



STATEMENT OF BASIS
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BAQ Air Permitting Division

Company Name:	Diatom US Inc	Permit Writer:	Kristen D. Tucker
Agency Air Number:	1140-0099	Date:	October 12, 2023
Permit Number:	CP-50000109 v1.0		

DATE APPLICATION RECEIVED: August 02, 2023
DATE ACCEPTED INTO EXPEDITED REVIEW: August 04, 2023

PROJECT DESCRIPTION

Diatom US Inc. (Diatom) is requesting a construction permit for a sodium silicate production facility. The proposed facility will include the following equipment and control devices:

- F06: 14.38 MMBTU/hr Natural Gas-Fired Furnace 06
 - SF1: Sleeve Filter 01
- F07: 14.38 MMBTU/hr Natural Gas-Fired Furnace 07
 - SF2: Sleeve Filter 02
- Sand01: Sand Silo with Voluntary Bin Vent Filter (BV1)
- Soda01: Soda Ash Silo with Voluntary Bin Vent Filter (BV2)
- Mix01: Mixture Silo 01 with Voluntary Bin Vent Filter (BV3)
- Mix02: Mixture Silo 02 with Voluntary Bin Vent Filter (BV4)
- SS01: Sodium Silicate Silo 01 with Voluntary Bin Vent Filter (BV5)
- SS02: Sodium Silicate Silo 02 with Voluntary Bin Vent Filter (BV6)

FACILITY DESCRIPTION

SIC CODE: 2819 – Industrial Inorganic Chemicals, Not Elsewhere Classified
NAICS CODE: 325188 (325180) – Other Basic Inorganic Chemical Manufacturing

Diatom is proposing to construct and operate a sodium silicate production facility. The facility will produce sodium silicate by heating and fusing sand and soda ash in two natural gas-fired furnaces.

The sand and soda ash will be delivered via rail car and unloaded onto belt conveyors that will fill the silos making up the raw material storage system (Sand01, Soda01). These raw materials will be transferred to a mixer for blending to specification. The mixed material will then be stored in one of two dedicated silos (Mix01, Mix02) that feed into the two 14.38 MMBTU/hr natural gas-fired furnaces (F06, F07) during the fusion process. The melted product, liquid silicate, will then be discharged from the furnaces onto a steel conveyor with a water system to cool the product as it is transported to the sodium silicate storage silos (SS01, SS02).

OPERATING PERMIT STATUS

The proposed facility has not been issued an operating permit. Upon completion of this project, the facility must request a Conditional Major operating permit.

EMISSIONS

Emission calculations are based on results from a stack test at sister facility Diatom Brazil, conducted April 5-6, 2023 and relevant emission factors from AP-42. The storage silos each employ the use of a voluntary bin vent filter. As such reductions from these control devices are not used to calculate controlled emissions.



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PROJECT EMISSIONS								
Emission ID	Control Device Type	Percent Control	Pollutant	Uncontrolled		Controlled		Basis
				lb/hr	TPY	lb/hr	TPY	
F06, F07 (Total)	Sleeve Filter	98%	PM/PM ₁₀ / PM _{2.5}	3825.5	873.4	76.52	17.47	Based on 2023 Diatom Brazil stack test results
	N/A	N/A	NO _x	125.6	28.68	--	--	
			SO ₂	2.28	0.52	--	--	
			CO	4.20	0.96	--	--	
			VOC	0.39	0.09	--	--	
			HAP	0.508	0.116	--	--	AP-42 Chapter 1.4, Table 1.4-3 and Table 1.4-4
Sand01	Voluntary Bin Vents		PM/PM ₁₀ / PM _{2.5}	0.007	0.032	--	--	AP-42 Chapter 11.12, Table 11.12- 2
Soda01			PM/PM ₁₀ / PM _{2.5}	0.013	0.055	--	--	
Mix01			PM/PM ₁₀ / PM _{2.5}	0.036	0.159	--	--	
Mix02			PM/PM ₁₀ / PM _{2.5}	0.036	0.159	--	--	
SS01			PM/PM ₁₀ / PM _{2.5}	0.031	0.136	--	--	
SS02			PM/PM ₁₀ / PM _{2.5}	0.031	0.136	--	--	
Exempt Activities								
Misc. Solvent Cleaning	N/A	N/A	VOC	0.42	1.83	--	--	Calculation Based on SDS
300 kW Emergency Generator	N/A	N/A	PM/PM ₁₀ / PM _{2.5}	1.0	0.05	--	--	AP-42 Chapter 3.3, Table 3.3-1 based on 100 hr/yr operating time
			NO _x	14.2	0.708	--	--	
			SO ₂	0.9	0.047	--	--	
			CO	3.1	0.153	--	--	
			VOC	1.2	0.058	--	--	
900 kW Emergency Generator	N/A	N/A	PM/PM ₁₀ / PM _{2.5}	0.9	0.044	--	--	AP-42 Chapter 3.4, Table 3.4-1 based on 100 hr/yr operating time
			NO _x	28.2	1.41	--	--	
			SO ₂	4.5	0.223	--	--	
			CO	7.5	0.375	--	--	
			VOC	0.8	0.04	--	--	



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Emission ID	Control Device Type	Percent Control	Pollutant	Uncontrolled		Controlled		Basis
				lb/hr	TPY	lb/hr	TPY	
Generators (Total)	N/A	N/A	HAP	0.066	0.015	--	--	AP-42 Chapter 3.3, Table 3.3-4 and Chapter 3.4, Table 3.4-3

PROJECT EMISSIONS							
Pollutant	Uncontrolled		Controlled		PTE		
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	
PM/PM10/PM2.5	3828.7	874.2	79.10	17.72	3828.7	< 100.0	
NO _x	134.90	30.80	--	--	134.90	30.80	
SO ₂	3.46	0.79	--	--	3.46	0.79	
CO	6.52	1.49	--	--	6.52	1.49	
VOC	8.84	2.02	--	--	8.84	2.02	
Total HAP	0.574	0.131	--	--	0.574	0.131	

SOURCE TEST REQUIREMENTS

An initial source test for PM, PM₁₀, PM_{2.5}, and NO_x will be required to verify emission factors from the furnaces (F06, F07). Source testing shall be conducted within 180 days of startup. The owner/operator shall use the initial emission factors submitted in the original application, until new emission factors developed from source testing have been approved.

REGULATIONS

Applicable - Section II(E) (Synthetic Minor)

The facility has uncontrolled emissions over the Title V major threshold of 100.0 TPY of PM, PM₁₀, and PM_{2.5} and over the PSD major threshold of 250.0 TPY of PM₁₀ and PM_{2.5}. The facility is requesting a federally enforceable limit to stay below these thresholds and avoid Title V and PSD permitting.

Synthetic Minor Limits					
Permit ID	Equipment ID	Permit Issue Date	Pollutant	Emission Limit (TPY)	Explanation
CP-50000109 v1.0	Facility Wide	October 12, 2023	PM	< 250.0	PSD Avoidance
			PM ₁₀	< 250.0	
			PM _{2.5}	< 250.0	
			PM	< 100.0	Title V Avoidance
			PM ₁₀	< 100.0	



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Synthetic Minor Limits					
Permit ID	Equipment ID	Permit Issue Date	Pollutant	Emission Limit (TPY)	Explanation
			PM _{2.5}	< 100.0	

Not Applicable - Standard No. 1 (*Emissions from Fuel Burning Operations*)

This project does not include any fuel burning sources as defined by this standard. S.C. Regulation 61-62.1, Section I defines a fuel burning operation as the “use of a furnace, boiler, device, or mechanism used principally, but not exclusively, to burn any fuel for the purpose of indirect heating in which the material being heated is not contacted by and adds no substance to the productions of combustion.” The furnaces will be direct-fired and, therefore, will not meet this definition.

Not Applicable - Standard No. 3 (state only) (*Waste Combustion and Reduction*)

This project does not include any waste combustion or reduction sources.

Applicable - Standard No. 4 (*Emissions from Process Industries*)

This project is subject to opacity and PM limits for the furnaces and silos. Visible emissions must not exhibit an opacity greater than 20%. See table below for PM limits.

Process	Max Process Weight Rate (tons/hr)	PM Allowable at Max (lb/hr)	Uncontrolled Emissions PM (lb/hr)	Controlled Emissions PM (lb/hr)	Monitoring
Furnaces (F06, F07)	9.92	19.08	199.41	3.99	Daily Pressure Drop Readings
Silos (Sand01, Soda01, Mix01/02, SS01/02)	24.78	35.23	0.155	--	Uncontrolled emissions are less than the allowable limit and do not require monitoring

Not Applicable - Standard No. 5 (*Volatile Organic Compounds*)

This standard applies to “existing processes;” the facility will be a new source.

Applicable - Standard No. 5.2 (*Control of Oxides of Nitrogen (NOx)*)

The facility is subject to the NO_x limit for the furnaces, F06 and F07, which fall under the category of “Fuel Combustion Sources burning any non-specified fuel not listed in Table [1 of this standard]”. The source is required to utilize low-NO_x burners or equivalent technology to achieve a 30% reduction of NO_x emissions from uncontrolled levels. AP-42 Chapter 11.15, Table 11.15-1 lists an uncontrolled NO_x emission factor as 6.2 lb/ton for a melting furnace producing container glass. Therefore, 4.34 lb/ton would represent a 30% reduction for the furnace. Stack test data from a similar source at sister facility, Diatom Brazil, provided a NO_x emission rate of 0.66 lb/ton, well under a 30% percent reduction. The report was reviewed by source evaluation. The facility will conduct an initial source test after startup to verify that



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the furnace will meet this requirement. Period testing has been waived based on the minimal NO_x emissions expected from the source.

Not Applicable - Standard No. 7 (*Prevention of Significant Deterioration*)

The facility is not one of the 28 named source categories under this standard; therefore, the facility has a major source threshold of 250.0 TPY under this standard. The facility has the potential to emit PM₁₀ and PM_{2.5} over this threshold but has requested a federally enforceable limit of less than 250.0 TPY to avoid PSD permitting.

Applicable - 61-62.6 (*Control of Fugitive Particulate Matter*)

The facility is subject to statewide requirements.

40 CFR 60 and 61-62.60 (*New Source Performance Standards (NSPS)*)

Not Applicable - Subpart Dc (*Small Industrial-Commercial-Institutional Steam Generating Units*)

This subpart applies to each steam generating unit at an affected facility, with a capacity of 100 MMBTU/hr or less, but greater than 10 MMBTU/hr. The facility will not operate any indirect-fired units that meet the definition of steam generating unit as defined by this subpart and, therefore, is not subject to this subpart.

Not Applicable - Subpart N (*Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973*)

This subpart applies to each basic oxygen process furnace. The subpart defines a basic oxygen process furnace as "any furnace with a refractory lining in which molten steel is produced...". The furnaces included in this project will not produce molten steel and, therefore, are not subject to this subpart.

Applicable - Subpart CC (*Glass Manufacturing Plants*)

This subpart applies to each glass melting furnace at an affected facility. The subpart defines a glass melting furnace as "a unit comprising a refractory vessel in which raw materials are charged, melted at high temperature, refined, and conditioned to produce molten glass." The furnaces included in this project meet this definition and, therefore, are subject to the requirements of this subpart.

Not Applicable - Subpart PPP (*Wool Fiberglass Insulation Manufacturing Plants*)

This subpart applies to each rotary spin wool fiber glass insulation manufacturing line. The facility will not produce wool fiberglass insulation and, therefore, is not subject to this subpart.

Applicable - Subpart IIII (*Stationary Compression Ignition Internal Combustion Engines*)

This subpart applies to stationary compression ignition (CI) internal combustion engines (ICE). The facility plans to install and operate two emergency generators that will be subject to this subpart.

40 CFR 61 and 61-62.61 (*National Emission Standards for Hazardous Air Pollutants (NESHAP)*)

This facility does not emit the pollutants in a way that is subject to this standard (asbestos, benzene, beryllium, coke oven emissions, arsenic, mercury, radio nuclide, radon, or vinyl chloride).



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40 CFR 63 and 61-62.63 (*National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories*)

Not Applicable - Subpart NN (*Wool Fiberglass Manufacturing at Area Sources*)

Subpart NNN (*Wool Fiberglass Manufacturing*)

These subparts apply to wool fiberglass manufacturing facilities. Subpart NN applies to facilities that are an area source, while Subpart NNN applies to facilities that are a major source. The facility will not be a major source and will not manufacture wool fiberglass and, therefore, is not subject to either of these subparts.

Not Applicable - Subpart HHHH (*Wet-Formed Fiberglass Mat Production*)

This subpart applies to drying and curing ovens at a wet-formed fiberglass mat production facility at a major source of HAP. The facility will not be a major source and will not produce wet-formed fiberglass mat and, therefore, is not subject to this subpart.

Applicable - Subpart ZZZZ (*Stationary Reciprocating Internal Combustion Engines*)

This subpart applies to stationary reciprocating internal combustion engines (RICE) at a major or area source. The facility plans to install and operate two emergency generators that will be subject to this subpart. Compliance with this subpart is covered with compliance with NSPS Subpart IIII.

Not Applicable - Subpart SSSSS (*Glass Manufacturing Area Sources*)

This subpart applies to each continuous furnace charged with one or more glass manufacturing metal HAP at an area source of HAP. The facility is an area source and will install two continuous furnaces; however, the raw material used to charge the furnaces does not contain any metal HAP. Therefore, the facility is not subject to this subpart.

Not Applicable - 61-62.68 (*Chemical Accident Prevention Provisions*)

The facility will not use or store any chemical subject to this regulation above threshold quantities.

Not Applicable - 40 CFR 64 (*Compliance Assurance Monitoring*)

The facility has requested federally enforceable emission limits to avoid Title V permitting, therefore, it is not subject to this regulation.

AMBIENT AIR STANDARDS REVIEW

Applicable - Standard No. 2 (*Ambient Air Quality Standards*)

The facility has demonstrated compliance through modeling. See summary dated 8/8/23.

Applicable - Standard No. 8 (state only) (*Toxic Air Pollutants*)

The facility has demonstrated compliance through modeling. See summary dated 8/8/23.

PERIODIC MONITORING



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ID	Regulatory Requirement	Measured Parameter	Required Monitoring Frequency	Reporting Frequency	Monitoring Basis/ Justification
Facility Wide	< 100.0/250.0 tpy PM, PM ₁₀ , PM _{2.5} S.C. Regulation 61-62.1, Section II (E)	PM, PM ₁₀ , PM _{2.5} emissions	Monthly	Annually	Required per S. C. Regulation 61-62.1, Section II(E)
F06, F07	20% Opacity S.C. Regulation 61-62.5, Standard No. 4, Section VIII	Pressure Drop	Daily	--	Required per Standard No. 4
	PM limit per PWR S.C. Regulation 61-62.5, Standard No. 4, Section IX				
F06, F07	4.34 lb NO _x /ton glass S.C. Regulation 61-62.5, Standard No. 5.2, Section IV	Record amount/type of fuel	Monthly	--	Required per Standard No. 5.2

PUBLIC NOTICE

This construction permit(s) will undergo a 30-day public notice period, in accordance with SC Regulation 61-62.1, Section II(N) and, to establish SC Regulation 61-62.1, Section II(E), synthetic minor limitations of < 100.0/250.0 TPY PM, PM₁₀, and PM_{2.5} for Title V and PSD avoidance. The comment period was open from September 1, 2023 to September 30, 2023 and was placed on the BAQ website during that time period. Comments were received during the comment period.

SUMMARY AND CONCLUSIONS

It has been determined that this source, if operated in accordance with the submitted application, will meet all applicable requirements and emission standards.