GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

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NARRATIVE

TO: Heather Brown

FROM: Wendy Troemel

DATE: June 28, 2023

Facility Name:	**Aspen Aerogels, Inc.**
AIRS No.:	031-00066
Location:	Register, GA (Bulloch County)
Application #:	28849
Date of Application:	April 24, 2023, updated May 31, 2023

Application/Background Information

Aspen Aerogels, Inc. (Aspen) has submitted an application to construct and operate a new manufacturing facility that produces thermal insulating blankets for industrial applications. The new facility will be constructed at 400 Rocky Road, Register, Georgia (Bulloch County). Construction is anticipated to begin as soon as possible.

Application No. 28849 (processed as an Expedited Permit) was received on April 26, 2023, updated on May 31, 2023, with additional information, and entered into the Expedited Permitting Program on May 18, 2023. A public advisory was issued on May 3, 2023, and expired on June 2, 2023. No comments were received. The greenfield facility was assigned AIRS No. 031-00066. The facility will be permitted to operate 8,760 hours/year. Bulloch County is classified as attainment for all applicable pollutants.

Process Description

Thermal blanket production rates vary on size, thickness, and grade of blanket required; however, the process steps are mostly the same throughout. Facility production is just under 25,000 tons/year product. The process includes both batch and continuous process operations. The facility will operate four natural gas-fired boilers rated at 26.8 MMBtu/hr each. Construction may be split into two roughly 50% phases with one set of emissions control devices properly sized for each phase. The facility will install two venturi scrubbers for PM, several dust collectors, two regenerative thermal oxidizers (RTO) for facility-wide VOC emissions control from the process vent header (PVH), and two selective catalytic reduction (SCR) units for NO_X control from the RTOs. The facility also includes one 150 hp diesel fire pump, one 2,333 hp diesel emergency generator, and six cooling towers.

- Tanks and Reactors –The primary solvent used in the process is ethanol, which is used in both a virgin state and recovered for reuse within the extraction steps. Tanks will be held above atmospheric pressure with an N_2 blanket. Tank emissions from tank transfer and breathing losses are vented to the PVH and then routed to an RTO. All tanks are smaller than the 40 CFR 60 Subpart Kb applicability threshold of 19,813 gallons.

Step one of the process is reacted in RO01 through RO03, while step 2 is reacted in tanks RO04 through RO06. Once these reactions are completed, the two are mixed in RO01 through RO03, and then transferred to RO07 through RO09 for storage and distribution to the blanket casting lines. RO01 through RO06 are closed vessels and produce no fugitive emissions. Makeup and distribution tanks will also be installed along the reactors. These tanks have N_2 blanketing and cross-connected vapor spaces to handle emissions based on the batch usage and constant filling/emptying of tanks. All VOC emissions are collected in the PVH and routed to an RTO.

- Catalyst and Opacifier Preparation – catalyst for the above solution mixture is provided by equipment in group IA01. Powdered agents from a dump station are added to an ethanol stream through rotary air locks, generating minimal dust that will be collected by dust collectors DC01 through DC04. The solution provides opacity for the blanket products.

- Casting Lines – The reacted ethanol/catalyst/powdered agents mixtures are sent to casting lines CL01 through CL09 and poured over the cloth batting fabric on the casting table, a horizontal conveyor under a vent hood. The mixture fills the fabric and the ingredients gel over a period of approximately 60 seconds into the formed blanket. The final blanket thickness can vary. The blankets then cure on the tables into the blanket product. Spent solution is drained to a purification system to either recover the ethanol or be sold as waste fuel. Ethanol emissions from this area are vented to a stack via an exhaust system.

- Aging and Extraction – From the casting tables, blankets are transferred to 60 extractor vessels using transfer cans in order to contain ethanol emissions. First, the blankets are exposed to a high temperature and enclosed aging process. Ethanol is supplied to the system from aging fluid tanks AN10 and AN11, and pumps and heat exchangers maintain the high temperature. After aging, the ethanol is drained into the acid neutralization sparging tanks AN01 through AN09 where dissolved CO_2 is removed by sparging with nitrogen, and ethanol is recovered. Second, the blankets are exposed to high pressure and high temperature in the extraction step, where CO_2 is used to extract ethanol. The CO_2/ethanol mixture is sent to Recovery System REC1, which recovers ethanol for reuse and returns the ethanol to Tanks AN01 through AN09. REC1 consists of a water scrubber and three CO_2 liquefaction plants. CO_2 is compressed in a liquefication plant and returned to the process for reuse. Emissions are routed to an RTO through the PVH.

- ANU Sparging – Tanks AN01 through AN09 receive ethanol solutions from the casting tables and aging fluid from the extractors. Any pH adjusting is done with sulfuric acid. The aqueous ethanol solutions are sparged with N_2 to remove CO_2 from the ethanol. Tanks AN10 and AN11 provide buffer capacity for recovered and filtered ANU solutions. Emissions are routed to an RTO through the PVH.

- Thermal Ovens – "Dry" blankets are removed from the transfer cans and sent to the thermal curing ovens OV01 through OV05 to drive out all remaining ethanol and by-products. Emissions are captured by a venturi scrubber for PM, emissions, followed by an RTO for ethanol and other VOC emissions, and finally SCR for NO_X control from the RTO. The ovens can operate up to 630^{o}F.

Equipment Table

ID	Equipment	APCE ID No.	Stack #
RO01 – RO03	Reactor tanks 1, 2, and 3 - 12,000 gal – reactor tanks, 50 psi	PVH	ST01/ST02
RO04 – RO06	Reactor tanks 1, 2, and 3 - 6,000 gal – Solution mix tanks, 50 psi	PVH	ST01/ST02
RO07 – RO09	Distribution tanks 1, 2, and 3 - 12,000 gal – mix tanks for distribution to casting, 4 psi	PVH	ST01/ST02
T001	Storage Tank – 10,000 gal, FR, 2.5 psi	PVH	ST01/ST02
T002	EtOH Day Tank – 9,000 gal, FR, 2.5 psi	PVH	ST01/ST02
T003	EtOH Aging Fluid Tank #1– 14,000 gal, 50 psi	PVH	ST01/ST02
T004	EtOH Aging Fluid Tank #2– 14,000 gal, 50 psi	PVH	ST01/ST02
AN01 – AN09	Acid Neutralization/N_2 Sparging (ANU) Working Tanks 1-9 – 13,000 gal, 2.5 psi	PVH	ST01/ST02
AN10 & AN11	ANU ethanol solutions recycle/buffer tanks, 13,000 gal, FR, 2.5 psi	PVH	ST01/ST02
CL01-CL09	Casting lines – blanket casting and forming	Bldg Vent	CL01-CL09
REC1	EtOH Extraction and CO_2/EtOH recycle – includes extractors, EtOH recovery scrubber, and CO_2 recycle/liquefication trains	PVH	ST01/ST02
OV01-OV05	Thermal Ovens 1 through 5- electric ovens for drying and curing blankets	TO01/TO02, SCR1/SCR2, VS01/VS02	ST01/ST02
IA01	Catalyst System	DC01-DC04	Indoor exhaust
BL01-BL04	Natural Gas Boilers – 26.8 MMBtu/hr each, low NO_X burners	None	ST12 Atmosphere
GEN1	Emergency Generator – 2,333 hp, 15 ppm sulfur diesel	None	ST16 Atmosphere
FP01	Fire Pump – 150 hp, 15 ppm sulfur diesel	None	ST17 Atmosphere
PVH	Process Vent Header	TO01/TO02	ST01/ST02
TO01/TO02	Thermal Oxidizers	SCR1/SCR2	ST01/ST02

FR – fixed roof on storage tanks
TO – (regenerative) thermal oxidizer
SCR – selective catalytic reduction (NO_X controls)
VS – venturi scrubber
DC – dust collector
ST - stack
PVH – Process Vent Header

Emissions Summary

The facility provided potential and estimated emissions. The facility requested limits to avoid classification as a Title V major source with 100 tpy limits for VOC, NO_X, and PM. Emission factors from AP-42, Section 1.4, Table 1.4-1 were used to calculate emissions from the four boilers and two RTO burners. Those units will only fire natural gas. Emission factors from AP-42, Section 3.1, Table 3.3-1 were used to calculate emissions from the fire pump and emergency generator. EPD calculations might be more conservative than those provided by the facility and are used to demonstrate the worst-case emissions scenario.

SO_2 and CO emissions are calculated to be well below the synthetic minor 100 tpy thresholds; and no further monitoring, recordkeeping, or reporting is required for these pollutants.

Most NO_X emissions are produced by the RTOs, based on mass balances and process simulations. The facility is proposing SCR units injected with aqueous ammonia, at an estimated 97% control efficiency, to be installed after the RTOs to reduce NO_X emissions. The balance of the facility NO_X emissions is from products of combustion.

Most VOC emissions from the facility will be collected in the PVH and routed to one of two RTOs for destruction. The facility used material balance and engineering estimates to determine potential emissions, and an estimated RTO destruction efficiency of 97% to calculate actual VOC emissions. The balance of the VOC emissions is from tanks that are not connected to the vent header and fugitive sources, as well as products of combustion.

Filterable PM, PM Total, PM_{10}, $PM_{2.5}$ emissions

Conservatively, it was assumed that total PM, total PM_{10}, and total $PM_{2.5}$ were all equal and calculated in the same manner. The facility has indicated that venturi scrubbers and dust collectors will control PM emissions from the oven exhaust and catalyst systems, respectively. The exhaust from the ovens will pass through the venturi scrubbers VS01 and VS02 for PM removal, then vent to the RTOs for VOC control, and finally exhaust outside through a stack. Dust collectors DC01-DC04 will vent indoors. Since the potential PM emissions exceed 100 tpy, the facility will be required to conduct an initial performance test for PM emissions from the scrubbers and establish monitoring parameters for each unit, with subsequent testing every 60 months. Due to the low loading on the dust collectors, no testing is required. Pressure differential for both the dust collectors and scrubbers will be monitored once per 8 hours of operation. The facility will also perform weekly visible emission checks of the exterior stacks and develop and implement a preventative maintenance program (PMP) for the dust collectors. The facility will be capped at 100 tpy of total PM emissions and will be required to create a protocol for calculating emissions and track monthly and rolling 12-month total PM emissions to assure compliance with this avoidance limit.

PM	**AP-42 Table**	**PM Emission Factor & other information**	**Capacity**	**Uncontrolled Emissions (tpy)**	**Controlled Emissions (tpy)**
Cooling Towers	13.4-1	5,000 ppm max TDS	5,000 gal/min (X6)	---	0.09
Ovens (scrubbers)	---	95% capture efficiency ^		218.1	10.9
Catalyst System	---	95% capture efficiency ^	---	0.2	0.02
RTO burners - NG combustion	1.4-1	7.6 lb/MMscf 1,020 MMBtu/MMscf	5.0 MMBtu/hr (X2)	0.33	0.33
Boilers	1.4-1	7.6 lb/MMscf 1,020 MMBtu/MMscf	26.8 MMBtu/hr (X4)	3.50	3.50
Emergency Generator	3.3-1	0.31 lb/MMBtu Btu/hr = 2,545*hp	2,333 hp 500 hr/yr	0.46	0.46
Fire Pump	3.3-1	0.31 lb/MMBtu Btu/hr = 2,545*hp	150 hp 500 hr/yr	0.03	0.03
			TOTAL	**222.6**	**15.5**

^ Calculated efficiency

NO_X emissions

The facility is utilizing ultra-low NO_X burners on the 4 boilers, with a vendor guarantee of 9 ppm (15 lb/MMBtu). Using the full AP-42 factor of 100 lb/MMscf with the boilers, the facility would still be below the emission limit of 100 tpy of NO_X. The facility is installing SCR units after the RTOs to reduce NO_X emissions. The vent stream coming out of the RTO will be injected with aqueous ammonia before passing over a catalyst bed. The design efficiency is asserted to be 97%. Since the potential NO_X emission exceed 100 tpy, the facility will be required to conduct an initial performance test for NO_X emissions from the SCR units and establish appropriate monitoring parameters for each unit, with subsequent testing every 60 months. Temperature and flow will be monitored once per 8 hours of operation. The facility will be capped at 100 tpy of total NO_X emissions and will be required to create a protocol for calculating emissions and track monthly and rolling 12-month total NO_X emissions to assure compliance with this avoidance limit.

NO_X	**AP-42 Table**	**NO_X Emission Factor & other information**	**Capacity**	**Uncontrolled Emissions (tpy)**	**Controlled Emissions (tpy)**
RTOs - SCR		97% destruction ^		403	12.3
RTO burners - NG combustion	1.4-1	100 lb/MMscf 1,020 MMBtu/MMscf	5.0 MMBtu/hr (X2)	4.3	4.3
Boilers	---	15 lb/MMscf* 1,020 MMBtu/MMscf	26.8 MMBtu/hr (X4)	6.9 (46.0 based on 100 lb/MMscf)	6.9
Emergency Generator	3.3-1	4.41 lb/MMBtu Btu = 2,545*hp	2,333 hp 500 hr/yr	6.55	6.55
Fire Pump	3.3-1	4.41 lb/MMBtu Btu = 2,545*hp	150 hp 500 hr/yr	0.42	0.42
			TOTAL	**421.2**	**30.5**

*Ultra-low NO_X burners, per Vendor Guarantee, calculated to be an 85% reduction over AP-42, Section 1.4-1.
^ Designed destruction efficiency

VOC Emissions

The facility has indicated that at least two RTOs will control VOC emissions from thermal ovens, acid neutralization/N_2 sparging tanks, reactors, and emissions gathered from storage tanks via the PVH. The calculations are based on a 97% destruction efficiency. Since the potential VOC emissions exceed 100 tpy, the facility will be required to conduct an initial performance test for VOC emissions from each RTO and establish appropriate monitoring parameters that demonstrates at least 97% VOC destruction efficiency, with subsequent testing every 60 months. Combustion temperature will be monitored continuously. Fugitive VOC emissions from catalyst systems, transfer cans, cooling towers, and valves/flanges are estimated at 2 tpy. The facility will be capped at 100 tpy of total VOC emissions and will be required to create a protocol for calculating emissions and track monthly and rolling 12-month total VOC emissions to assure compliance with this avoidance limit.

VOC	AP-42 Table	VOC Emission Factor & other information	Capacity	Uncontrolled Emissions (tpy)	Controlled Emissions (tpy)
Various process Steps		Process Simulation & Engineering Estimates		1,482.4	73.6
Fugitives		Process Simulation & Engineering Estimates		2.0	2.0
RTOs (NG)	1.4-1	5.5 lb/MMscf 1,020 MMBtu/MMscf	5.0 MMBtu/hr (X2)	0.24	0.24
Boilers (NG)	1.4-1	5.5 lb/MMscf* 1,020 MMBtu/MMscf	26.8 MMBtu/hr (X4)	2.53	2.53
Emergency Generator	3.3-1	TOC exhaust 0.35 lb/MMBtu	2,333 hp 500 hr/yr	0.52	0.52
Fire Pump	3.3-1	TOC exhaust 0.35 lb/MMBtu	150 hp 500 hr/yr	0.03	0.03
			TOTAL	**1,487.7**	**78.9**

Facility-Wide Emissions
(in tons per year)

Pollutant	Uncontrolled Emissions	Potential Controlled Emissions	EPD Calculated Controlled Potential Emissions
$PM/PM_{10}/PM_{2.5}$	218/218/218	<100*	15.5
NOx	424	<100*	30.5
SO_2	0.28	0.28	0.28
CO	41.2	41.2	41.2
VOC	1,482.4	<100*	78.9
Max. Individual HAP	<1	<1	1
Total HAP	<1	<1	1
Total GHG (if applicable)	61,108	61,108	61,108
Max. Individual TAP – Ethanol	109.5 (MER)	<109.5	74.1

* Potential emissions based on emission limits requested in permit

Regulatory Applicability

FEDERAL RULES

Prevention of Significant Deterioration (40 CFR 52.21)

The facility's SIC code of 3296 – Mineral Wool/Mineral Wool Insulation Products – is not included in the 28 source categories listed in 40 CFR 52.21(b)(1)(i)(a). The facility is subject to the 250 tons per year threshold for regulated pollutants under PSD.

40 CFR Part 70 – Title V Applicability

To maintain emissions below the 100 tpy thresholds for VOC, PM, and NO_X, the facility is utilizing thermal oxidizers, selective catalytic reduction, several dust collectors, and venturi scrubbers.

40 CFR 60 Subpart Dc – NSPS for Small Industrial-Commercial-Institutional Steam Generating Units

This rule applies to steam generating units with a heat input capacity between 10 and 100 MMBtu/hr, constructed after June 9, 1989. All four boilers are classified as "steam-generating units" and are subject to this regulation with a rated heat input capacity of 26.8 MMBtu/hr. The units are restricted to firing natural gas only, so the PM, opacity, and SO_2 emission limitations and associated monitoring do not apply. The facility will be required to submit reports upon construction and startup of the boilers and maintain records of monthly natural gas usage.

40 CFR 60 Subpart IIII – NSPS for Stationary Compression Ignition Internal Combustion Engines and 40 CFR 63 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines

The facility has a 150 hp diesel fired emergency fire pump and a 2,333 hp diesel fired emergency generator that are classified as reciprocating internal combustion engine (RICE) units. Both units will utilize ultra-low sulfur (15 ppm) diesel. The fire pump operates at 500 hr/yr or less. For the fire pump, compliance with 40 CFR 60 Subpart IIII is demonstrated by purchasing engines certified to the emissions standards in 40 CFR 60.4205(c) and emission limitations of Table 4. For the emergency generator, compliance with 40 CFR 63 Subpart ZZZZ is demonstrated by complying with all applicable requirements of 40 CFR 60 Subpart IIII per 40 CFR 63.6590(c).

Georgia Rule 391-3-1-.02(2)(b) – Visible Emissions

Georgia Rule (b) limits the opacity of emissions from any source to less than 40%, unless a more restrictive limit applies. The rule will apply to all process equipment at the facility. Violation of the rule is not likely due to the nature of the process and the use of control equipment.

Georgia Rule 391-3-1-.02(2)(d) – Fuel-Burning Equipment

Georgia Rule (d) contains provisions for PM, opacity, and NO_X emissions from fuel-burning equipment. The boilers will be constructed after January 1, 1972 and have a heat input capacity of greater than 10 MMBtu/hr but less than 250 MMBtu/hr. The filterable PM emissions from the boilers are limited to $0.5(10/R)^{0.5}$ lb/MMBtu heat input.

Georgia Rule (d) also limits the opacity from the boilers to less than 20% opacity (6-minute average), except for one 6-minute period per hour of not more than 27% opacity. These units will not be subject to the NO_X limit under 391-3-1-.02(2)(d)4 because the capacity for each unit is less than 250 MMBtu/hr.

Georgia Rule 391-3-1-.02(2)(e) – Particulate Emission from Manufacturing Processes

Georgia Rule (e) limits the emission of particulate matter on a pound per hour basis from a source based on the ton per hour of material input. The rule applies to all process equipment at the facility. Violation of the rule is not likely due to the use of dust collectors.

Georgia Rule 391-3-1-.02(2)(g) – Sulfur Dioxide

Georgia Rule (g) limits the sulfur content of fuel burned in a unit below 100 MMBtu/hr to 2.5% or less. The facility will only fire natural gas in the boilers, which subsumes this limit and ensures compliance. Ultra-Low sulfur diesel (15 ppm) will be used in the fire pump and emergency generator.

Georgia Rule 391-3-1-.02(2)(n) – Fugitive Emissions

Georgia Rule (n) limits the opacity of fugitive emissions to 20% and requires the facility to take precautions to prevent dust from becoming airborne.

Georgia Rule 391-3-1-.02(2)(mmm) – NOx Emissions from Stationary Gas Turbines and Stationary Engines used to Generate Electricity

This rule applies to stationary gas turbines or stationary engines used to generate electricity with a nameplate capacity greater than 100 kilowatts. Emergency standby stationary gas turbines and stationary engines are exempt from limitations per 391-3-1-.02(mmm)4.(i).

RULES AND REGULATIONS THAT ARE NOT APPLICABLE

40 CFR 63 Subparts DDDDD and JJJJJJ – NESHAP for Industrial, Commercial, and Institutional Boilers (major sources and area sources)

The facility's boilers are not subject to 40 CFR 63 Subpart DDDDD since they are a minor source of HAP. 40 CFR 63 Subpart JJJJJJ applies to each boiler at area sources of HAP. However, under §63.11195(e), gas-fired boilers, as defined in §63.11237, are not subject to 63 Subpart JJJJJJ. Under §63.11237, a gas-fired boiler is defined as "any boiler that burns gaseous fuels," which includes natural gas. None of these units will be connected to a fuel oil source. Because the boilers meet this definition, they are not subject to 40 CFR 63 Subpart JJJJJJ.

40 CFR 60 Subpart Kb – NSPS for Volatile Organic Liquid Storage Vessels

Ethanol is a volatile organic liquid (VOL) and all storage tanks will be constructed after July 23, 1984. All storage tanks on site will have some concentration of ethanol stored. Storage tanks range in size from 9,000 gallons to 14,000 gallons, all of which are less than the 40 CFR 60 Subpart Kb applicability threshold of 75 m^3 (19,813 gallons). Therefore, the rule is not applicable.

40 CFR 60 Subpart RRR – NSPS for Volatile Organic Compound (VOC) Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) – Reactor Processes

While the facility includes reactors and utilizes ethanol within the manufacturing process, it does not produce any of the chemicals listed in 40 CFR 60.707 as either a product, co-product, by-product, or intermediate. Therefore, this rule is not applicable.

40 CFR 60 Subpart VVa – NSPS for Equipment Leaks of VOC in the SOCMI Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006

While the facility includes utilizes ethanol within the manufacturing process, it does not produce any of the chemicals listed in 40 CFR 60.489 as either a product, co-product, by-product, or intermediate. Therefore, this rule is not applicable.

Georgia Rule 391-3-1-.02(2)(bb) – Petroleum Liquid Storage

This rule applies to tanks that have a capacity of greater than 40,000 gallons that store a petroleum liquid. Ethanol is not a petroleum liquid; therefore, this rule does not apply.

Georgia Rule 391-3-1-.02(2)(nn) – VOC Emissions from External Floating Roof Tanks

This rule applies to tanks that have a capacity of greater than 40,000 gallons that store a petroleum liquid. Ethanol is not a petroleum liquid; therefore, this rule does not apply.

Georgia Rule 391-3-1-.02(2)(vv) – Volatile Organic Liquid Handling and Storage

This rule applies to the transfer of VOLs in quantities greater than 4,000 gallons without tanks being equipped with submerged fill pipes and in specified counties, which does not include Bulloch County; therefore the facility is not subject to this rule.

Georgia Rule 391-3-1-.02(2)(ccc) – VOC Emissions from Bulk Mixing Tanks

This rule applies to all mixing tanks in specified counties, which does not include Bulloch County; therefore the facility is not subject to this rule.

Georgia Rule 391-3-1-.02(2)(lll) – NO_X Emissions from Fuel-Burning Equipment

Georgia Rule (lll) limits NO_X emissions from all fuel-burning equipment with a heat input capacity between 10 and 250 MMBtu/hr installed after May 1, 1999 in specific counties, but the listed counties do not include Bulloch County; therefore this facility is not subject to this rule.

Georgia Rule 391-3-1-.02(2)(rrr) – NO_X Emissions from Small Fuel-Burning Equipment

Georgia Rule (rrr) limits NO_X emissions from all fuel-burning equipment that have the potential to emit more than 1 tpy NO_X, and are not subject to Georgia Rules (jjj) or (lll) in specific listed counties, but the listed counties do not include Bulloch County; therefore this facility is not subject to this rule.

TESTING AND MONITORING REQUIREMENTS

See discussions above with individual pollutant emission information.

SYNTHETIC MINOR LIMITS

The facility is required to create a protocol for calculating site-wide VOC, NO_X, and PM emissions based on fuel usage, materials usage, materials balances, emission factors, results from compliance testing, etc. All emissions must be calculated site-wide both monthly and on a consecutive twelve-month rolling average and reported to the Division.

Permit Conditions

Conditions 1.1 through 1.5 are general conditions that apply to all SIP sources.

Condition 2.1 limits the facility to less than 100 tpy each VOC, NO_X, and PM emissions. The facility requested these limits to avoid applicability to 40 CFR Part 70.

Condition 2.2 requires the facility to operate the air pollution control equipment at all times the associated process equipment is in operation.

Condition 2.3 subjects the four boilers at the facility to all applicable requirements of 40 CFR 60 Subparts A and Dc.

Condition 2.4 subjects the boilers to the PM and opacity requirements of Georgia Rule (d).

Condition 2.5 restricts the boilers to firing natural gas only in order to remove the facility from applicability to 40 CFR 63 Subpart JJJJJJ.

Condition 2.6 subjects the emergency generator and fire pump to the general requirements of 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ.

Condition 2.7 requires the thermal oxidizer to be operated such that it meets a 97% minimum VOC destruction efficiency. This is to ensure that the facility-wide emissions remain under 100 tpy VOC emissions. It also requires the facility to maintain records of bypass and to estimate emissions during such times for the monthly and yearly VOC emissions total.

Condition 2.8 restricts the facility to firing natural gas only in the thermal oxidizer burners.

Condition 2.9 subjects all process equipment to an opacity of 40% (Georgia Rule (b)).

Condition 2.10 subjects to all applicable equipment to the requirements of Georgia Rule (e).

Condition 3.1 is the general fugitive emission requirement under Georgia Rule (n).

Condition 4.1 is a general condition that requires the facility to perform routine maintenance in order to keep air pollution control equipment in good working order.

Condition 4.2 requires the facility to keep an inventory of filter bags/cartridges on hand to replace any defective bags in any of the dust collectors.

Condition 4.3 outlines the parameters the facility must continue monitoring for the APCE after performance testing.

Condition 4.4 requires the facility to inspect the catalyst beds in SCR1 and SCR2 yearly and to replace the catalyst as needed based on these activity checks and the manufacturer’s recommendations.

Condition 5.1 lists the monitoring parameters and frequency of data collection for the dust collectors, venturi scrubbers, selective catalytic reduction systems, and thermal oxidizers.

Condition 5.2 requires a weekly VE check from stacks ST01 and ST02.

Condition 5.3 requires the facility to develop a preventative maintenance program for dust collectors DC01 through D04.

Condition 6.1 and 6.2 are general testing provisions that apply to all sources.

Condition 6.3 outlines the specific test methods for the facility.

Condition 6.4 requires the facility to conduct various performance tests for VOC, NO_X, and PM emissions and establish appropriate monitoring parameters for the thermal oxidizers, venturi scrubbers, and selective catalytic reduction systems. On-going tests will occur every sixty months.

Conditions 7.1 and 7.2 are general provisions that apply to all sources.

Condition 7.3 requires the facility to notify the Division of construction and startup of the boilers under 40 CFR 60 Subpart Dc.

Condition 7.4 requires monthly natural gas usage records specifically for the boilers under 40 CFR 60 Subpart Dc, but also includes all fuel-burning sources.

Condition 7.5 outlines the records the facility must maintain for the operation of the boilers, fire pump, and emergency generator.

Condition 7.6 requires the facility to submit to the Division in writing a detailed protocol the facility will use to calculate site-wide NO_X, VOC, and PM emissions for approval.

Conditions 7.7 and 7.8 require the facility to calculate monthly and 12-month rolling total VOC emissions. Prior to site-specific performance testing, the facility will use the emission factors as described in Application No. 28849.

Conditions 7.9 and 7.10 require the facility to calculate monthly and 12-month rolling total NO_X emissions. Prior to site-specific performance testing, the facility will use the emission factors as described in Application No. 28849.

Conditions 7.11 and 7.12 require the facility to calculate monthly and 12-month rolling total PM emissions. Prior to site-specific performance testing, the facility will use the emission factors as described in Application No. 28849.

Condition 7.13 outlines the information required to be submitted in the semi-annual reports, which includes parameter monitoring excursions, bypass of APCE, fuel-usage records, and monthly and twelve-month rolling total VOC, PM, and NO_X emissions.

Condition 7.14 requires the facility to send in notification of startup.

Condition 8.1 is a general condition that applies to all Georgia air permits.

Condition 8.2 requires the facility to calculate and pay air permit fees.

Toxic Impact Assessment

Facility-wide emissions for arsenic and chromium VI (products of combustion) exceeded the minimum emission rates (MER) as outlined in EPD's *Guidelines for Ambient Impact Assessment of Toxic Air Pollutants (TAP)* due to natural gas consumption. While ethanol is also a TAP, the MER for ethanol is 219,000 lb/year (109.5 tpy) and the facility has estimated ethanol emissions at 74.1 tpy. Additionally, the facility is limited to 100 tpy VOC, so no further limitation on ethanol is needed. The facility provided a facility wide toxic impact assessment for arsenic and chromium VI using SCREEN3. The totals below are from natural gas combustion in all four boilers and the two RTOs operating at 8,760 hours/year.

The Division reviewed the inputs and results and agrees with the finding that all pollutants are less than the applicable acceptable ambient concentrations. Please see the application for a complete copy of the report.

TAP	Ave. Period	AAC ($\mu g/m^3$)	MER (lb/yr)	Facility emissions (lb/yr)	Emission rate (lb/hr)	Total ($\mu g/m^3$)	% of AAC	Pass
Arsenic	15-min	0.2	0.0567	0.202	2.3×10^{-5}	1.29×10^{-5}	0.007	YES
	Annual	2.33×10^{-4}				2.58×10^{-6}	1.1	YES
Chromium VI mist	Annual	8×10^{-5}	0.0195	0.0563	6.43×10^{-6}	7.30×10^{-7}	0.9	YES

Summary & Recommendations

The public advisory for the Aspen Aerogels, Inc. facility expired on June 2, 2023, and no comments were received. The facility has been classified as a synthetic minor source for VOC, PM, and NO_X emissions and the appropriate operating and testing/recording/reporting requirements have been included in this "S" permit. The facility has indicated that it can comply with all applicable rules and regulations; therefore, I recommend that Air Quality Permit No. 3296-031-0066-S-01-0 be issued to Aspen Aerogels, Inc.