMBLY PLANT	TX	70661, PSDTX1036M1, GHGPSDTX18	09/23/2018	Gasoline Storage Tank 15,000 Gallons	42.009	White fixed roof storage tank equipped with a submerged fill pipe and vapor balance loading (Stage 1 Controls). The use of drain dry construction is required to minimize the emissions from tank entry and inspection.	--	--
TX-0846	MOTOR VEHICLE ASSEMBLY PLANT	TX	70661, PSDTX1036M1, GHGPSDTX18	09/23/2018	Storage Tanks " Very Low Vapor Pressure Non Gasoline Automotive Fluids" Gear Lube, Engine Oil, Diesel fuel, Urea, ATF Etc. ;20,000 gal each	42.009	White fixed roof storage tanks equipped with a submerged fill pipe. use of drain dry construction is required to minimize the emissions from tank entry and inspection.	--	--
IN-0359	NUCOR STEEL	IN	107-45480-00038	03/30/2023	Diesel Storage Tank (DST #6)	49.999	Submerged fill pipe and white painted tank shell and roof	--	--
PA-0313	FIRST QUALITY TISSUE LOCK HAVEN PLT	PA	18-00030C	07/27/2017	Storage Tanks	49.999	Not Specified	0.07	TPY

Process IDs: 99.011
Other Search Criteria: --
Process Description: Semiconductor Manufacturing
Date Range: 1/1/2014 - 11/7/2024
Date Conducted: 11/7/2024 - 1/6/2025
Notes & Filtering: Filtered for Process ID and Process Name

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0387	INTEL OHIO SITE	OH	P0132323	9/20/2022	Semiconductor Fabrication: P179 through P182	99.011	RCTO; annual burner tuning on the trimix systems; good combustion practices; the use of natural gas; store cleaning material in closed non-absorbent and non-leaking containers; minimize spills of cleaning materials and clean up spills immediately.	--	--

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
AK-0083	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT06	01/06/2015	Diesel Fired Well Pump	17.21	Limited Operation of 168 hr/yr.	0.36	LB/MMBTU
AK-0085	GAS TREATMENT PLANT	AK	AQ1524CPT01	08/13/2020	Three (3) Firewater Pump Engines and two (2) Emergency Diesel Generators	17.21	Good combustion practices, ULSD, and limit operation to 500 hours per year.	0.19	G/HP-HR
AK-0086	KENAI NITROGEN OPERATIONS	AK	AQ0083CPT07	03/26/2021	Diesel Fired Well Pump	17.21	Good Combustion Practices and Limited Use	0.36	LB/MMBTU
AR-0173	BIG RIVER STEEL LLC	AR	2445-AOP-R0	01/31/2022	Emergency Water Pumps	17.21	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	1.12	G/BHP-HR
IL-0134	CRONUS CHEMICALS	IL	19110020	12/21/2023	Firewater Pump Engine	17.21	Not Specified	4	G/KW-HR

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
KS-0030	MID-KANSAS ELECTRIC COMPANY, LLC - RUBART STATION	KS	C-13309	03/31/2016	Compression ignition RICE emergency fire pump	17.21	Not Specified	1.14	G/HP-HR
LA-0301	LAKE CHARLES CHEMICAL COMPLEX ETHYLENE 2 UNIT	LA	PSD-LA-779	05/23/2014	Firewater Pump Nos. 1-3 (EQTs 997, 998, & 999)	17.21	Compliance with 40 CFR 60 Subpart IIII and operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage	0.1	LB/HR
LA-0309	BENTELER STEEL TUBE FACILITY	LA	PSD-LA-774(M1)	06/04/2015	Firewater Pump Engines	17.21	Complying with 40 CFR 60 Subpart IIII	---	---
LA-0313	ST. CHARLES POWER STATION	LA	PSD-LA-804	08/31/2016	SCPS Emergency Diesel Firewater Pump 1	17.21	Good combustion practices	1.87	LB/H
LA-0314	INDORAMA LAKE CHARLES FACILITY	LA	PSD-LA-813	08/03/2016	Diesel Firewater pump engines (6 units)	17.21	complying with 40 CFR 63 subpart ZZZZ	---	---
LA-0316	CAMERON LNG FACILITY	LA	PSD-LA-766(M3)	02/17/2017	firewater pump engines (8 units)	17.21	Complying with 40 CFR 60 Subpart IIII	---	---
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39A	17.21	Good combustion practices and NSPS Subpart IIII	4	G/KW-H
LA-0328	PLAQUEMINES PLANT 1	LA	PSD-LA-709(M-3)	05/02/2018	Emergency Diesel Engine Pump P-39B	17.21	Good combustion practices and NSPS Subpart IIII	4	G/KW-H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0387	TAYLOR SAWMILL	LA	PSD-LA-842	04/12/2022	Firewater Pump Engine (FIR)	17.21	Compliance with 40 CFR 60 Subpart IIII	0.02	TPY
LA-0390	DERIDDER SAWMILL	LA	PSD-LA-843	05/10/2022	ENG1 - Emergency Fire Water Pump	17.21	Good combustion practices and maintenance and compliance with applicable 40 CFR 60 Subpart JJJJ limitation for VOC.	1.85	LB/HR
LA-0391	MAGNOLIA POWER GENERATING STATION UNIT 1	LA	PSD-LA-839	06/03/2022	Emergency Diesel Fired Water Pump Engine	17.21	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	3	G/HP-HR
LA-0397	WESTLAKE ETHYLENE PLANT	LA	PSD-LA-813(M3)	04/29/2022	Emergency Generators and Fire Water Pumps (EQT0027 - EQT0032, EQT0044, EQT0045)	17.21	Compliance with applicable requirements of 40 CFR 60 Subpart IIII	---	---
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-01 - Firewater Pump Engine No. 1	17.21	Compliance with 40 CFR 60 Subpart IIII	1.47	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-02 - Firewater Pump Engine No. 2	17.21	Compliance with 40 CFR 60 Subpart IIII	1.47	LB/HR
LA-0401	KOCH METHANOL (KME) FACILITY	LA	PSD-LA-851	12/20/2023	FWP-03 - Firewater Pump Engine No. 3	17.21	Compliance with the requirements of 40 CFR 60 Subpart IIII	0.61	LB/HR
LA-0402	DESTREHAN OIL PROCESSING FACILITY	LA	PSD-LA-855	12/13/2023	HLK39 - Emergency Diesel Fire Pump Engine (EQT0094)	17.21	Compliance with 40 CFR 60 Subpart IIII	0.14	LB/H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MD-0044	COVE POINT LNG TERMINAL	MD	PSC CASE NO. 9318	06/09/2014	5 EMERGENCY FIRE WATER PUMP ENGINES	17.21	USE ONLY ULSD, GOOD COMBUSTION PRACTICES, AND DESIGNED TO ACHIEVE EMISSION LIMIT	3	G/HP-H
MI-0423	INDECK NILES, LLC	MI	75-16	01/04/2017	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices	0.64	LB/H
MI-0424	HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	MI	107-13C	12/05/2016	EUFPENGINE (Emergency engine-diesel fire pump)	17.21	Good combustion practices	0.47	LB/H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (South Plant): Fire pump engine	17.21	Good combustion practices.	0.75	LB/H
MI-0433	MEC NORTH, LLC AND MEC SOUTH LLC	MI	167-17 AND 168-17	06/29/2018	EUFPENGINE (North Plant): Fire pump engine	17.21	Good combustion practices	0.75	LB/H
MI-0435	BELLE RIVER COMBINED CYCLE POWER PLANT	MI	19-18	07/16/2018	EUFPENGINE: Fire pump engine	17.21	State of the art combustion design.	0.13	LB/H
MI-0451	MEC NORTH, LLC	MI	167-17B	06/23/2022	EUFPENGINE (North Plant): Fire Pump Engine	17.21	Good combustion practices.	0.75	LB/H
MI-0452	MEC SOUTH, LLC	MI	168-17B	06/23/2022	EUFPENGINE (South Plant): Fire pump engine	17.21	Good Combustion Practices	0.75	LB/H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
MS-0092	EMBERCLEAR GTL MS	MS	0040-00055	05/08/2014	firewater pumps, diesel	17.21	Not Specified	---	---
NJ-0081	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068 -(BOP120002)	03/07/2014	Emergency diesel fire pump	17.21	Not Specified	0.119	LB/H
NJ-0084	PSEG FOSSIL LLC SEWAREN GENERATING STATION	NJ	18068/BOP150001	03/10/2016	Emergency Diesel Fire Pump	17.21	use of ULSD a clean burning fuel, and limited hours of operation	0.1	LB/H
NJ-0085	MIDDLESEX ENERGY CENTER, LLC	NJ	19149/PCP150001	07/19/2016	EMERGENCY DIESEL FIRE PUMP	17.21	Use of Ultra Low Sulfur Diesel (ULSD) Oil a clean burning fuel and limited hours of operation	0.117	LB/H
OH-0366	CLEAN ENERGY FUTURE - LORDSTOWN, LLC	OH	P0117655	08/25/2015	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	0.11	LB/H
OH-0367	SOUTH FIELD ENERGY LLC	OH	P0119495	09/23/2016	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	0.25	LB/H
OH-0368	PALLAS NITROGEN LLC	OH	P0118959	04/19/2017	Emergency Fire Pump Diesel Engine (P008)	17.21	good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	0.14	LB/H
OH-0370	TRUMBULL ENERGY CENTER	OH	P0122331	09/07/2017	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	0.24	LB/H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
OH-0372	OREGON ENERGY CENTER	OH	P0121049	09/27/2017	Emergency fire pump engine (P004)	17.21	State-of-the-art combustion design	0.24	LB/H
OH-0374	GUERNSEY POWER STATION LLC	OH	P0122594	10/23/2017	Emergency Fire Pump (P006)	17.21	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII. Good combustion practices per the manufacturer's operating manual.	2.7	LB/H
OH-0377	HARRISON POWER	OH	P0122266	04/19/2018	Emergency Fire Pump (P004)	17.21	Good combustion practices (ULSD) and compliance with 40 CFR Part 60, Subpart IIII	2.12	LB/H
OH-0378	PTTGCA PETROCHEMICAL COMPLEX	OH	P0124972	12/21/2018	Firewater Pumps (P005 and P006)	17.21	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII and employ good combustion practices per the manufacturer's operating manual	2.64	LB/H
OH-0387	INTEL OHIO SITE	OH	P0132323	09/20/2022	275 hp (205 kW) Diesel-Fired Emergency Fire Pump Engine	17.21	Certified to meet the standards in Table 4 of 40 CFR Part 60, Subpart IIII and good combustion practices	0.7	LB/H
OK-0164	MIDWEST CITY AIR DEPOT	OK	2009-394-C(M-2)PSD	01/08/2015	Diesel-Fueled Fire Pump Engines	17.21	1. Good Combustion Practices.	0.15	GRAMS PER HP-HR
PR-0009	ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	PR	R2-PSD 1	04/10/2014	Emergency Diesel Fire Pump	17.21	Not Specified	0.15	G/B-HP-H
VA-0325	GREENSVILLE POWER STATION	VA	52525	06/17/2016	DIESEL-FIRED WATER PUMP 376 bhp (1)	17.21	Good Combustion Practices/Maintenance	3	G/HP-H

Process IDs: 17.210
Other Search Criteria: Process Name Contains "Fire Pump"
Process Description: Diesel-Fired Fire Pump Engines
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 02/19/2025
Notes & Filtering: Filtered Process Types, Process Name for "Fire Pump", Fuel Type for "Diesel", "ULSD", "Fuel Oil No. 2", etc., Heat Input <500 HP

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
VA-0328	C4GT, LLC	VA	52588	04/26/2018	Emergency Fire Water Pump	17.21	good combustion practices and the use of ultra low sulfur diesel (S15 ULSD) fuel oil with a maximum sulfur content of 15 ppmw.	---	---
WI-0263	WISCONSIN POWER & LIGHT - NEENAH GENERATING STATION	WI	14-DMM-200	02/15/2016	Fire pump (process P05)	17.21	Good combustion practices, use diesel fuel, and operate <500 hr/yr	---	---
WI-0292	GREEN BAY PACKAGING INC. MILL DIVISION	WI	19-DMM-001	04/01/2019	P37 Diesel-Fired Emergency Fire Pump	17.21	Hours of Operation	200	HOURS
WI-0300	NEMADJI TRAIL ENERGY CENTER	WI	18-MMC-168	09/01/2020	Emergency Diesel Fire Pump (P06)	17.21	Operation limited to 500 hours/year and operate and maintain according to the manufacturer's recommendations.	1.1	G/HP-H
WI-0302	WPL- RIVERSIDE ENERGY CENTER	WI	19-DMM-153	02/28/2020	Diesel-Fired Fire Pump Engine (P04)	17.21	Good combustion practices	0.26	LB/H
WV-0025	MOUNDSVILLE COMBINED CYCLE POWER PLANT	WV	R14-0030	11/21/2014	Fire Pump Engine	17.21	Not Specified	0.17	LB/H

Process IDs: -
Other Search Criteria: Process Name Contains "Lab"
Process Description: Laboratory Operations
Date Range: 1/1/2014 - 2/14/2025
Date Conducted: 06/27/2025
Notes & Filtering: Filtered Process Name for "Lab"

RBLC ID	Facility Name	State	Permit ID	Permit Issuance Date	Process Description	RBLC Process ID	Control Technology Definition	Emission Limit	
LA-0290	LAKE CHARLES CHEMICAL COMPLEX GTL LAB-2 UNIT	LA	70669	5/23/2014	LAB-2 Unit Fugitive Emissions (FUG 11)	64.002	Leak detection and repair (LDAR) program: 40 CFR 63 Subpart H	16.77	TPY
*TN-0182	HOLSTON ARMY AMMUNITION PLANT - AREA B OPERATIONS	TN	37660	8/2/2021	Analytical Lab	64.999	Usage of solvents at minimal rates, as dictated by applicable military specifications.	--	--

Attachment 2
Bay Area Air Quality Management District Summary

					BACT Determination		Typical Technology	
Source Type	**Classification**	**Primary Fuel**	**Reference [a]**	**Date of Reference**	**Feasible /Cost Effective**	**Achieved in Practice**	**Feasible/ Cost Effective**	**Achieved in Practice**
Boiler	5 - 33.5 MMBtu/hr Heat Input	Not Specified	BAAQMD	8/4/2010	No Determination	Not Specified	No Determination	Good Combustion Practice
Boiler	33.5 - 50 MMBtu/hr Heat Input	Not Specified	BAAQMD	8/4/2010	No Determination	Not Specified	No Determination	Good Combustion Practice
Boiler	> 50 MMBtu/hr Heat Input	Not Specified	BAAQMD	8/4/2010	No Determination	Not Specified	No Determination	Good Combustion Practice
Diesel-Fired Emergency Engine	> 50 BHP and < 1000 BHP Output	Diesel	BAAQMD	12/22/2020	Not Specified	CARB ATCM standard for POC at applicable horsepower rating (see attached Table 1).	Not Specified	Any engine certified or verified to achieve the applicable standard.
Organic Liquid Storage Tank	< 20,000 Gallons	Not Applicable	BAAQMD	3/3/1995	No Determination	Vapor recovery system w/ an overall system efficiency ≥95%	No Determination	Vapor Balance; or Carbon Adsorber; or Refrigerated Condenser; or Incinerator; or BAAQMD approved equivalent
Organic Liquid Storage Tank	≥ 20,000 Gallons	Not Applicable	BAAQMD	3/3/1995	No Determination	Vapor recovery system w/ an overall system efficiency >98%	No Determination	Thermal Incinerator; or Carbon Adsorber; or Refrigerated Condenser; or BAAQMD approved equivalent
Semiconductor Fabrication - Photoresist Operations	All	Not Specified	BAAQMD	6/16/1995	No Determination	Enclosure of photoresist track and spinner. Vent to control system w/ DRE ≥98.5% or VOC outlet ≤10 ppmv. For control device, the following are acceptable: ≤10 ppmv at outlet; or ≥98.5% DRE if inlet VOC ≥2000 ppmv; ≥97% DRE if inlet VOC ≥200 to <2000 ppmv; or ≥90% DRE if inlet VOC <200 ppmv.	No Determination	BAAQMD approved Collection System and Control Device

					BACT Determination		Typical Technology	
Source Type	**Classification**	**Primary Fuel**	**Reference [a]**	**Date of Reference**	**Feasible /Cost Effective**	**Achieved in Practice**	**Feasible/ Cost Effective**	**Achieved in Practice**
Semiconductor Fabrication - Siliconizing Reactors, Furnace Chambers, and Chemical Vapor Deposition Reactors	All	Not Specified	BAAQMD	1/10/1992	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Semiconductor Fabrication - Solvent Cleaning Stations	All	Not Specified	BAAQMD	10/25/1991	Enclosure of solvent station, and vent to control system w/ capture/destruction efficiency >90% or VOC outlet concentration ≤10 ppm	Compliance with BAAQMD Reg. 8, Rule 30, and all solvent station reservoirs, sinks, and containers shall be provided with a cover and have a freeboard ratio >1.0.	Collection System Vented to Incinerator or Carbon Adsorption System	BAAQMD Approved Design and Operation

Notes:

a. Data sources include:

BAAQMD - Bay Area Air Quality Management District (https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook);

Attachment 3
Semiconductor Permit Review Summary

Source Type	Permit Emission Unit Description	Permittee	State	Permit ID	Issue Date	Pollutant	Control Technology	Permit Limit
Wastewater Treatment	All TRMX systems (Catalytic Oxidizers)	Intel Corp	AZ	P0009315	1/11/2016	Odor, H_2S	Subject to Agency	0.03 ppmv H_2S emission limit (Averaging Period of 30 Minutes or More)
Wastewater Treatment	All TRMX systems (Catalytic Oxidizers)	Intel Corp	AZ	P0009315	1/11/2016	CO	Not Specified	---
Wastewater Treatment	All TRMX systems (Catalytic Oxidizers)	Intel Corp	AZ	P0009315	1/11/2016	NOx	Selective Catalytic Reduction (SCR) System	NO_x emission limit of 0.34 lb NO_x/hr.
Wastewater Treatment	Ammonia Wastewater Treatment System	Intel Corp	OR	34-2681-ST-01	1/22/2016	NO_X	Thermal Catalytic Oxidation/Reduction System	NO_X Limit of 0.34 lb/hr
Wastewater Treatment	Ammonia Wastewater Treatment System	Intel Corp	OR	34-2681-ST-01	1/22/2016	CO	Thermal Catalytic Oxidation/Reduction System	CO Limit of 0.030 lb/MMBtu
Wastewater Treatment	Wastewater Treatment Acid Scrubbers	TSMC Arizona Corporation	AZ	P0008497	11/4/2022	H_2S	--	0.03 ppm by Volume (30-min Minimum Averaging Period)

Source Description	Emission Unit	Process	Emission Source(s)/ Control(s)	ES Type	Emission Point(s)
Fab 1 acid scrubbers	1-FABOP	FA1	AS001 - AS040	K	1F001 - 1F040
Plasma etch processes exhausting to Fab 1 acid scrubbers	1-FABOP	FA1	PLE01	I	-
Plasma etch POU control devices exhausting to Fab 1 acid scrubbers	1-FABOP	FA1	POU01	K	-
Plasma etch RCS exhausting to Fab 1 acid scrubbers	1-FABOP	FA1	RCS01 - RCS10	K	-
Ion implant processes exhausting to Fab 1 acid scrubbers	1-FABOP	FA1	IMP01	I	-
Wet etch & wet clean processes exhausting to Fab 1 acid scrubbers	1-FABOP	FA1	WET01	I	-
Fab 1 CVD scrubbers	1-FABOP	FC1	CS001 - CS016	K	1F041 - 1F056
Thin films / diffusion processes exhausting to Fab 1 CVD scrubbers	1-FABOP	FC1	TFD01	I	-
Fab 1 ammonia (base) scrubbers	1-FABOP	FB1	BS001 - BS016	K	1F057 - 1F072
Photolithography processes exhausting to Fab 1 ammonia scrubbers	1-FABOP	FB1	PHO01	I	-
Wet etch & wet clean processes exhausting to Fab 1 ammonia scrubbers	1-FABOP	FB1	WET01	I	-
CMP processes exhausting to Fab 1 ammonia scrubbers	1-FABOP	FB1	CMP01	I	-
Fab 1 storage tanks for basic raw materials	1-FABOP	FB1	ST001 - ST006	I	-
Fab 1 RCTOs (solvent exhaust)	1-FABOP	FS1	TO001 - TO036	K	1F073 - 1F144
Photolithography processes exhausting to Fab 1 RCTOs	1-FABOP	FS1	PHO01	I	-
Wet etch & wet clean processes exhausting to Fab 1 RCTOs	1-FABOP	FS1	WET01	I	-
Fab 1 storage tanks for organic waste materials	1-FABOP	FS1	WS001 - WS030	I	-
Fab 1 general exhaust (IPA, HTF, MeOH, etc.)	1-FABOP	FG1	GN001 - GN040	I	1F145 - 1F184
Fab 2 acid scrubbers	2-FABOP	FA2	AS041 - AS080	K	2F001 - 2F040
Plasma etch processes exhausting to Fab 2 acid scrubbers	2-FABOP	FA2	PLE02	I	-
Plasma etch POU control devices exhausting to Fab 2 acid scrubbers	2-FABOP	FA2	POU02	K	-
Plasma etch RCS exhausting to Fab 2 acid scrubbers	2-FABOP	FA2	RCS11 - RCS20	K	-
Ion implant processes exhausting to Fab 2 acid scrubbers	2-FABOP	FA2	IMP02	I	-
Wet etch & wet clean processes exhausting to Fab 2 acid scrubbers	2-FABOP	FA2	WET02	I	-
Fab 2 CVD scrubbers	2-FABOP	FC2	CS017 - CS032	K	2F041 - 2F056
Thin films / diffusion processes exhausting to Fab 2 CVD scrubbers	2-FABOP	FC2	TFD02	I	-
Fab 2 ammonia (base) scrubbers	2-FABOP	FB2	BS017 - BS032	K	2F057 - 2F072
Photolithography processes exhausting to Fab 2 ammonia scrubbers	2-FABOP	FB2	PHO02	I	-
Wet etch & wet clean processes exhausting to Fab 2 ammonia scrubbers	2-FABOP	FB2	WET02	I	-
CMP processes exhausting to Fab 2 ammonia scrubbers	2-FABOP	FB2	CMP02	I	-
Fab 2 storage tanks storing basic raw materials	2-FABOP	FB2	ST007 - ST012	I	-
Fab 2 RCTOs (solvent exhaust)	2-FABOP	FS2	TO037 - TO072	K	2F073 - 2F144
Photolithography processes exhausting to Fab 2 RCTOs	2-FABOP	FS2	PHO02	I	-
Wet etch & wet clean processes exhausting to Fab 2 RCTOs	2-FABOP	FS2	WET02	I	-
Fab 2 storage tanks storing organic waste materials	2-FABOP	FS2	WS031-WS060	I	-
Fab 2 general exhaust (IPA, HTF, MeOH, etc.)	2-FABOP	FG2	GN041 - GN080	I	2F145 - 2F184
Natural gas-fired utility boilers	1-CMBOP	BLR	BLR01 - BLR03	C	1U001 - 1U003
Natural gas-fired water bath vaporizers	1-CMBOP	WBV	WBV01 - WBV04	C	1U004 - 1U007
Diesel-fired emergency generators	1-CMBOP	EMD	DG001 - DG060	C	1U008 - 1U067
Diesel-fired backup fire pump engine	1-CMBOP	DFP	FP001	C	1FP01
Natural gas-fired utility boilers	2-CMBOP	BLR	BLR04 - BLR06	C	2U001 - 2U003
Natural gas-fired water bath vaporizers	2-CMBOP	WBV	WBV05 - WBV08	C	2U004 - 2U007
Diesel-fired emergency generators	2-CMBOP	EMD	DG061 - DG118	C	2U008 - 2U065
HPM 1 South acid scrubbers	1-HPMCU	HA1	AS081 - AS084	K	1H001 - 1H004
HPM 1 South storage tanks storing acidic raw materials	1-HPMCU	HA1	ST013 - ST018 ST025 - ST028 ST033 - ST034 ST037 - ST038 ST041 - ST042	I	-
HPM 1 South storage tanks storing acidic waste materials	1-HPMCU	HA1	WS061 - WS063	I	-
HPM 1 North acid scrubbers	1-HPMCU	HA2	AS085 - AS088	K	1H005 - 1H008
HPM 1 North storage tanks storing acidic raw materials	1-HPMCU	HA2	ST019 - ST024 ST029 - ST032 ST035 - ST036 ST039 - ST040 ST043 - ST044	I	-
HPM 1 North storage tanks storing acidic waste materials	1-HPMCU	HA2	WS064 - WS066	I	-
CUB 1 acid scrubbers	1-HPMCU	CA1	AS089 - AS092	K	1C001 - 1C004
CUB 1 storage tanks storing acidic raw materials	1-HPMCU	CA1	ST045	I	-
HPM 1 South ammonia (base) scrubbers	1-HPMCU	HB1	BS033 - BS036	K	1H009 - 1H012
HPM 1 South storage tanks storing ammonia and/or basic raw materials	1-HPMCU	HB1	ST046 - ST049 ST054 - ST055 ST058 - ST059 ST062 - ST063	I	-
HPM 1 North ammonia (base) scrubbers	1-HPMCU	HB2	BS037 - BS040	K	1H013 - 1H016
			ST050 - ST053		

HPM 1 North storage tanks storing ammonia and/or basic raw materials	1-HPMCU	HB2	ST056 - ST057	I	-
			ST060 - ST061		
			ST064 - ST065		
HPM 1 South RCTOs (solvent exhaust)	1-HPMCU	HS1	TO073 - TO076	K	1H017 - 1H024
HPM 1 South storage tanks storing organic raw materials	1-HPMCU	HS1	ST066 - ST069	I	-
			ST074 - ST075		
HPM 1 South SOD waste treatment station	1-HPMCU	HS1	SOD01	I	-
HPM 1 North RCTOs (solvent exhaust)	1-HPMCU	HS2	TO077 - TO080	K	1H025 - 1H032
HPM 1 North storage tanks storing organic raw materials	1-HPMCU	HS2	ST070 - ST073	I	-
			ST076 - ST077		
HPM 1 North SOD waste treatment station	1-HPMCU	HS2	SOD02	I	-
HPM 1 diesel tanks	1-HPMCU	DT1	DT001 - DT004	I	1D001 - 1D004
CUB 1 storage tanks with fugitive emissions	1-HPMCU	FU1	ST078 - ST081	I	-
CUB 1 cooling towers	1-HPMCU	CT1	CT001 - CT105	I	1C005 - 1C109
Gas yard 1 cooling towers	1-HPMCU	CT1	CT106 - CT111	I	1G001 - 1G006
HPM 2 South acid scrubbers	2-HPMCU	HA3	AS093 - AS096	K	2H001 - 2H004
HPM 2 South storage tanks storing acidic raw materials	2-HPMCU	HA3	ST082 - ST087	I	-
			ST094 - ST097		
			ST102 - ST103		
			ST106 - ST107		
			ST110 - ST111		
HPM 2 South storage tanks storing acidic waste materials	2-HPMCU	HA3	WS067 - WS069	I	-
HPM 2 North acid scrubbers	2-HPMCU	HA4	AS097 - AS100	K	2H005 - 2H008
HPM 2 North storage tanks storing acidic raw materials	2-HPMCU	HA4	ST088 - ST093	I	-
			ST098 - ST101		
			ST104 - ST105		
			ST108 - ST109		
			ST112 - ST113		
HPM 2 North storage tanks storing acidic waste materials	2-HPMCU	HA4	WS070 - WS072	I	-
CUB 2 acid scrubbers	2-HPMCU	CA2	AS101 - AS104	K	2C001 - 2C004
CUB 2 storage tanks storing acidic raw materials	2-HPMCU	CA2	ST114	I	-
HPM 2 South ammonia (base) scrubbers	2-HPMCU	HB3	BS041 - BS044	K	2H009 - 2H012
HPM 2 South storage tanks storing ammonia and/or basic raw materials	2-HPMCU	HB3	ST115 - ST118	I	-
			ST123 - ST124		
			ST127 - ST128		
			ST131 - ST132		
HPM 2 North ammonia (base) scrubbers	2-HPMCU	HB4	BS045 - BS048	K	2H013 - 2H016
HPM 2 North storage tanks storing ammonia and/or basic raw materials	2-HPMCU	HB4	ST119 - ST122	I	-
			ST125 - ST126		
			ST129 - ST130		
			ST133 - ST134		
HPM 2 South RCTOs (solvent exhaust)	2-HPMCU	HS3	TO081 - TO084	K	2H017 - 2H024
HPM 2 South storage tanks storing organic raw materials	2-HPMCU	HS3	ST135 - ST138	I	-
			ST143 - ST144		
HPM 2 South SOD waste treatment station	2-HPMCU	HS3	SOD03	I	-
HPM 2 North RCTOs (solvent exhaust)	2-HPMCU	HS4	TO085 - TO088	K	2H025 - 2H032
HPM 2 North storage tanks storing organic raw materials	2-HPMCU	HS4	ST139 - ST142	I	-
			ST145 - ST146		
HPM 2 North SOD waste treatment station	2-HPMCU	HS4	SOD04	I	-
HPM 2 diesel tanks	2-HPMCU	DT2	DT005 - DT008	I	2D001 - 2D004
CUB 2 storage tanks with fugitive emissions	2-HPMCU	FU2	ST147 - ST150	I	-
CUB 2 cooling towers	2-HPMCU	CT2	CT112 - CT216	I	2C005 - 2C109
Gas yard 2 cooling towers	2-HPMCU	CT2	CT217 - CT222	I	2G001 - 2G006
WWT 1 acid scrubbers	1-WWBIO	WA1	AS105 - AS108	K	1W001 - 1W004
WWT 1 main wastewater treatment processes	1-WWBIO	WA1	WWT01	I	-
WWT 1 storage tanks storing acidic raw materials	1-WWBIO	WA1	ST151 - ST168	I	-
WWT 1 storage tanks storing acid waste	1-WWBIO	WA1	WS073 - WS092	I	-
WWT 1 lab operations	1-WWBIO	WA1	WLB01	I	-
WWT 1 ammonia (base) scrubbers	1-WWBIO	WB1	BS049 - BS051	K	1W005 - 1W007
WWT 1 main wastewater treatment processes	1-WWBIO	WB1	WWT01	I	-
WWT 1 storage tanks storing ammonia and/or basic raw materials	1-WWBIO	WB1	ST169 - ST175	I	-
WWT 1 lab operations	1-WWBIO	WB1	WLB01	I	-
WWT 1 thermal oxidizers (solvent exhaust)	1-WWBIO	WS1	TO089 - TO091	K	1W008 - 1W010
WWT 1 main wastewater treatment processes	1-WWBIO	WS1	WWT01	I	-
WWT 1 lab operations	1-WWBIO	WS1	WLB01	I	-
WWT 1 silos storing solid raw materials	1-WWBIO	SL1	SIL01 - SIL02	I	1W011, 1W012
BIO 1 general exhaust / odor scrubber	1-WWBIO	BG1	OS001 - OS002	I	1B001 - 1B002
BIO 1 biological wastewater treatment processes	1-WWBIO	BG1	BIO01	I	-
BIO 1 storage tanks storing raw materials	1-WWBIO	BG1	ST176 - ST178	I	-
BIO 1 storage tanks with fugitive emissions	1-WWBIO	FU1	ST179 - ST183	I	-

WWT 2 acid scrubbers	2-WWBIO	WA2	AS109 - AS112	K	2W001 - 2W004
WWT 2 main wastewater treatment processes	2-WWBIO	WA2	WWT02	I	-
WWT 2 storage tanks storing acidic raw materials	2-WWBIO	WA2	ST184 - ST201	I	-
WWT 2 storage tanks storing acid waste	2-WWBIO	WA2	WS093 - WS112	I	-
WWT 2 lab operations	2-WWBIO	WA2	WLB02	I	-
WWT 2 ammonia (base) scrubbers	2-WWBIO	WB2	BS052 - BS054	K	2W005 - 2W007
WWT 2 main wastewater treatment processes	2-WWBIO	WB2	WWT02	I	-
WWT 2 storage tanks storing ammonia and/or basic raw materials	2-WWBIO	WB2	ST202 - ST208	I	-
WWT 2 lab operations	2-WWBIO	WB2	WLB02	I	-
WWT 2 thermal oxidizers (solvent exhaust)	2-WWBIO	WS2	TO092 - TO094	K	2W008 - 2W010
WWT 2 main wastewater treatment processes	2-WWBIO	WS2	WWT02	I	-
WWT 2 lab operations	2-WWBIO	WS2	WLB02	I	-
WWT 2 silos storing solid raw materials	2-WWBIO	SL2	SIL03 - SIL04	I	2W011, 2W012
BIO 2 general exhaust / odor scrubber	2-WWBIO	BG2	OS003 - OS004	I	2B001 - 2B002
BIO 2 biological wastewater treatment processes	2-WWBIO	BG2	BIO02	I	-
BIO 2 storage tanks storing raw materials	2-WWBIO	BG2	ST209 - ST211	I	-
BIO 2 storage tanks with fugitive emissions	2-WWBIO	FU2	ST212 - ST216	I	-
Admin/Probe 1 acid scrubbers	1-ADMPR	AA1	AS113 - AS114	K	1A001 - 1A002
Admin/Probe 1 lab operations	1-ADMPR	AA1	ALB01	I	-
Admin/Probe 1 thermal oxidizers (solvent exhaust)	1-ADMPR	AS1	TO095 - TO096	K	1A003 - 1A004
Admin/Probe 1 lab operations	1-ADMPR	AS1	ALB01	I	-
Admin/Probe 2 acid scrubbers	2-ADMPR	AA2	AS115 - AS116	K	2A001 - 2A002
Admin/Probe 2 lab operations	2-ADMPR	AA2	ALB02	I	-
Admin/Probe 2 thermal oxidizers (solvent exhaust)	2-ADMPR	AS2	TO097 - TO098	K	2A003 - 2A004
Admin/Probe 2 lab operations	2-ADMPR	AS2	ALB02	I	-
Fab 1 Fugitive Emissions - Roadways	1-FUGEM	RF1	RWY01	I	-
Fab 1 Fugitive Emissions - SF6	1-FUGEM	SF1	SF601	I	-
Fab 2 Fugitive Emissions - Roadways	2-FUGEM	RF2	RWY02	I	-
Fab 2 Fugitive Emissions - SF6	2-FUGEM	SF2	SF602	I	-