NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date:

Region: Raleigh Regional Office
County: Chatham
NC Facility ID: 1900138
Inspector's Name: N/A
Date of Last Inspection: N/A
Compliance Code: N/A

Facility Data

Applicant (Facility's Name): Wolfspeed, Inc. - Siler City Factory

Facility Address:
Wolfspeed, Inc. - Siler City Factory
1000 Carolina Core Parkway
Siler City, NC 27344

SIC: 3674 / Semiconductors & Related Devices
NAICS: 334413 / Semiconductor and Related Device Manufacturing

Facility Classification: Before: Permit Pending **After:** Title V
Fee Classification: Before: N/A **After:** Title V

Permit Applicability (this application only)

SIP: 15A NCAC 02D .0515, .0516, .0524, .0605, .1100, .1111, .1806, .2100, and 02Q .0317 (PSD Avoidance and Avoidance of NESHAP BBBBB/HAP Major)
NSPS: Subpart IIII
NESHAP: Subpart ZZZZ and avoidance condition for individual and total HAPs (NESHAP BBBBB)
PSD: N/A
PSD Avoidance: N/A
NC Toxics: HCl, HF, and H_2SO_4
112(r): HF, H_2SO_4, and Hydrogen
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Robin Housh Environmental Manager (919) 407-6103 4600 Silicon Drive Durham, NC 27703	Thomas Agron VP Facilities (919) 407-5875 4600 Silicon Drive Durham, NC 27703	Robin Housh Environmental Manager (919) 407-6103 4600 Silicon Drive Durham, NC 27703

Application Data

Application Number: 1900138.22A
Date Received: 11/03/2022
Application Type: Greenfield Facility
Application Schedule: State

Existing Permit Data
Existing Permit Number: N/A
Existing Permit Issue Date: N/A
Existing Permit Expiration Date: N/A

Review Engineer: Emily Supple

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 10771/R00
Permit Issue Date: XXXXX XX, 2023
Permit Expiration Date: XXXXXX XX, 2031

1. Purpose of Application

The purpose of this application is for Wolfspeed, Inc. (Wolfspeed) to obtain an initial construction and operation permit for a greenfield facility located in Siler City, Chatham County. The facility will be a silicon carbide (SiC) foundry process for semiconductor wafer substrate production.

As discussed in this application review, the facility's potential to emit (PTE) for the pollutants (NOx, PM10, and VOC) exceeds the major source threshold under the Clean Air Act (CAA)'s Title V operating program. The facility has been deemed a Title V facility. Pursuant to NC's Title V Procedures in 15A NCAC 02Q .0504(a) and (b), the facility has requested to obtain a construction and operation permit in accordance with 02Q .0300, before it is required to obtain a Title V permit. Therefore, the submitted application will be processed under the 02Q .0300 program at this time. Per 02Q .0504(c), the facility will be required to submit another application per Title V procedures (02Q .0500) after obtaining an initial permit, but, within 12 months of commencement of operations. The permit (if granted) will specify this Title V application submittal requirement.

The owner of the facility is registered as a limited liability company with NC Secretary of State office under the name of "Wolfspeed, Inc.". Thus, the application Form A correctly includes the site name as Wolfspeed, Inc. – Siler City Factory.

2. Application Chronology

November 3, 2022	Received greenfield permit application 1900138.22A.
November 16, 2022	Sent acknowledgment letter indicating that the greenfield application was complete. DAQ received the required application fee of $10,635.
November 17, 2022	A PFAS questionnaire was sent to Wolfspeed (attached below).
November 18, 2022	A technical additional information letter was sent to Wolfspeed.
December 9, 2022	A response to the technical additional information letter was received.
December 16, 2022	The modeling dispersion analysis was approved by AQAB.
December 20, 2022	A response to the PFAS questionnaire was received.
December 30, 2022	A technical additional information request was sent to Wolfspeed.
January 20, 2023	A response to the technical additional information request was received.
January 24, 2023	It was requested that the facility provide the stack parameters for all sources of benzene so DAQ can verify compliance with the AAL.
January 26, 2023	The facility provided the requested stack information.
January 27, 2023	The stack parameter information was forwarded to AQAB for analysis. I contacted Sal Mohammad, facility consultant, via email to inform him that the facility had the option to run their own benzene modeling if they would prefer to do so.
January 31, 2023	Sal sent an email indicating that he completed the benzene modeling himself with the modeling files attached. The modeling files were forwarded to AQAB for review.
February 6, 2023	The revised modeling dispersion analysis was approved by AQAB. The facility was informed that a NOx PSD avoidance condition may be required and that several additional pollutants may require modeling for 2D .1100.
February 7, 2023	The facility responded with justification that a NOx avoidance condition is not required nor do any additional pollutants require modeling.
February 10, 2023	Draft permit and review submitted for initial review.
February 23, 2023	A technical additional information request was sent to Wolfspeed.
February 24, 2023	Discussed the additional information request with the facility via Teams call.
March 3, 2023	Some information from the recent additional information request was received.
March 6, 2023	Updated toxics dispersion modeling analysis data was provided for arsenic, beryllium, and cadmium.
March 9, 2023	Follow-up information was requested pertaining to the information received on March 3, 2023.
March 10, 2023	Phone call with Robin Housh to discuss the need to include a detailed project description.

March 17, 2023	Phone call with Robin Housh to discuss the content of the information that Wolfspeed plans to submit. The remaining additional information was received along with a request that this information be held as confidential business information (CBI).
March 23, 2023	Draft permit and review submitted for second round of review.
March 29, 2023	Draft permit and review forwarded to the facility and to the regional office for comments.
March 31, 2023	The Raleigh Regional Office (RRO) of the DAQ indicated that they have no comments.
March 31, 2023	Wolfspeed provided mostly minor comments. Significant comments are addressed in Section 13 below.
April 3, 2023	SSCB indicated that they have no comments.
April X, 2023	Draft permit and permit review forwarded to public notice.
April X, 2023	Public comment period ends. Comments received:
April X, 2023	Permit issued.

3. Facility Description

The proposed facility will be located at 1000 Carolina Core Parkway, Siler City, North Carolina, on approximately 445 acres of land including Parcels 61119, 12547, 63971, 78171, 12551, 12552, 95699, and portions of 67263, 72513, 12580, 82157, 12765, 76879, and 76966. The facility will be a silicon carbide foundry process for semiconductor wafer substrate production. Wolfspeed's primary business activity for the Siler City Factory is to manufacture wafer substrate for use in the production of semiconductors. DAQ has classified this activity, with respect to the Standard Industrial Classification System, under the Code 3674 "Semiconductors and Related Devices", and for the North American Industry Classification System (NAICS), under the Code 334413 "Semiconductor and Related Device Manufacturing".

4. Compliance Status

The proposed facility has not yet been constructed. It is expected to start construction and operation for the emissions sources included in the application after obtaining an air permit. Therefore, no compliance status is available or can be determined.

5. Proposed Facility

Wolfspeed's proposed Siler City Factory will be a silicon carbide substrate production factory located near Siler City, Chatham County on several parcels of land spanning approximately 445 acres nearby US Highway 64. The proposed manufacturing building will occupy approximately 1.2 million square feet and the overall site development will occupy about 80 acres. The facility has requested that much of the process information be kept confidential, so this information will not appear in the permit review. The project will include the operations as follows:

5.1 Wafer Production Operations

The facility will operate a silicon carbide foundry process where silicon carbide crystal boules are grown to specifications and then sliced into wafers. The silicon carbide wafers will be shaped and polished in the wafer production area and an epitaxy layer will be applied to the finished wafers before shipping. Figure 5-1.1 below demonstrates an overview of the process.

A machine shop using lathes and saws to process the porous and hard carbon rods used to make the wafer substrates will generate particulate matter (PM) emissions which will be collected using hoods above the production machines and controlled using a 11,000 cubic feet per minute dust collector. Additionally, general housekeeping for dust in the wafer

production area will be collected and controlled using a 1,000 cubic feet per minute vacuum system. The particulate collection devices are expected to control PM emissions with a minimum control efficiency of 98%.

Various HAPs, TAPs, and VOCs will be used in the wafer production process including sulfuric acid, hydrogen chloride, hydrogen fluoride, nitric acid, chlorine, and isopropyl alcohol. The evaporated gases from this process will be captured and controlled using a series of solvent scrubbers, acid gas scrubbers, and a natural gas-fired gas abatement system. The scrubber efficiencies are assumed to be 90% for each listed pollutant, and the scrubbers are assumed to operate with a 100% capture efficiency. The processing steps which will vent to the solvent exhaust will occur separately from the acid gas processes, so no acid gas emissions will be emitted through the solvent scrubbers. The gas abatement system will utilize gaseous hydrogen chloride and chlorine for oxidation, reduction, and/or pyrolysis to treat off gases generated in the epitaxy application area resulting in additional hydrogen chloride emissions and some chlorine emissions. No control efficiency was assumed from the gas abatement system. Thus, it is not required for compliance with any State or Federal air quality regulations. Figure 5-1.2 shown below demonstrates the locations of each of the stacks associated with the wafer production operations.

Figure 5-1.1: Manufacturing Process Flow Diagram

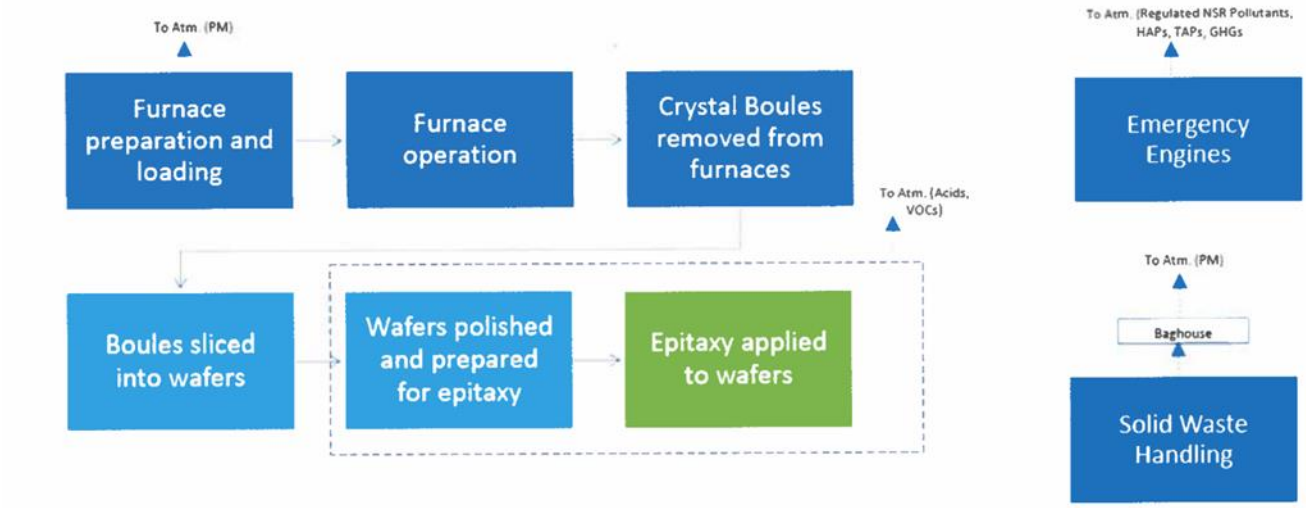
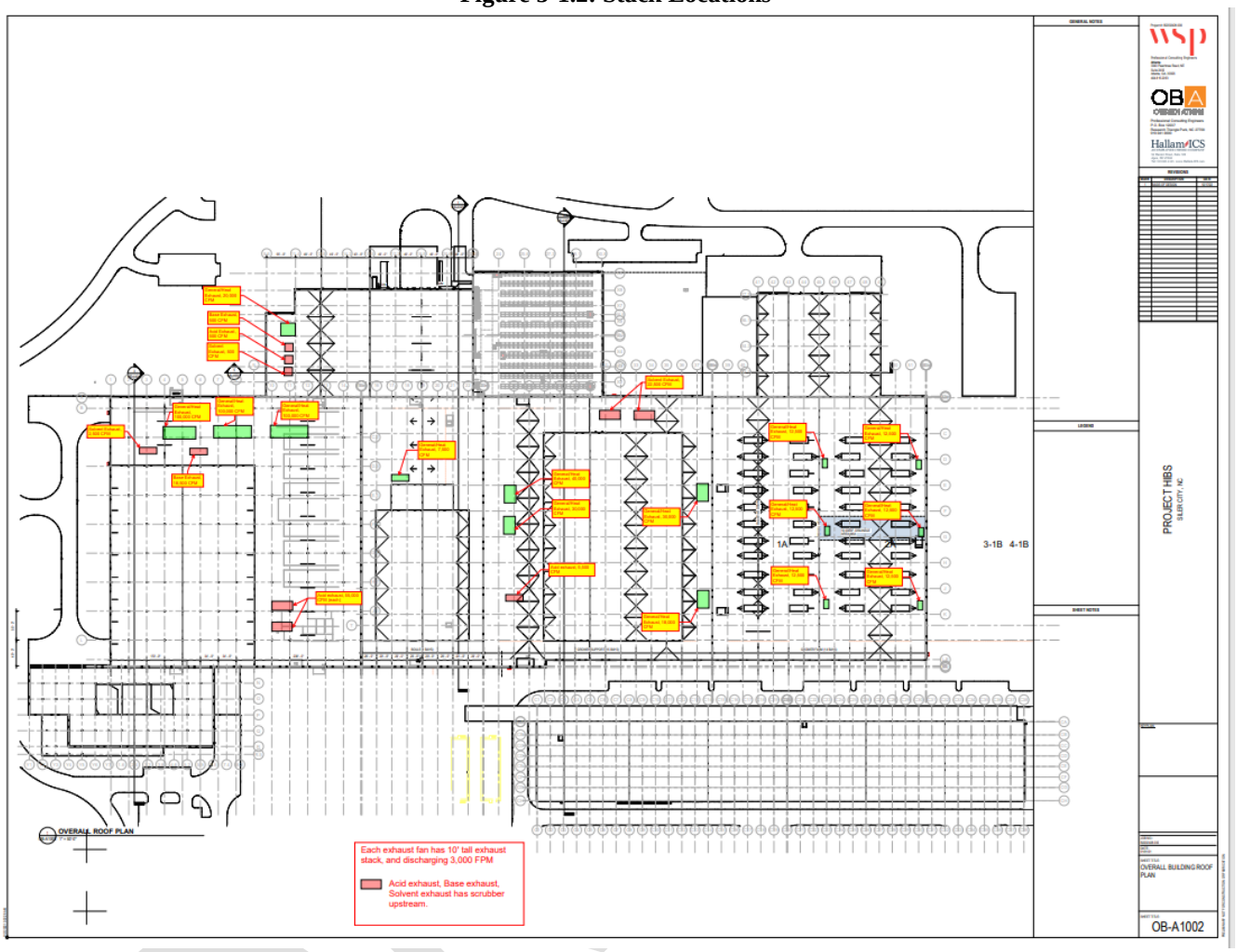


Figure 5-1.2: Stack Locations



5.2 Emergency Engines

Due to the large power demand of the project, eleven (11) diesel-fired emergency generators (2,923 horsepower, maximum engine output, each) will be installed to supply emergency power during power outages. The proposed facility will also have diesel-fired emergency water pumps to provide power for the process cooling water system during power outages. A total of four (4) condenser water pumps (800 horsepower, maximum engine output, each) and a total of six (6) primary water pumps (1,150 horsepower, maximum engine output, each) will be installed on site. A diesel-fired fire pump (500 horsepower, maximum engine output) will also be installed. All listed engines will fire ultra-low sulfur diesel fuel. Potential emissions before and after controls are based on 500 hours of operation per year per engine.

5.3 Miscellaneous Sources

The proposed facility will also include a 12,000-gallon diesel fuel storage tank and ten 160 gallon each day fuel storage tanks. Although it is likely that this tank can be considered an “insignificant activity”, the Permittee has indicated that the evaluation of insignificant sources will be addressed during the initial Title V permit application.

6. Emissions Estimates

The following Tables 6.0-1 and 6.0-2 provide the potential emissions estimates for the proposed facility. For wafer production operations, the emissions are based on the plant's proposed material usage information provided in the application and supporting emissions spreadsheet. Potential emissions after controls are based on scrubber control efficiencies of 90% for sulfuric acid, hydrochloric acid, hydrofluoric acid, nitric acid, chlorine, and isopropyl alcohol (a VOC) from wafer production operations (ID No. ES-WAFEROP) and 98% for PM from solid waste processing (ID No. ES-SW) and the house vacuum system (ID No. ES-VAC). Natural gas combustion emissions are based on 8,760 hours of operation per year for the miscellaneous natural gas-fired appliances (ID No. ES-NGMISC) and the gas abatement system (ID No. CD-1j). Emergency engine potential emissions before and after controls are based on a maximum of 500 hours of operation per year per each engine.

As defined pursuant to the provision in 02Q .0503(8), "insignificant activities because of size or production rate" would not violate any applicable emissions standard and the respective potential emissions rates of particulate, sulfur dioxide, nitrogen oxides, volatile organic compounds, and carbon monoxide before air pollution control devices, are each no more than five tons per year, and the respective potential emissions of hazardous air pollutants before air pollution control devices are each below 1,000 pounds per year. The Permittee has indicated that a more refined distinction of insignificant vs. Title V activities will be addressed in the initial Title V application.

Table 6.0-1: Potential Emissions Before Control

Regulated Air Pollutants	**Emergency Generators**	**Condenser Water Pumps**	**Primary Pumps**	**Fire Pump**	**NG WAFEROP**	**NG Appliances**	**Dust Collection**	**House Vac**	**Diesel Tank**	**Scrubbers**	**Total Emissions**
	(tons/yr)	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/year)**
PM	2.64	0.26	0.57	0.04	0.11	0.02	41.5	56.5	--	--	101.64
PM_{10}	2.64	0.26	0.57	0.04	0.11	0.02	41.5	56.5	--	--	101.64
$PM_{2.5}$	2.64	0.26	0.57	0.04	0.11	0.02	41.5	56.5	--	--	101.64
NO_X	84.57	8.42	18.15	0.82	1.39	0.27	--		--	--	113.62
CO	46.25	4.60	9.93	0.72	1.17	0.22	--		--	--	62.89
SO_2	0.10	0.01	0.02	0.00	0.01	0.00	--		--	--	0.14
VOC	5.67	0.56	1.22	0.31	0.08	0.01	--		0.008	104.8	112.66
Lead (H)	5.1E-04	5.0E-05	1.1E-04	7.9E-06	--	--	--	--	--	--	6.7E-04
SAM (T)	--	--	--	--	--	--	--	--	--	8.2	8.2
Carbon Dioxide (CO2)	6,583.2	655.2	1,412.7	102.4	1,662.2	318.8	--	--	--	--	10,734.5
Nitrous Oxide (N2O)	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	--	0.0
Methane (CH4)	0.1	0.0	0.0	0.0	0.0	0.0	--	--	--	--	0.2
Total GHG as $CO2e^7$	6,589.9	655.9	1,414.2	102.5	1,663.9	319.2	--	--	--	--	10,745.5
Acetaldehyde (H,T)	1.42E-03	1.41E-04	3.04E-04	6.71E-04	--	--	--	--	--	--	2.53E-03
Acrolein (H,T)	4.43E-04	4.41E-05	9.52E-05	8.09E-05	--	--	--	--	--	--	6.64E-04
Arsenic (H,T)	2.25E-04	2.24E-05	4.83E-05	3.50E-06	5.57E-06	1.07E-06	--	--	--	--	3.06E-04
Benzene (H,T)	4.37E-02	4.35E-03	9.37E-03	8.16E-04	5.85E-05	1.12E-05	--	--	--	--	5.83E-02
Benzo(a)pyrene (T)	1.45E-05	1.44E-06	3.10E-06	1.65E-07	--	--	--	--	--	--	1.92E-05
Beryllium (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	3.34E-07	6.41E-08	--	--	--	--	2.25E-04
Cadmium (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	3.06E-05	5.88E-06	--	--	--	--	2.61E-04
Chlorine (H,T)	--	--	--	--	--	--	--	--	--	2.58	2.58
Chromium (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	3.90E-05	7.48E-06	--	--	--	--	2.71E-04
Cobalt (H)	--	--	--	--	2.34E-06	4.49E-07	--	--	--	--	2.79E-06

Dichlorobenzene (H,T)	--	--	--	--	3.34E-05	6.41E-06	--	--	--	--	3.98E-05
Ethylbenzene (H)	4.78E-03	1.31E-03	1.88E-03	8.18E-04	--	--	--	--	--	--	8.79E-03
Formaldehyde (H,T)	4.44E-03	4.42E-04	9.53E-04	1.03E-03	2.09E-03	4.01E-04	--	--	--	--	9.36E-03
n-Hexane (H,T)	--	--	--	--	5.01E-02	9.62E-03	--	--	--	--	5.98E-02
Hydrogen Chloride (H,T)	--	--	--	--	--	--	--	--	--	12	12
Hydrogen Fluoride (H,T)	--	--	--	--	--	--	--	--	--	11.5	11.5
Manganese (H,T)	3.38E-04	3.36E-05	7.25E-05	5.25E-06	1.06E-05	2.03E-06	--	--	--	--	4.62E-04
Mercury (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	7.24E-06	1.39E-06	--	--	--	--	2.33E-04
Naphthalene (H)	7.31E-03	7.28E-04	1.57E-03	1.14E-04	--	--	--	--	--	--	9.73E-03
Nitric Acid (T)	--	--	--	--	--	--	--	--	--	1.01	1.01
Nickel (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	5.85E-05	1.12E-05	--	--	--	--	2.94E-04
Selenium (H)	8.44E-04	8.40E-05	1.81E-04	1.31E-05	6.69E-07	1.28E-07	--	--	--	--	1.12E-03
Toluene (H,T)	1.58E-02	1.57E-03	3.39E-03	3.58E-04	9.47E-05	1.82E-05	--	--	--	--	2.12E-02
Trichloroethane (H)	1.78E-02	4.86E-03	6.98E-03	3.04E-03	--	--	--	--	--	--	3.26E-02
Xylene (H,T)	1.09E-02	1.08E-03	2.33E-03	2.49E-04	--	--	--	--	--	--	1.45E-02
Total HAP	0.11	0.015	0.027	0.007	0.053	0.01	--	--	--	27.09	27.31

Table 6.0-2: Potential Emissions After Control

Regulated Air Pollutants	**Emergency Generators**	**Condenser Water Pumps**	**Primary Pumps**	**Fire Pump**	**NG WAFEROP**	**NG Appliances**	**Dust Collection**	**House Vac**	**Diesel Tank**	**Scrubbers**	**Total Emissions**
	(tons/yr)	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/year)**
PM	2.64	0.26	0.57	0.04	0.11	0.02	0.83	1.13	--	--	5.59
PM_{10}	2.64	0.26	0.57	0.04	0.11	0.02	0.83	1.13	--	--	5.59
$PM_{2.5}$	2.64	0.26	0.57	0.04	0.11	0.02	0.83	1.13	--	--	5.59
NO_X	84.57	8.42	18.15	0.82	1.39	0.27	--		--	--	113.62
CO	46.25	4.60	9.93	0.72	1.17	0.22	--		--	--	62.89
SO_2	0.10	0.01	0.02	0.00	0.01	0.00	--		--	--	0.14
VOC	5.67	0.56	1.22	0.31	0.08	0.01	--		0.008	10.48	18.34
Lead (H)	5.1E-04	5.0E-05	1.1E-04	7.9E-06	--	--	--	--	--	--	6.7E-04
SAM (T)	--	--	--	--	--	--	--	--	--	0.82	0.82
Carbon Dioxide (CO2)	6,583.2	655.2	1,412.7	102.4	1,662.2	318.8	--	--	--	--	10,734.5
Nitrous Oxide (N2O)	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	--	0.0
Methane (CH4)	0.1	0.0	0.0	0.0	0.0	0.0	--	--	--	--	0.2
Total GHG as $CO2e^7$	6,589.9	655.9	1,414.2	102.5	1,663.9	319.2	--	--	--	--	10,745.5
Acetaldehyde (H,T)	1.42E-03	1.41E-04	3.04E-04	6.71E-04	--	--	--	--	--	--	2.53E-03
Acrolein (H,T)	4.43E-04	4.41E-05	9.52E-05	8.09E-05	--	--	--	--	--	--	6.64E-04
Arsenic (H,T)	2.25E-04	2.24E-05	4.83E-05	3.50E-06	5.57E-06	1.07E-06	--	--	--	--	3.06E-04
Benzene (H,T)	4.37E-02	4.35E-03	9.37E-03	8.16E-04	5.85E-05	1.12E-05	--	--	--	--	5.83E-02

Benzo(a)pyrene (T)	1.45E-05	1.44E-06	3.10E-06	1.65E-07	--	--	--	--	--	--	1.92E-05
Beryllium (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	3.34E-07	6.41E-08	--	--	--	--	2.25E-04
Cadmium (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	3.06E-05	5.88E-06	--	--	--	--	2.61E-04
Chlorine (H,T)	--	--	--	--	--	--	--	--	--	0.258	0.258
Chromium (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	3.90E-05	7.48E-06	--	--	--	--	2.71E-04
Cobalt (H)	--	--	--	--	2.34E-06	4.49E-07	--	--	--	--	2.79E-06
Dichlorobenzene (H,T)	--	--	--	--	3.34E-05	6.41E-06	--	--	--	--	3.98E-05
Ethylbenzene (H)	4.78E-03	1.31E-03	1.88E-03	8.18E-04	--	--	--	--	--	--	8.79E-03
Formaldehyde (H,T)	4.44E-03	4.42E-04	9.53E-04	1.03E-03	2.09E-03	4.01E-04	--	--	--	--	9.36E-03
n-Hexane (H,T)	--	--	--	--	5.01E-02	9.62E-03	--	--	--	--	5.98E-02
Hydrogen Chloride (H,T)	--	--	--	--	--	--	--	--	--	1.20	1.20
Hydrogen Fluoride (H,T)	--	--	--	--	--	--	--	--	--	1.15	1.15
Manganese (H,T)	3.38E-04	3.36E-05	7.25E-05	5.25E-06	1.06E-05	2.03E-06	--	--	--	--	4.62E-04
Mercury (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	7.24E-06	1.39E-06	--	--	--	--	2.33E-04
Naphthalene (H)	7.31E-03	7.28E-04	1.57E-03	1.14E-04	--	--	--	--	--	--	9.73E-03
Nitric Acid (T)	--	--	--	--	--	--	--	--	--	0.101	0.101
Nickel (H,T)	1.69E-04	1.68E-05	3.62E-05	2.63E-06	5.85E-05	1.12E-05	--	--	--	--	2.94E-04
Selenium (H)	8.44E-04	8.40E-05	1.81E-04	1.31E-05	6.69E-07	1.28E-07	--	--	--	--	1.12E-03
Toluene (H,T)	1.58E-02	1.57E-03	3.39E-03	3.58E-04	9.47E-05	1.82E-05	--	--	--	--	2.12E-02
Trichloroethane (H)	1.78E-02	4.86E-03	6.98E-03	3.04E-03	--	--	--	--	--	--	3.26E-02
Xylene (H,T)	1.09E-02	1.08E-03	2.33E-03	2.49E-04	--	--	--	--	--	--	1.45E-02
Total HAP	0.11	0.015	0.027	0.007	0.053	0.01	--	--	--	2.71	2.92

6.1 Wafer Production Operations Emissions

Emissions from the wafer production operations were calculated by using the assumed material usage provided by Wolfspeed in the application and seen in the following Tables 6.1-1 and 6.1-2. It is assumed that 5% of the sulfuric acid, liquid hydrogen chloride, hydrogen fluoride, and nitric acid will evaporate and be emitted through the acid gas scrubbers (ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d). It was conservatively estimated that 90% of the isopropyl alcohol will be evaporated and be emitted through the solvent scrubbers (ID Nos. CD-1e, CD-1f, CD-1g, and CD-1h) with an assumed control efficiency of 90%. It was estimated that 50% of the gaseous hydrogen chloride and chlorine used in the gas abatement system (ID No. CD-1j) is consumed in the process of oxidation, reduction, and/or pyrolysis, and the unconsumed 50% is sent to the wet acid gas scrubbers with a control efficiency of 90%. A capture efficiency of 100% was assumed for the scrubbers as indicated by the facility in an email on March 6, 2023. Potential emissions before controls can be back calculated by removing the control efficiency.

Table 6.1-1: Wafer Production Operations Chemical Usage

Chemicals Used in Process [1]	Formula	VOC, HAP, or TAP Content?	HAP or TAP Compound	HAP/TAP Content (%)	Density (lb/gal)	Daily Usage [1] (gal/day)	Daily Usage (lbs/day)	Evaporation [1] (%)	Scrubber Efficiency [2] (%)	Daily Emissions (lb/day)	Annual Emissions (tons/yr)
Hydrogen peroxide	H2O2	No	--	--	--	--	--	--	--	--	--
Sulfuric acid	H2SO4	Yes, TAP	H2SO4	100	15.86	50	793	5%	90%	4.0	0.7
Hydrogen chloride	HCl	Yes, HAP & TAP	HCl	100	10.40	92	954	5%	90%	4.8	0.9
Hydrogen fluoride	HF	Yes, HAP & TAP	HF	100	10.13	92	929	5%	90%	4.6	0.8
Isopropyl alcohol	IPA	No, VOC	--	--	6.96	92	638	90%	90%	57.4	10.5
Potassium hydroxide	KOH	No	--	--	--	--	--	--	--	--	--
Ammonium hydroxide	NH4OH	No	--	--	--	--	--	--	--	--	--
Nitric acid	HNO3	Yes, TAP	HNO3	100	12.33	9	111	5%	90%	0.6	0.1
CMP Slurry	CMP Slurry	No	--	--	--	--	--	--	--	--	--
Buffered oxide etchant	BOE	Yes, HAP & TAP	HF	8	10.22	32	327	5%	90%	1.6	0.298
Sulfuric acid - scrubbers + waste neutralize	H2SO4	Yes, TAP	H2SO4	100	15.86	34	531	1%	90%	0.5	0.1
Sodium hydrox. - scrubbers + waste neutralize	NaOH	No	--	--	--	--	--	--	--	--	--

Table 6.1-2: Wafer Production Operations Gas Usage

Gas Usage in Process [1]	Formula	VOC, HAP, or TAP?	Density (lb/ft^3)	Daily Usage [1] (ft^3/day)	Daily Usage (lbs/day)	Used in Process [1] (%)	Gas Abatement System Control Efficiency [2] (%)	Scrubber Efficiency [2] (%)	Daily Emissions (lb/day)	Annual Emissions (tons/yr)
Chlorine	Cl2	Yes, TAP	0.185	152.7	28.3	50%	0%	90%	1.413	0.2578
Hydrogen Chloride	HCl	Yes, TAP	0.094	378.9	35.6	50%	0%	90%	1.781	0.3250

6.2 Vacuum System and Dust Collection

Emissions from the building house dust vacuum system and dust collector were calculated in the application using the exhaust gas flow rates of the control devices and the expected outlet PM concentration. Potential emissions before controls can be back calculated by removing the assumed control efficiency of 98%. Emissions given in the application and supporting emissions spreadsheet are shown in Table 6.2-1 below.

Table 6.2-1: Particulate Matter Emissions from Dust Collection

Parameter	Units	Torit DFE 3-12 Dust Collector	House Vacuum System	Total
Exhaust Gas Flow Rate [1]	acfm	11,000	1,000	--
Outlet PM Loading [1]	grains/dscf	0.002	0.03	--
Operation hours	hrs/yr	8760	8760	--
Hourly PM/PM_{10}/$PM_{2.5}$ Emissions[2]	lb/hr	0.19	0.26	0.45
Annual PM/PM_{10}/$PM_{2.5}$ Emissions[2]	tons/yr	0.83	1.13	1.95

6.4 Natural Gas Combustion

Natural gas combustion emissions are expected from the miscellaneous natural gas sources (ID No. ES-NGMISC) as well as from the natural gas-fired gas abatement systems. Emissions factors for natural gas combustion are from AP-42 Section 1.4. The emissions were calculated assuming 8,760 hours of operation per year.

6.5 Emergency Generators

Emissions from the emergency generators were calculated using the EPA Tier 2 emissions standards for NSPS Subpart IIII subject engines for PM, PM10, PM2.5, NOx, and CO. The fuel used in the emergency generators is assumed to be Ultra Low Sulfur Diesel fuel with a sulfur content of 0.0015%. SO2 emissions were calculated using this sulfur content assumption. VOC emissions were calculated using AP-42 Section 3.4 emissions factors for Large Stationary Diesel Engines. HAP emissions were calculated using a combination of factors from AP-42 Section 3.4 for Large Stationary Diesel Engines and AP-42 Section 1.3 for Fuel Oil Combustion. Potential emission calculations were based on a maximum of 500 hours per year of engine operation[1].

6.6 Condenser Water Pumps

Emissions from the condenser water pumps were calculated using the EPA Tier 2 emissions standards for NSPS Subpart IIII subject engines for PM, PM10, PM2.5, NOx, and CO. The fuel used in the condenser water pumps is assumed to be Ultra Low Sulfur Diesel fuel with a sulfur content of 0.0015%. SO2 emissions were calculated using this sulfur content assumption. VOC emissions were calculated using AP-42 Section 3.4 emissions factors for Large Stationary Diesel Engines. HAP emissions were calculated using a combination of factors from AP-42 Section 3.4 for Large Stationary Diesel Engines and AP-42 Section 1.3 for Fuel Oil Combustion. Potential emission calculations were based on a maximum of 500 hours per year of engine operation[1].

6.7 Primary Water Pumps

Emissions from the primary water pumps were calculated using the EPA Tier 2 emissions standards for NSPS Subpart IIII subject engines for PM, PM10, PM2.5, NOx, and CO. The fuel used in the primary water pumps is assumed to be Ultra Low Sulfur Diesel fuel with a sulfur content of 0.0015%. SO2 emissions were calculated using this sulfur content assumption. VOC emissions were calculated using AP-42 Section 3.4 emissions factors for Large Stationary Diesel Engines. HAP emissions were calculated using a combination of factors from AP-42 Section 3.4 for Large Stationary Diesel Engines and AP-42 Section 1.3 for Fuel Oil Combustion. Potential emission calculations were based on a maximum of 500 hours per year of engine operation[1].

6.8 Fire Pump

Emissions from the primary water pumps were calculated using the EPA Tier 2 emissions standards for NSPS Subpart IIII subject engines for PM, PM10, PM2.5, NOx, and CO. The fuel used in the primary water pumps is assumed to be Ultra Low Sulfur Diesel fuel with a sulfur content of 0.0015%. SO2 emissions were calculated using this sulfur content assumption. VOC emissions were calculated using AP-42 Section 3.4 emissions factors for Large Stationary Diesel Engines. HAP emissions were calculated using a combination of factors from AP-42 Section 3.4 for Large Stationary Diesel Engines and AP-42 Section 1.3 for Fuel Oil Combustion. Potential emission calculations were based on a maximum of 500 hours per year of engine operation[1].

6.9 Diesel Tank

Emissions from the diesel tank were calculated in the application using the emissions factors and methods provided in AP-42 Section 7.1 for Liquid Organic Storage Tanks. The throughput is based on one turnover per month. The emissions are demonstrated in Table 6.9-1 below.

[1] *Calculating Potential to Emit (PTE) for Emergency Generators*, John S. Seitz, EPA OAQPS Director, September 6, 1995

Table 6.9-1: Emissions from the Diesel Tank

Parameters	Symbol	Units	Formula/Notes	Reference Equations[1]	Value
Tank Contents					Diesel
Tank Type					VFR
Throughput[2]	Q	gal/yr	T_{CG}*N		1,200,000
Tank Height	H_S	ft			20
Average Liquid Height	H_L	ft	H_S / 2	Section 7.1.3.1.Eqn 1-16	10
Diameter	D	ft			10.4
Tank Shell Radius	R_S	ft	1/2*D		5.2
Tank Liquid Volume	V_{LX}	ft^3	$(D/2)^2$ * pi * H_S	Section 7.1.3.1.2 Eqn 1-31	1,699
Tank Nominal Capacity	T_{CG}	gal			12,000
Turnovers	N				100.00
Roof Slope	S_R	ft/ft			0.0625
Tank roof Height	H_R	ft	S_R*R_S	Section 7.1.3.1.1 Equation 1-18	0.33
Tank Color/Shade					Gray (medium)
Paint Condition					Average
Paint Solar Absorptance	α	-		Table 7.1-6	0.71
Daily Total Solar Insolation Factor	I	$Btu/ft^2 \cdot d$	AP-42 Chapter 7, Organic Liquid Storage Tanks	Table 7.1-7	1367
Daily Maximum Ambient Temperature	T_{AX}	ºF	AP-42 Chapter 7, Organic Liquid Storage Tanks	Table 7.1-7	68.4
Daily Minimum Ambient Temperature	T_{AN}	ºF	AP-42 Chapter 7, Organic Liquid Storage Tanks	Table 7.1-7	49.5
Daily Ambient Temp. Change	ΔT_A	ºF	T_{AX} - T_{AN}	Section 7.1.3.1.1 Eqn 1-12	18.90
Daily Avg. Ambient Temperature	T_{AA}	ºR	((T_{AX}+459.67)+(T_{AN}+459.67))/2	Section 7.1.3.1.1 Eqn 1-27	518.6
Liquid Bulk Temperature	T_b	ºR	T_{AA}+(0.003*α_s*I)	Section 7.1.3.1.1 Eqn 1-31	521.5
Daily Avg. Liquid Surface Temp.	T_{LA}	ºR	(0.4 T_{AA})+0.6 T_B)+(0.005*α*I)	Section 7.1.3.1.1 Eqn 1-28	525.2
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	ºR	T_{LA}+0.25*ΔT_V	Figure 7.1-17	533.4
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	ºR	T_{LA}-0.25*ΔT_V	Figure 7.1-17	517.1
Daily Vapor Temperature Range	ΔT_V	ºF	(0.7*ΔT_A)+ (0.02 *α*I)	Section 7.1.3.1.1 Eqn 1-7	32.6
Liquid Molecular Wt.	M_L	lb/lb-mole	AP-42 Chapter 7, Organic Liquid Storage Tanks	Table 7.1-2	188
Vapor Molecular Wt.	M_V	lb/lb-mole	AP-42 Chapter 7, Organic Liquid Storage Tanks	Table 7.1-2	130
Reid Vapor Pressure	RVP	psi			NA
C-C Vapor Pressure Equation Constant A	A	dimensionless	12.82-0.9672ln(RVP)	Table 7.1-2	12.101
C-C Vapor Pressure Equation Constant B	B	ºR	7261-1216ln(RVP)	Table 7.1-2	8907
True Vapor Pressure @ TLA	P_{VA}	psia @ T_{LA}	exp(A-(B/T_{LA}))	Section 7.1.3.1.1 Eqn 1-25	0.008
True Vapor Pressure @ TLX	P_{VX}	psia @ T_{LX}	exp(A-(B/T_{LX}))	Section 7.1.3.1.1 Eqn 1-25	0.010
True Vapor Pressure @ TLN	P_{VN}	psia @ T_{LN}	exp(A-(B/T_{LN}))	Section 7.1.3.1.1 Eqn 1-25	0.006
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$		0.00013
Daily Vapor Pressure Range	ΔP_V	psia	P_{VX} - P_{VN}	Section 7.1.3.1.1 Eqn 1-9	0.00413
Atmospheric Pressure (ΔP_B)		psia	P_{BP}-P_{BV}	Section 7.1.3.1.1 Eqn 1-10	0.06
Breather Vent Pressure Setting (P_{BP})		psig		Section 7.1.3.1.1 Eqn 1-10	0.03
Breather Vent Vacuum Setting (P_{BV})		psig		Section 7.1.3.1.1 Eqn 1-10	-0.03
True Vapor Pressure @ 95F	P	psia	exp(A-(B/T_{LA}))	Section 7.1.3.1.1 Eqn 1-24	0.019
Roof Outage	H_{RO}	ft	1/3 * H_R	Section 7.1.3.1.1 Eqn 1-16	0.11
Vapor Space Outage	H_{VO}	ft	(H_S-$H_{L)}$ +H_{RO}	Section 7.1.3.1.1 Eqn 1-15	10.11
Vapor Space Expansion Factor	K_E		($\Delta T_V/T_{LA}$) + ((ΔP_V-ΔP_B)/(P_A-P_{VA})))	Section 7.1.3.1.1 Eqn 1-5	0.058
Vented Vapor Saturation Factor	K_S		1/(1 + 0.053 * P_{VA} * H_{VO})	Table 7.1-22 Eqn 1-21	0.96
Turnover Factor	K_N		turnovers < 36 = 1, turnovers > 36 = (180 + N)/6N	Section 7.1.3.1.2 Eqn 1-29	0.467
Working Loss Product Factor	K_P		0.75 for crude oils, 1.0 all other organic liquids		1
Daily Vapor Pressure Range	ΔP_V	psia	P_{VX}-P_{VN}	Section 7.1.3.1.1 Eqn 1-9	0.004
Vapor Space Volume	V_V	ft^3	pi * $(D/2)^2$ * H_{VO}	Section 7.1.3.1.1 Eqn 1-15	859
Vapor Density	W_V	lb/ft^3	(M_V * P_{VA}) / (10.731*T_{LA})	Section 7.1.3.1.1 Eqn 1-21	0.00018
Standing Losses	L_S	lb/yr	365 * V_V * W_V * K_E * K_S	Section 7.1.3.1.1 Eqn 1-2	3.1
Working Losses	L_W	lb/yr	0.0010 * M_V * P_{VA} * Q/42 * K_N * K_P	Section 7.1.3.1.2 Eqn 1-29	13.5
Total Losses	L_T	lb/yr	L_S + L_W	Section 7.1.3.1 Eqn 1-1	16.6
Annual VOC Emission Rate		tpy	L_T / 2000		0.008

7. Regulatory Requirements

The proposed facility sources are subject to the following regulatory requirements: 15A NCAC 02D .0515, .0516, .0521, .0524, .0535, .0605, .0611, .1100, .1111, .1806, .2100, and 15A NCAC 02Q .0207, .0304, .0308, .0317, .0504, and .0711.

- 15A NCAC 02D .0515, Particulates from Miscellaneous Industrial Processes

  This rule applies to the solid waste processing operation (ID No. ES-SW) and the wafer operations housekeeping dust vacuum system (ID No. ES-VAC). This rule sets emissions limits for PM emissions resulting from any industrial processes for which no other emission control standards in 02D is applicable. Particulate matter emissions resulting from the operation of the solid waste processing operation (ID No. ES-SW) and the wafer operations housekeeping dust vacuum system (ES-VAC) shall not exceed the allowable emission rate where the allowable emission rate (E) in pounds per hour is defined as a function of the process weight rate (P) in tons per hour according to the following formulas:

  $$E = 4.10 * (P)^{0.67} \quad \text{for P} \leq 30 \text{ tons per hour, or}$$
  $$E = 55 * (P)^{0.11} - 40 \quad \text{for P} > 30 \text{ tons per hour}$$

  Based on the emissions calculations discussed in Section 6 above, the particulate emissions from these emission sources will comply with the allowable particulate matter emission limits after controls. A comparison of the maximum anticipated particulate matter emission rates with the associated allowable emission limits for each emission source is provided in the following table.

Emission Source	Process Weight Rate (ton/hr)	Allowable Emission Rate (lb/hr)	Potential Emission Rate (lb/hr)	Actual Emission Rate (lb/hr)	In Compliance?
Solid Waste Processing (ID No. ES-SW)	0.286	1.77	9.47	0.19	Yes
Wafer Operations Housekeeping Dust Vacuum System (ID No. ES-VAC)	0.286	1.77	12.9	0.26	Yes

  Compliance with this regulation will be determined after commencement of operation of these sources. However, compliance is expected for all these sources due to the operation of the particulate collection devices (ID Nos. CD-2 and CD-3).

  The permit will include annual inspection and maintenance requirements for each particulate control device and require recordkeeping and reporting for each inspection and results of any maintenance performed on the control devices.

- 15A NCAC 02D .0516, Sulfur Dioxide Emissions from Combustion Sources

  Emission of sulfur dioxide from any source of combustion that is discharged from any vent, stack, or chimney shall not exceed 2.3 pounds of sulfur dioxide per million Btu heat input. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard.

  A source subject to an emission standard for sulfur dioxide in Rules 02D .0524, .0527, .1110, .1111, .1206 or .1210 shall meet the standard in that particular rule instead of 2.3 lb/million Btu emission standards under 02D .0516.

  The combustion equipment including miscellaneous natural gas-fired sources (ID No. ES-NGMISC) and the natural gas-fired gas abatement system (ID No. CD-1j) are not subject to any of the regulations above so are therefore subject to the emission standard provided in 02D .0516. Natural gas contains a negligible sulfur content. As per AP-42, the potential emission rate when burning natural gas is only 0.000588 lb/million Btu which is much lower than the allowable emission standard of 2.3 lb/million Btu. Compliance with the SO2 standard of 02D .0516 is expected. No monitoring, recordkeeping, or reporting requirements apply to the combustion sources when firing natural gas since the potential emissions are significantly below the emission standard.

The proposed stationary engines including the emergency generators, condenser water pumps, primary water pumps, and fire pump are subject to the ultra-low sulfur diesel (ULSD) requirement of 15 ppm by weight in accordance with NSPS Subpart IIII. This value translates to a value of 0.00155 lb/million Btu emission rate based on a fuel density of 7.14 lb/gallon and 138,000 Btu/gallon heat content. Therefore, compliance with this condition is expected. Since the potential SO2 emissions from the stationary engines is significantly lower than the emission standard, no monitoring, recordkeeping, or reporting requirements will be required when burning ultra-low sulfur diesel fuel in these engines.

- 15A NCAC 02D .0521, Control of Visible Emissions

For sources manufactured after July 1, 1971, visible emissions shall not be more than 20 percent opacity when averaged over a six-minute period except that six-minute. However, except for sources required to install COMs, six-minute averaging periods may exceed 20 percent opacity if:

(1) No six-minute period exceeds 87 percent opacity;
(2) No more than one six-minute period exceeds 20 percent opacity in any hour; and
(3) No more than four six-minute periods exceed 20 percent opacity in any 24-hour period.

A source subject to an emission standard for visible emissions in Rules 02D .0506, .0508, .0524, .1110, .1111, .1206, or .1210 of 15A NCAC shall meet the standard in that particular rule instead of the standard contained in 02D .0521.

None of the natural gas combustion sources are subject to any visible emission standards given in any of the above-mentioned regulations. Thus, the natural gas combustion sources are subject to the 20 percent opacity standard given in 02D .0521. Compliance with the regulation will be determined after commencement of operation. However, compliance is expected due to the use of natural gas as fuel. No monitoring, recordkeeping, or reporting is required for opacity emissions from natural gas firing. Additionally, compliance with the 20 percent opacity limit is expected for the stationary engines burning ULSD, as mandated by NSPS Subpart IIII.

Particulate emissions from the solid waste processing fugitive dust operation and the wafer operations house dust vacuum system will both be controlled by a particulate collection device. The wafer production operations will have HAP, TAP, and VOC emissions controlled by a wet scrubber. Thus, no visible emissions are expected from these sources. Compliance is expected but will be verified after commencement of operations for each of these sources.

- 15A NCAC 02D .0524, New Source Performance Standards (NSPS IIII)

In accordance with 40 CFR 60.4200(a)(2), the owner/operator of any stationary emergency compression ignition engine is subject to NSPS Subpart IIII, if he/she commences construction after July 11, 2005, and if the stationary engine (not a fire pump) is manufactured after April 1, 2006 or if the fire pump is manufactured after July 1, 2006.

Each of the proposed emergency engines (2,923 HP, each, for emergency generators 1-11; 1,150 HP, each, for primary water pumps 1-6; 800 HP, each, for condenser water pumps 1-4; 500 HP for the fire pump) is subject to this NSPS due to the expected commence construction dates falling after the applicability date of July 11, 2005 and the manufacturing date falling after April 1, 2006 (emergency engines) and July 1, 2006 (fire pump engine).

Emission Standards

From Table 2 to Appendix I to 40 CFR 1039, the following pollution standards apply to each emergency generator, primary water pump, and condenser water pump:

NMHC and NOx (combined): 6.4 g/kW-hr [4.7 g/hp-hr]
CO: 3.5 g/kW-hr [2.6 g/hp-hr]
PM: 0.20 g/kW-hr [0.15 g/hp-hr]

From Table 3 to Appendix I to 40 CFR 1039, the following pollution standards apply to the fire pump engine:

NMHC and NOx (combined): 4.0 g/kW-hr [3.0 g/hp-hr]
CO: 3.5 g/kW-hr [2.6 g/hp-hr]

PM: 0.20 g/kW-hr [0.15 g/hp-hr]
Fuel Requirements

In accordance with 40 CFR 60.4207(b), the facility will be limited to using diesel fuel with a sulfur content of less than 15 ppm. Furthermore, in accordance with 40 CFR 80.510(b) and (c), the diesel fuel must meet one of the following standards: (1) minimum cetane index of 40 and (2) maximum aromatic content of 35 volume percent.

Monitoring Requirements

In accordance with 40 CFR 60.4209(a), the Permittee is required to install a non-resettable hour meter prior to startup of each emergency engine.

In accordance with 40 CFR 60.4209(b), if the emergency engines are equipped with diesel particulate filters to comply with the above emissions standards, the Permittee shall install a backpressure monitor on each diesel particulate filter that notifies the Permittee when the high backpressure limit of the engine is approached.

In accordance with 40 CFR 60.4206 and 60.4211(a), the Permittee shall operate and maintain each stationary CI ICE that achieves the emission standards in 40 CFR 60.4205 over the entire life of the engine according to the manufacturer's emission-related written instructions or procedures developed by the Permittee that are approved by the engine manufacturer. The Permittee may only change engine settings that are permitted by the manufacturer.

In accordance with 40 CFR 60.4211(c), the Permittee is required to purchase engines which are certified to the emission standards listed in Table 1 of 40 CFR 89.112.

In accordance with 40 CFR 60.4211(f), the Permittee will be allowed to operate the emergency engines for the purposes of maintenance checks and readiness testing for no more than 100 hours per year. Any operation of the emergency engines other than for emergency operation, maintenance, and readiness testing will be prohibited. If an engine is not operated according to the requirements of 40 CFR 60.4211 paragraphs (f)(1) through (3), the engine will not be considered an emergency engine under this Subpart and shall meet all requirements for non-emergency engines.

Recordkeeping Requirements

In accordance with 40 CFR 60.4214(b), if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the Permittee shall keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The Permittee shall record the time and operation of the engine and the reason the engine was in operation during that time.

In accordance with 40 CFR 60.4214(c), if the stationary CI internal combustion engine is equipped with a diesel particulate filter, the Permittee shall keep records of any corrective action taken after the backpressure monitor has notified the Permittee that the high backpressure limit of the engine is approached.

Reporting Requirements

In accordance with 40 CFR 60.4214(d), if the Permittee owns or operates an emergency stationary CI ICE with a maximum engine power more than 100 HP that operates for the purpose specified in 40 CFR 60.4211(f)(3)(i), he/she must submit an annual report according to the requirements in paragraphs (d)(1) through (3) of 40 CFR 60.4214.

In accordance with 40 CFR 60.4214(e), owners or operators of stationary CI ICE equipped with AECDs pursuant to the requirements of 40 CFR 1039.665 must report the use of AECDs as required by 40 CFR 1039.665(e).

The facility has indicated that the new engines will be EPA certified and the documents shall be available for viewing during the initial compliance inspection. The facility indicated in the application that it expects to purchase ultra-low sulfur fuel to be used in the emergency engines. Compliance will be determined during the initial compliance inspection.

Compliance with this regulation is expected and will be determined during inspections.

- 15A NCAC 02D .0535, Excess Emissions Reporting and Malfunctions

  Any excess emissions that do not occur during start-up or shut-down are considered a violation of the appropriate rule, unless the owner or operator of the source of excess emissions demonstrates to the Director, that the excess emissions are the result of a malfunction.

  This rule generally does not apply to sources to which 15A NCAC 02D .0524, .1110, or .1111 applies, unless excess emissions exceed an emission limit established in a permit issued under 15A NCAC 02Q .0700 that is more stringent than the emission limit set by 15A NCAC 02D .0524, .1110, or .1111.

  The owner or operator is required to notify the DAQ if the affected source emits excess emissions that last for more than four hours and that results from a malfunction, a breakdown of process or control equipment or any other abnormal conditions. The facility shall notify the Director or his designee of any such occurrence by 9:00 a.m. EST of the Division's next business day of becoming aware of the occurrence and describe:

  i. the name and location of the facility;
  ii. the nature and cause of the malfunction or breakdown;
  iii. the time when the malfunction or breakdown is first observed;
  iv. the expected duration; and
  v. an estimated rate of emissions.

  Finally, the owner/operator is required to notify the Director or his designee immediately when the corrective measures have been accomplished.

- 15A NCAC 02D .0605, Testing Requirement

  The facility plans to comply with TAP and HAP limits by controlling hydrogen chloride (HCl), hydrogen fluoride (HF), sulfuric acid (H_2SO_4), chlorine (Cl_2), and nitric acid (HNO_3) emissions using wet acid gas scrubbers (ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d). The facility has assumed a control efficiency of 90% for the scrubbers and has used design emission factors and actual expected material throughput to demonstrate compliance with the TAP emission limits of HCl, HF, H_2SO_4, Cl_2 and HNO_3. Additionally, the facility has claimed to be a HAP minor source using the same assumed control efficiency, expected material throughput, and design emission factors. Neither the control efficiency of the scrubbers, the design emission factors used, nor the expected operating parameters for the scrubbers such as liquid injection rate of the scrubbing liquid, differential pressure drop, or scrubber liquid pH can be verified. Thus, the facility is required to conduct stack testing of the wet acid gas scrubbers (ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d) to verify the emissions factors for HCl, HF, H_2SO_4, Cl_2, and HNO_3 and to verify the operating parameters of the scrubbers. The testing requirements will be listed in the permit as follows:

  a. Under the provisions of North Carolina General Statute 143-215.108 and in accordance with 15A NCAC 02D .0605, the Permittee shall conduct stack testing on the wafer production operations **(ID No. ES-WAFEROP**) and the wet acid gas scrubbers **(ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d)** to determine the following:
     i. control efficiencies of the wet acid gas scrubbers (P1 in Section 2.2 A.2.j and Section 2.2 A.4.n) for removal of the air pollutants (HCl, HF, H_2SO_4, Cl_2, and HNO_3);
     ii. operating parameters of the wet acid gas scrubbers including liquid injection rate, differential pressure drop, and scrubber liquid pH;
     iii. evaporation rate of liquid H_2SO_4 from use in wafer production (P2 in Section 2.2 A.2.j);
     iv. evaporation rate of liquid H_2SO_4 from use in the acid gas scrubbers (P3 in Section 2.2 A.2.j);
     v. evaporation rate of liquid HCl from use in wafer production (P4 in Section 2.2 A.2.j and P2 in Section 2.2 A.4.n);
     vi. emission of gaseous HCl from use in gas abatement system (P5 in Section 2.2 A.2.j and P3 in Section 2.2 A.4.n);
     vii. evaporation rate of liquid HF from use in wafer production (P6 in Section 2.2 A.2.j and P4 in Section 2.2 A.4.n); and
     viii. emission of gaseous Cl_2 from use in gas abatement system (P5 in Section 2.2 A.4.n).

Affected Source(s)	Pollutant	Test Method
Wafer production operations (ID No. ES-WAFEROP) controlled by wet acid gas scrubbers (ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d) and gas abatement system (ID No. CD-1j)	HCl (hydrochloric acid)	DAQ Approved Method
	HF (hydrofluoric acid)	DAQ Approved Method
	H_2SO_4 (sulfuric acid)	DAQ Approved Method
	Cl_2 (chlorine)	DAQ Approved Method
	HNO_3 (nitric acid)	DAQ Approved Method

b. Unless otherwise specified by federal rules, the Permittee shall perform such testing in accordance with 15A NCAC 02D 2600.
c. The Permittee shall conduct the performance test and submit the results within 180 days of startup of the wafer production operations **(ID No. ES-WAFEROP)**.
d. The Permittee shall arrange for air emissions testing protocols to be provided to the DAQ prior to testing. Testing protocols are not required to be pre-approved by the DAQ prior to testing. The DAQ shall review testing protocols for pre-approval prior to testing if requested by the Permittee at least 45 days before conducting the test.
e. To afford the Regional Supervisor, DAQ, the opportunity to have an observer present, the Permittee shall provide the Regional Office, in writing, at least 15 days notice of any required performance test(s).
f. Two copies of the test results must be submitted to the Regional Supervisor, DAQ, in accordance with the approved procedures of the Environmental Management Commission.
g. This permit may be revoked, with proper notice to the Permittee, or enforcement procedures initiated, if the results of the test(s) indicate that the facility does not meet applicable limitations.
h. During this stack testing, the Permittee shall measure and document liquid injection rates, differential pressure drop across the scrubbers, and pH values of the liquid injected into the scrubbers associated with each of the emission sources, for ensuring compliance with the limits for hydrochloric acid, hydrofluoric acid, sulfuric acid, chlorine, and nitric acid given in Section 2.2 A.2.a, Section 2.2.A.4.a, and Section 2.2 A.6.d, below.
i. The source shall be responsible for ensuring, within the limits of practicality, that the equipment or process being tested is operated at or near its maximum normal production rate, or at a lesser rate if specified by the Director or his delegate.
j. All associated testing costs are the responsibility of the Permittee.
k. Upon DAQ approval of stack test results for hydrochloric acid, hydrofluoric acid, sulfuric acid, chlorine, and nitric acid, ensuring compliance with the limits given in Section 2.2 A.2.a, Section 2.2.A.4.a, and Section 2.2 A.6.d, below, the Permittee shall request an administrative amendment of its Title V permit, to revise the liquid injection rates of each scrubber included in Section 1 of the permit with the observed liquid injection rate for each scrubber during this stack testing.

Compliance will be determined during inspections.

- 15A NCAC 02D .0611, Scrubber Requirements

The facility will have two series of scrubbers, solvent scrubbers for VOC control (ID Nos. CD-1e, CD-1f, CD-1g, and CD-1h), and acid gas scrubbers for HAP/TAP control (ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d). The acid gas scrubbers for HAP and TAP control will have inspection and maintenance requirements listed under conditions 02D .1100 and 02Q .0317. For the remaining solvent scrubbers, the facility must perform, at a minimum, an annual internal

inspection of each scrubber system for each 12-month period following the initial inspection. Additionally, the facility must perform periodic inspections and maintenance as recommended by the equipment manufacturer. The results of all inspections must be recorded in a logbook available for inspector review upon request.

Compliance will be determined during inspections.

- 15A NCAC 02D .1100, Control of Toxics

  See Section 9 below for detailed information regarding toxic emission limits.

- 15A NCAC 02D .1111, Maximum Achievable Control Technology (MACT ZZZZ)

  For the eleven (11) diesel-fired emergency generators (ID Nos. ES-GEN1 through ES-GEN11), four (4) diesel-fired emergency condenser water pumps (ID Nos. ES-PCW1 through ES-PCW4), six (6) diesel-fired emergency primary water pumps (ID Nos. ES-PCW5 through ES-PCW10), and diesel-fired emergency fire pump (ID No. ES-FPUMP), the Permittee shall comply with NESHAP Subpart ZZZZ for new stationary RICE by complying with the requirements of NSPS Subpart IIII.

  Compliance will be determined during inspections and semi-annual reporting.

- 15A NCAC 02D .1806, Control and Prohibition of Odorous Emissions

  This regulation is state enforceable only. The Permittee shall not operate the facility without implementing management practices or installing and operating odor control equipment sufficient to prevent odorous emissions from the facility from causing or contributing to objectionable odors beyond the facility's boundary. This facility is a greenfield facility. The facility will fire only diesel fuel and natural gas. The wafer production operations will be controlled with a scrubber system. No objectionable odors are expected.

  Compliance will be determined during inspections and potential complaint investigations.

- 15A NCAC 02D .2100, Risk Management Program (112r) – The facility indicated in the application and in the response to the additional information request, received on December 9, 2022, that the facility will store three 112(r) regulated substances, hydrofluoric acid (HF), sulfuric acid (H_2SO_4), and hydrogen, above threshold quantities. The facility shall comply with the requirements given in 40 CFR 68.12 before the subject chemicals are present on site.

  Compliance will be determined during inspections.

- 15A NCAC 02Q .0207, Annual Emissions Reporting

  The facility must report by June 30 of each year the actual emissions of each air pollutant listed in 15A NCAC 02Q .0207(a) from each emission source within the facility during the previous calendar year. The report shall be in or on such form as established by the Director. The accuracy of the report shall be certified by the responsible official of the facility.

  Compliance will be determined through receipt of the annual emission inventory.

- 15A NCAC 02Q .0304, Application

  The facility, at least 90 days prior to the expiration date of this permit, shall request permit renewal by letter in accordance with 15A NCAC 02Q .0304(d) and (f). No application fee is required for renewal of an existing air permit. The renewal request should be submitted to the Regional Supervisor, DAQ.

  Compliance will be determined during the next permit renewal.

- 15A NCAC 02Q .0308 and 15A NCAC 02Q .0309, Disclosure of Information Relating to Emissions of Fluorinated Chemicals

  This condition is state-enforceable only. The facility has an ongoing duty to disclose the presence of materials containing fluorinated chemicals at the facility that have the potential to result in the emission of fluorinated chemicals to the environment. The facility must disclose the presence of these materials to the Regional Office Supervisor, in writing, within thirty days of becoming aware of such information. DAQ may require testing or analysis of the materials to properly evaluate emissions sources at the facility.

  Compliance will be determined during inspections.

- 15A NCAC 02Q .0317, Avoidance Conditions for
  15A NCAC 02D .1111 Maximum Achievable Control Technology

  The facility has the potential to emit greater than the major sources thresholds of 10 tons per year each of the individual HAPs hydrochloric acid (HCl) and hydrofluoric acid (HF) and 25 tons per year of total HAPs. Thus, the facility is considered a major source for hazardous air pollutants under 40 CFR Part 63 (Maximum Achievable Control Technology (MACT)) and is required to comply with all major source requirements and standards unless the Permittee is willing to accept a limitation to avoid major source requirements for HAPs. The facility has accepted a limitation to avoid major source requirements for HAPs by operating control devices (wet acid gas scrubbers (ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d)) which will limit HAP emissions to below major source thresholds. The requirements for the facility to avoid MACT (NESHAP BBBBB (5B)) are discussed below.

  The following requirements for the avoidance of MACT will be included:

  - Actual HAP emissions for the entire facility (all emission sources including insignificant activities) shall be less than 10 tons per consecutive 12-month period (for each single HAP) and 25 tons per consecutive 12-month period (for aggregate HAPs).
  - The Permittee shall conduct stack testing according to the requirements listed under Section 2.1 A.4 of the permit.
  - The Permittee shall conduct inspections and maintenance on the wet acid gas scrubbers **(ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d)** as recommended by the manufacturer. At a minimum, the inspection and maintenance requirements must include a monthly visual inspection of the system ductwork and each scrubber unit for leaks, and an annual internal inspection of each wet scrubber.
  - The Permittee shall install continuous parametric monitoring instruments to continuously monitor the liquid injection rate, differential pressure drop, and scrubber liquid pH of the wet acid gas scrubbers.
  - The Permittee shall maintain the operating parameters (liquid injection rate, differential pressure drop, and scrubber liquid pH) at or above the minimum values established during stack testing per Section 2.1 A.4 of the permit.
  - The Permittee shall monitor the hours of operation for each day the wafer production operations and the associated wet acid gas scrubbers and gas abatement system are operating.
  - The results of all inspections and maintenance shall be recorded and kept in a logbook on site.
  - The amounts of each HAP-containing material used in the wafer production operations shall be recorded and kept in a logbook on site.
  - The Permittee shall maintain purchase orders, invoices, or similar documentation for all HAP-containing materials used in the wafer production operations.
  - The Permittee shall calculate the monthly HAP emissions using the mass balance procedures as follows:

    Monthly Total Facility-wide HAP Emissions

    Monthly Total Facility-wide HAP Emissions (ton/month) =

    [Monthly Hydrogen Chloride Emissions (ton/month)] + [Monthly Hydrogen Fluoride Emissions (ton/month)] + [Monthly Chlorine Emissions (ton/month)] + [Monthly HAP Emissions from Other Permitted Sources (ton/month)]

    The Permittee shall determine 12-month rolling individual HAP emissions by summing the individual HAP emissions from the current month with the individual HAP emissions from the previous 11 months. The Permittee shall determine the 12-month rolling aggregate HAP emissions by summing the total facility-wide HAP emissions

from the current month with the total facility-wide HAP emissions from the previous 11 months. Each of the individual HAP emissions and each component of the Monthly Total Facility-wide HAP Emissions in the formula above shall be calculated using the following equations as well as the parameters presented in the table below.

Parameter Number	Parameter	Value
P1	Assumed Scrubber Control Efficiency	90%
P2	Evaporation of liquid HCl from use in wafer production	5%
P3	Emission of gaseous HCl from gas abatement system	50%
P4	Evaporation of liquid HF from use in wafer production	5%
P5	Emission of gaseous Cl_2 from gas abatement system	50%

Monthly Hydrogen Chloride (HCl) Emissions (Equation 6)

Monthly HCl Emissions (ton/month) =

{[(Quantity of HCl-Containing Liquid Used in Wafer Production Operation (gallons/month)) x (Density of HCl-Containing Liquid (lb/gallon)) x (HCl Content (%weight)) x (P2)] + [(Quantity of HCl-Containing Gas Used in Gas Abatement System (lbs/month)) x (P3)]} x (1 – (P1)) / (2,000 lbs/ton)

Monthly Hydrogen Fluoride (HF) Emissions (Equation 7)

Monthly HF Emissions (ton/month) =

[(Quantity of HF-Containing Liquid Used in Wafer Production Operation (gallons/month)) x (Density of HF-Containing Liquid (lb/gallon)) x (HF Content (%weight)) x (P4)] x (1 – (P1)) / (2,000 lbs/ton)

Monthly Chlorine (Cl_2) Emissions (Equation 8)

Monthly Cl_2 Emissions (ton/month) =

[(Quantity of HF-Containing Gas Used in Gas Abatement System (lbs/month)) x (P5)] x (1 – (P1)) / (2,000 lbs/ton)

Monthly HAP Emissions from Other Permitted Sources (i.e., Diesel Fuel and Natural Gas Combustion)

The Permittee shall use the default total emission rate of 37 pounds per month for HAPs from all other permitted sources including all natural gas and diesel-fired combustion sources to calculate the monthly facility-wide HAP emissions.

- The Permittee shall submit a permit application after stack testing has been conducted to revise the assumed control efficiencies (or emission factors) of the wet acid gas scrubbers before the stack testing control efficiency can be used in the calculations.
- The Permittee shall operate the wet acid gas scrubbers at setpoints (liquid injection rate, differential pressure drop, and scrubber liquid pH) recommended by the equipment manufacturer(s).
- The Permittee shall comply with the applicable recordkeeping requirements for area source applicability determination in accordance with 40 CFR 63.10(b)(3), and notification requirements for area sources in 40 CFR 63.9(b)(1)(ii), (j), and (k), as applicable.
- The Permittee shall maintain daily records of the hourly values of the operational parameters including liquid injection rate, differential pressure drop, and scrubber liquid pH for each wet acid gas scrubber.
- The Permittee shall submit the results of any maintenance or repairs performed on the wet acid gas scrubbers within 30 days of a request from DAQ.

- The Permittee shall submit a summary report semi-annually that details the monitoring and recordkeeping activities and provides the monthly HAP emissions totals (both single and aggregate) for the previous 17 months for each of the 12-month periods over the previous 17 months.

The facility was also requested to review all materials planned to be used to determine if emissions of a newly added HAP, 1-bromopropane, will result from operations at the facility. Wolfspeed reviewed all planned material usage and confirmed that no materials containing 1-bromopropane will be used and no emissions of 1-bromopropane are expected.

Compliance will be determined during stack testing and inspections.

- 15A NCAC 02Q .0504, Option for Obtaining Construction and Operating Permit

For completion of the Greenfield permitting process as initiated by Application No. 1900038.22A, the facility shall file an amended application following the procedures of Section 15A NCAC 02Q .0500 within one year from the date of beginning operation of any of the permitted sources. Additionally, the facility shall notify the Regional Office of the date of beginning operation of any of the permitted sources postmarked no later than 30 days after such date.

Additionally, it is requested that the facility provide DAQ with updated design data of the emissions control systems including the wet acid gas scrubbers, wet solvent scrubbers, and gas abatement system. The requested information should contain the vendor information, details on the expected operating parameters of each scrubber, and overall control system design.

Compliance will be determined once the facility has started up operations.

- 15A NCAC 02Q .0711, Emission Rates Requiring a Permit

See Section 9 below for more information regarding toxic emission limits.

8. NSPS, NESHAPS/MACT, PSD, Attainment Status, 112(r), CAM

NSPS
The facility is subject to NSPS Subpart IIII for the new diesel-fired emergency engines and fire pump (ID Nos. ES-GEN1 through ES-GEN11, ES-PCW1 through ES-PCW10, and ES-FPUMP) as discussed in Section 7 above.

NESHAP/MACT
Wolfspeed will avoid the applicability of NESHAP BBBBB as discussed in 02Q .0317, Section 7 above.

Wolfspeed is also subject to NESHAP ZZZZ as discussed in Section 7 above.

PSD Applicability and Increment Tracking
Chatham County is in attainment or unclassifiable for all promulgated National Ambient Air Quality standards (NAAQs) in accordance with 81.334. The PSD program applies to major stationary sources and major modifications in this airshed.

Based upon the potential to emit (after controls/limitations) as discussed in Sections 6 and 7 above, Wolfspeed is not a major stationary source for PSD for any "regulated NSR pollutant". It is important to note that the emissions calculations in the application made reference to multiple phases of operation (Phase 1A, Phase 1B, and Phase 2), and Wolfspeed indicated in an email on March 3, 2023 that the application 1900138.22A addresses only the emissions from Phase 1A of the facility operations. Wolfspeed was informed via email on March 9, 2023 that if it is found that a PSD permit is required for future operations, the facility could possibly be found in violation for either knowingly or unknowingly circumventing the PSD permitting process for Phase 1A, if all phases (Phases 1A, 1B, and 2) were determined to be "substantially related" based on a technical and economical standpoint, and emissions amounting to major source thresholds.

Chatham county has triggered minor source baseline dates for PM10, SO2, and NOx. The actual emission increases for the proposed new stationary project are 1.28 lbs/hr (PM10), 0.03 lbs/hr (SO2), and 25.94 lbs/hr (NOx).

112(r)
As was stated in the application and in the additional information response received on December 9, 2022, the facility is subject to Section 112(r) of the Clean Air Act requirements because it will store the RMP regulated substances HF, H_2SO_4, and hydrogen in quantities above the 112(r) thresholds. The facility must comply with the requirements under 40 CFR 68.12 before the subject chemicals are stored on site.

CAM
This application is processed pursuant to 15A NCAC 02Q .0300 "Construction and Operation Permits" and not under 02Q .0500 "Title V Procedures". Compliance assurance monitoring (CAM) requirement under 40 CFR 64, as implemented through 02D .0614, is strictly a Title V requirement. When DAQ processes the facility's initial Title V application, such applicability analysis will be conducted. Therefore, CAM analysis need not be performed at this time.

9. Air Toxics Evaluation

Per 15A NCAC 02Q .0704(a) and (c), the owner or operator of a new facility shall submit a permit application to comply with 15A NCAC 02D .1100 if emissions of any toxic air pollutant, excluding sources exempt from evaluation pursuant to 02Q .0702, exceed the levels set forth in 02Q .0711. In addition, the state agency shall evaluate the impacts of the air toxic emissions sources, specifically meeting the exemption set forth in 02Q .0702(a)(27), pursuant to NCGS 143-215.107(a)(5)b.

With this new facility construction, there are increases in emissions of certain toxics air pollutants, causing exceedance of toxic air pollutant emission rates (TPERs) in 02Q .0711. Thus, per 02Q .0704, toxic air pollutant (TAP) compliance demonstration is required for this new facility to ensure that the emissions of TAPs will not cause the exceedance of the applicable acceptable ambient level (AAL) listed in 15A NCAC 02D .1104 beyond the property line. It needs to be emphasized that although the air emissions sources, subject to Part 63 standards (eleven emergency generators, 10 emergency water pumps, and one fire pump subject to MACT Subpart ZZZZ) are exempt from air toxics permitting pursuant to 02Q .0702(a)(27)(B), the Permittee has included the emissions of all exempt sources for compliance purposes.

The following table provides the facility-wide air toxics evaluation to determine the pollutants exceeding the TPERs:

Toxic Air Pollutant	Emissions, Actual, Controlled			Toxic Air Pollutant Permitting Rates[1]			Modeling Required?
	(lb/hr)	(lb/day)	(lb/yr)	(lb/hr)	(lb/day)	(lb/yr)	
Acetaldehyde	0.01	0.24	5.07	28.43	-	-	No
Acrolein	2.65E-03	6.37E-02	1.33	0.08	-	-	No
Arsenic	1.20E-03	2.88E-02	0.61	-	-	0.194	**Yes**
Benzene	0.23	5.60	116.6	-	-	11.069	**Yes**
Benzo(a)pyrene	7.69E-05	1.84E-03	3.84E-02	-	-	3.044	No
Beryllium	8.94E-04	2.16E-02	0.45	-	-	0.378	**Yes**
Cadmium	9.06E-04	2.17E-02	0.52	-	-	0.507	**Yes**
Chlorine	5.9E-02	1.42	516	0.95	1.6	-	No[3]
Chromium	9.08E-04	2.18E-02	0.54	-	2.6E-02	-	No
Formaldehyde	2.81E-02	0.25	18.72	0.16	-	-	No
Hexane	1.36E-02	0.33	119.6	-	46.3	-	No

Hydrogen Chloride	0.27	6.55	2,400	0.74	-	-	No[2,3]
Hydrogen Fluoride	0.26	6.29	2,300	0.26	1.3	-	**Yes**
Manganese	1.80E-03	4.32E-02	0.92	-	1.3	-	No
Mercury	9.00E-04	2.16E-02	0.47	-	2.5E-02	-	No
Nickel	9.14E-04	2.19E-02	0.59	-	0.3	-	No
Nitric Acid	2.30E-02	0.55	202	1.05	-	-	No[3]
Sulfuric Acid	0.19	4.49	1,642	0.11	0.5	-	**Yes**
Toluene	8.46E-02	2.03	42.4	58.97	197.96	-	No
Xylene	5.84E-02	1.40	29	68.44	113.7	-	No

[1]TPERs are for unobstructed toxic air pollutant permitting emission rates as given in 15A NCAC 02Q .0711(b).
[2]Facility performed a modeling dispersion analysis for this pollutant although none was required.
[3]No modeling is required for these pollutants after controls have been applied.

Based on the above analysis, the Permittee is required to demonstrate compliance with the AALs for arsenic, benzene, beryllium, cadmium, hydrogen fluoride, and sulfuric acid. The facility has also opted to demonstrate compliance with the AAL for hydrogen chloride. Arsenic, benzene, beryllium, cadmium, and hydrogen chloride each have annual averaging periods. Hydrogen fluoride and sulfuric acid each have both daily and hourly averaging periods. The Permittee has performed the compliance demonstration for these pollutants on a source-by-source basis and the resulting modeled concentrations are compared to the applicable AALs. Modeled emissions from the exempt sources (emergency engines subject to MACT ZZZZ) were based on 500 hours of operation per year. All other TAPs emissions impacts for the AALs were based upon 8,760 hours per year of operation. Modeled emissions of chlorine, hydrogen chloride, hydrogen fluoride, nitric acid, and sulfuric acid were based on a scrubber control efficiency of 90%.

Since the facility opted to use controlled emissions in the compliance demonstration, the following terms will be included in the air permit:

- Actual emissions of TAPs shall not exceed the approved modeled emissions rates.
- The facility shall be constructed and operated in accordance with the approved dispersion modeling and shall reflect the hours of operation and all stack parameters assumed in the approved modeling.
- The Permittee shall conduct stack testing according to the requirements listed under Section 2.1 A.4 of the permit.
- The Permittee shall conduct inspections and maintenance on the wet acid gas scrubbers **(ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d)** as recommended by the manufacturer. At a minimum, the inspection and maintenance requirements must include a monthly visual inspection of the system ductwork and each scrubber unit for leaks, and an annual internal inspection of each wet scrubber.
- The Permittee shall install continuous parametric monitoring instruments to continuously monitor the liquid injection rate, differential pressure drop, and scrubber liquid pH of the wet acid gas scrubbers.
- The Permittee shall maintain the operating parameters (liquid injection rate, differential pressure drop, and scrubber liquid pH) at or above the minimum values established during stack testing per Section 2.1 A.4 of the permit.
- The Permittee shall monitor the hours of operation for each day the wafer production operations and the associated wet acid gas scrubbers and gas abatement system are operating.
- The results of all inspections and maintenance shall be recorded and kept in a logbook on site.
- The amounts of each TAP-containing material used in the wafer production operations shall be recorded and kept in a logbook on site.
- The Permittee shall maintain purchase orders, invoices, or similar documentation for all HAP-containing materials used in the wafer production operations.

- The Permittee shall calculate, on a monthly basis, actual daily and hourly (as applicable) TAP emissions using mass balance procedures in conjunction with the product usage and purchase records, and the application of control efficiencies, as applicable, for the wet acid gas scrubbers **(ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d)**. The following general approach shall be used for calculations of emissions of TAPs from the wafer production operations **(ID No. ES-WAFEROP)**.

Parameter Number	Parameter	Value
P1	Assumed Scrubber Control Efficiency	90%
P2	Evaporation of liquid H_2SO_4 from use in wafer production	5%
P3	Evaporation of liquid H_2SO_4 from use in scrubbers	1%
P4	Evaporation of liquid HCl from use in wafer production	5%
P5	Emission of gaseous HCl from gas abatement system	50%
P6	Evaporation of liquid HF from use in wafer production	5%

Actual Hourly Hydrogen Chloride (HCl) Emissions (Equation 1)

Actual Hourly HCl Emissions (lb/hr) =

{[(Quantity of HCl-Containing Liquid Used in Wafer Production Operation (gallons/day)) x (Density of HCl-Containing Liquid (lb/gallon)) x (HCl Content (%weight)) x (P4)] + [(Quantity of HCl-Containing Gas Used in Scrubbers (lbs/day)) x (P5)]} x (1 – (P1)) / (hours per day of operation of wafer production operations **(ES-WAFEROP)**)

Actual Daily Hydrogen Fluoride (HF) Emissions (Equation 2)

Actual Daily HF Emissions (lb/day) =

[(Quantity of HF-Containing Liquid Used in Wafer Production Operation (gallons/day)) x (Density of HF-Containing Liquid (lb/gallon)) x (HF Content (%weight)) x (P6)] x (1 – (P1))

Actual Hourly Hydrogen Fluoride (HF) Emissions (Equation 3)

Actual Hourly HF Emissions (lb/hr) =

(Equation 2) / (hours per day of operation of wafer production operations **(ES-WAFEROP)**)

Actual Daily Sulfuric Acid (H_2SO_4) Emissions (Equation 4)

Actual Daily H_2SO_4 Emissions (lb/day) =

{[(Quantity of H_2SO_4-Containing Liquid Used in Wafer Production Operation (gallons/day)) x (Density of H_2SO_4-Containing Liquid (lb/gallon)) x (H_2SO_4 Content (%weight)) x (P2)] + [(Quantity of H_2SO_4-Containing Liquid Used in Scrubbers (gallons/day)) x (Density of H_2SO_4-Containing Liquid (lb/gallon) x (H_2SO_4 Content (%weight)) x (P3)]} x (1 – (P1))

Actual Hourly Sulfuric Acid (H_2SO_4) Emissions (Equation 5)

Actual Hourly H2SO4 Emissions (lb/hr) =

(Equation 4) / (hours per day of operation of wafer production operations **(ES-WAFEROP)**)

- The Permittee shall submit a permit application after stack testing has been conducted to revise the assumed control efficiencies (or emission factors) of the scrubbers before the stack testing control efficiency can be used in the calculations.
- The Permittee shall operate the wet scrubbers at setpoints (liquid injection rate, differential pressure drop, and scrubber liquid pH) recommended by the equipment manufacturer(s).
- The Permittee shall maintain daily records of the hourly values of the operational parameters including liquid injection rate, differential pressure drop, and scrubber liquid pH.
- The Permittee shall submit the results of any maintenance or repairs performed on the control devices within 30 days of a request from DAQ.
- The Permittee shall submit a summary report semi-annually that details the monitoring and recordkeeping activities and provides the highest hourly and highest daily (if applicable) HCl, HF, and H_2SO_4 emissions for each month of the reporting period.

The following tables include the predicted maximum impacts, the model inputs, and the modeled air toxics rates.

Maximum Impacts –Wolfspeed
Siler City, Chatham County, NC

TAP	Averaging Period	Max. Conc. (µg/m^3)	AAL (µg/m^3)	% of AAL
Arsenic	Annual	6.26E-06	2.1E-03	3
Benzene	Annual	0.0013	0.12	1
Beryllium	Annual	4.86E-06	4.1E-03	1
Cadmium	Annual	1.29E-05	5.5E-03	1
Hydrogen Chloride	1-hour	7.20	700	1
Hydrogen Fluoride	1-hour	6.90	250	3
	24-hour	2.58	30	9
Sulfuric Acid	1-hour	4.95	100	5
	24-hour	1.85	12	15

Model Inputs for Wolfspeed, Siler City, Chatham County, NC

Source ID	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temp.	Exit Velocity	Stack Diameter
	(m)	(m)	(m)	(ft)	(°F)	(fps)	(ft)
SCRUB4	632514.45	3956961	192	28	75	50	0.46
SCRUB3	632572.94	3956780.8	198	64	75	50	1.53
SCRUB1	632444.87	3956824.2	190	64	75	50	4.83
SCRUB2	632449.53	3956834.3	190	64	75	50	4.83
GENS	632830.76	3956546.1	192	25	979	102	2.00
PCW_CP	632787.14	3956582.1	197	25	965	97	1.00
PCW_PWP	632782.5	3956573.2	197	25	974	120	1.00
FPUMP	633071.98	3956787.9	195	12	1025	254	0.50

Modeled Toxics Rates

Source ID No. and Description	Modeled ID No.	Emission Rates								
		Hydrogen Chloride (lb/hr)	Hydrogen Fluoride		Sulfuric Acid (lb/hr)		Arsenic	Benzene	Beryllium	Cadmium
			(lb/hr)	(lb/day)	(lb/hr)	(lb/day)	(lb/yr)	(lb/yr	(lb/yr)	(lb/yr)
Wafer Production Operations (ID No. ES-WAFEROP)	SCRUB1	1.29E-01	1.24E-01	2.98	8.89E-02	2.13	-	-	-	-
	SCRUB2	1.29E-01	1.24E-01	2.98	8.89E-02	2.13	-	-	-	-
	SCRUB3	1.27E-02	1.27E-02	0.30	8.73E-03	0.02	-	-	-	-
	SCRUB4	1.19E-03	1.11E-03	0.03	7.94E-04	0.02	-	-	-	-
Gas Abatement System (ID No. CD-1j) and Miscellaneous Natural Gas-Fired Appliances (ID No. ES-NGMISC)	SCRUB1	-	-	-	-	-	3.79E-07	3.98E-06	2.28E-08	2.09E-06
	SCRUB2	-	-	-	-	-	3.79E-07	3.98E-06	2.28E-08	2.09E-06
	SCRUB3	-	-	-	-	-	3.79E-07	3.98E-06	2.28E-08	2.09E-06
	SCRUB4	-	-	-	-	-	3.79E-07	3.98E-06	2.28E-08	2.09E-06

The emissions factors and methodology used to estimate emissions have been verified for the various pollutants and found to be satisfactory. Emissions factors are discussed in Section 6 above. The first toxics dispersion modeling analysis was submitted on November 8, 2023 for the pollutants hydrogen fluoride, hydrogen chloride, and sulfuric acid. This toxics modeling dispersion analysis was reviewed and approved by the Air Quality Analysis Branch (AQAB) on December 16, 2023.

It was indicated in the application that benzene emissions from the emergency engines (which are exempt from toxics permitting as per 02Q .0702(a)(27)) will also have the potential to exceed the applicable TPER limit. Since the sources of benzene are exempt, it was requested that the facility provide the stack parameters of the emergency engines such that DAQ could make a demonstration that the benzene emissions will not present an unacceptable risk to human health. The facility opted to make the demonstration of compliance with the AAL for benzene and submitted a revised modeling analysis to DAQ on January 31, 2023. The demonstration of compliance was approved by AQAB on February 6, 2023.

On February 23, 2023, an additional information request was sent to the facility requesting that they recalculate the emissions from the emergency engines using metals emissions factors from AP-42 Section 1.3 to determine if a toxics compliance demonstration will be required for arsenic, beryllium, cadmium, chromic acid (soluble chromium compounds, as chromium VI equivalent), mercury (vapor), and nickel. It was determined by the facility on March 3, 2023 that the facility will also have the potential to exceed the TPER limits for arsenic, beryllium, and cadmium. The facility opted to complete a compliance demonstration for the AALs of those pollutants. The modeling dispersion analysis was received on March 6, 2023 and approved by AQAB on March 21, 2023.

Since compliance was demonstrated for sources exempt from toxics permitting, the DAQ has found that the emissions from the exempt sources will not present an unacceptable risk to human health. Consistent with 02Q .0702(a)(27)(B), the DAQ will not include in the air permit the approved air toxics emissions rate for the toxics-exempt emergency engines. The approved emission rates for arsenic, benzene, beryllium, and cadmium for the natural gas combustion sources (ID Nos. CD-1j and ES-NGMISC) will be included in the air permit since these sources are not exempt from air toxics permitting.

A procedural requirement under 02Q .0711 will be included for a requirement to obtain a permit to emit toxic pollutants emissions, if the facility wide actual emissions exceed the respective TPERs for acetaldehyde, acrolein, benzo(a)pyrene, chlorine, soluble chromate compounds as chromium VI equivalent, dichlorobenzene, formaldehyde, n-hexane, manganese, mercury, nickel, nitric acid, toluene, and xylenes. It must also be noted that the facility will comply with the applicable

TPER limits for chlorine and nitric acid by operating control devices (wet acid gas scrubbers, ID Nos. CD-1a, CD-1b, CD-1c, and CD-1d). It is required that the facility stack test the wet acid gas scrubbers to verify the emissions rates of chlorine and nitric acid.

10. PFAS and Other Emerging Compounds

North Carolina DEQ is working to address the environmental impacts of PFAS, or per- and poly- fluoroalkyl substances. DEQ is advancing science-based, standards-setting approach for thorough permitting of PFAS releases into the environment. DEQ believes that the standards-based permit limits reduce the PFAS compounds entering the environment, give the industrial community certainty and set clear targets for PFAS reductions. Accordingly, to undertake any future standards-setting for PFAS emissions, the DEQ is currently collecting information on PFAS uses, creation (product or byproduct), and its environmental releases through a set of screening-questions from some air quality permit-applicants.

The facility was sent a PFAS questionnaire on November 17, 2022. A response was received on December 20, 2022. The questionnaire and the responses received are attached below as Attachment 1. Additionally, the permit will contain a specific condition pursuant to 15A NCAC 02Q .0308 and .0309 for "Disclosure of Information Relating to Emissions of Fluorinated Chemicals". This condition is state-enforceable only and states that the facility must disclose the presence of PFAS containing materials to DAQ within thirty days of becoming aware of such information. Additionally, DAQ may require testing or analysis of the materials to properly evaluate emissions sources at the facility.

11. Public Participation

Generally, the draft permits issued in accordance with 02Q .0300 "Construction and Operation Permits" are not required to be noticed for public comment unless the public participation is specifically required for such permits in 02Q .0306(a). For this greenfield Title V facility located in Chatham County, DEQ determined that an environmental justice review was triggered and an EJ report is required to be prepared. A 30-day public notice period will occur with the issuance of this draft permit due to the EJ review.

12. Stipulation Review

Not applicable. This is a greenfield facility. All stipulations included in the air permit are new.

13. Conclusions, Comments, and Recommendations

- Professional Engineer (PE) Seal Requirement – 15A NCAC 02Q .0112 APPLICATIONS REQUIRING PROFESSIONAL ENGINEER SEAL

  This regulation requires that a professional engineer (PE) licensed to practice in NC is required to seal the technical portions of air permit application for new and modified sources that involve design, determination of applicability and appropriateness, or determination and interpretation of performance of air pollution capture and control systems. This rule includes a few exemptions from this PE seal requirement. One prominent exemption is for particulate emission sources with air flow rates of ≤10,000 acfm. This application includes several types of control devices (dust collector, vacuum system, scrubbers, and gas abatement system). As included in Section 5.1 above, the air flow rates of multiple pieces of control equipment are greater than 10,000 acfm. The applicant consultant, Brian Eichlin, has fulfilled the requirement of this rule by providing a PE seal for all control devices included in the application (ref. Brian J. Eichlin, P.E. Seal # 031665, 11-2-2022). Per the NCBELS (North Carolina Board of Examiners for Engineers and Surveyors) website, Mr. Brian Eichlin's PE license appears to be current.

- Zoning Requirement – 15A NCAC 02Q .0305(a)(1)(B) and .0304(b)(1)

  The new Wolfspeed facility requires a local zoning consistency determination. A zoning consistency determination request was mailed to the Town of Siler City and reviewed by Jack Meadows, Community Development Director, Town of Siler City on November 3, 2022. The review indicated that "the proposal use requires zoning permit approval to 7th HI Zoning District". No further correspondence was received from the Town of Siler City.

- A Title V Greenfield fee of $10,635 was required for this application and was received by the DAQ on November 16, 2022.
- The appropriate number of application copies were received by the DAQ.

- The draft permit was sent to the regional office (Raleigh Regional Office (RRO)) for review on March 29, 2023. No comments were received.

- The draft permit was sent to the applicant for review on March 29, 2023. Comments were received on March 31, 2023.

  Comment 1

  The Permittee requested to update the description of the source (ID No. ES-VAC) to "wafer operations housekeeping dust vacuum system".

  DAQ Response: The description has been updated in the equipment list and throughout the document.

  Comment 2

  "Semi-annual reporting of monitoring and recordkeeping activities seems onerous. Could this be changed to submittal upon request?" in regard to Section 2.1 A.1.f.

  DAQ Response: It is standard to require semiannual reporting of monitoring and recordkeeping as per 15A NCAC 02Q .0308(a)(1) and 40 CFR 70.6(a)(3)(iii). No change to the draft permit will be made.

  Comment 3

  "How will Wolfspeed define "normal"? Is no visible emissions normal, or visible emissions up to 20% opacity normal? Plant personnel may not be trained to read opacity. Should this condition be reworded to say presence of no visible emissions is normal. Such as Method 22," and "Semi-annual reporting of visual observations is onerous. Please change to reporting upon request," in regard to Section 2.1 A.3.

  DAQ Response: The Permittee may define "normal" visible emissions as zero visible emissions if applicable. It is standard to require semiannual reporting of monitoring and recordkeeping as per 15A NCAC 02Q .0308(a)(1) and 40 CFR 70.6(a)(3)(iii). No change to the draft permit will be made.

  Comment 4

  "Gas abatement systems exhaust through the scrubber stacks. Please remove the part "and gas abatement system…" in regard to Section 2.1 A.4.

  DAQ Response: Agreed with the applicant. The sentence was removed.

  Comment 5

  "Please note that evaporation rates cannot be tested. The scrubber efficiency can be tested using known quantity of pollutant passed through the scrubber. The evaporation rate can be calculated using the control efficiency, usage rates, and emissions rates. Please add permitting note to clarify," in regard to Section 2.1 A.4.

  DAQ Response: Agreed with the applicant. The permit language indicates that the stack testing will be conducted to determine the evaporation rates used in the calculations in Sections 2.2 A.2.j and 2.2 A.4.n. The evaporation rate will be

determined using the control efficiency, usage rates, and emissions rates determined during testing. A note will be added to the permit to clarify.

Comment 6

"What is the testing frequency? Wolfspeed is requesting just an initial testing," in regard to Section 2.1 A.4.

DAQ Response: The testing requirement is a one-time-only testing requirement. The permit language does not specify or imply any subsequent testing. No changes to the permit will be made.

Comment 7

"Semi-annual reporting is onerous. Please change to annual reporting," in regard to Section 2.1 B.3.l.

DAQ Response: Semiannual reporting is a requirement of NSPS Subpart IIII. No change to the permit will be made.

Comment 8

"Wolfspeed requests removal of the semi-annual reporting of monitoring and recordkeeping activities," in regard to Section 2.1 B.4.l.

DAQ Response: Semiannual reporting is a requirement of NSPS Subpart IIII. No change to the permit will be made.

Comment 9

"Please remove NG-fired appliances. Emissions from these units are not controlled," in regard to Section 2.2 A.2.

DAQ Response: The NG-fired appliances were modeled for emissions of arsenic, benzene, beryllium, and cadmium with all emissions routed through scrubber stacks (ID Nos. SCRUB1 through SCRUB4). These sources are not exempt from toxics permitting and will not be removed from this section.

Comment 10

"Please clarify as initial testing, which can be repeated for permit renewals," in regard to Section 2.2 A.4.c.

DAQ Response: This section refers to the stack testing condition given in Section 2.1 A.4 which specifies all testing requirements. No change will be made to the permit.

Comment 11

"Please replace with re-testing requirement, which seems appropriate for normal 5-year test frequency," in regard to Section 2.2 A.4.g.

DAQ Response: The frequency of testing may be negotiated with the submittal of the initial Title V permit application. Language may be added to the initial Title V permit to specify that the Permittee may re-test the scrubbers to determine new operating parameters. An administrative permit amendment will be required for more stringent operating

parameters, and a minor modification will be required for less stringent operating parameters. No changes will be made to the permit at this time.

Comment 12

"Confirm this can be maintained electronically," in regard to Section 2.2 A.4.l.

DAQ Response: Agreed with applicant. The permit will be updated to indicate that these records may be kept electronically.

Comment 13

"How was this rate calculated? The total annual HAP for the fuel combustion sources is 0.461 tons/yr as presented in Application Table 2," in regard to Section 2.2 A.4.n.

DAQ Response: This rate was calculated by adding HAP emissions from all diesel and natural gas combustion sources as given in Application Table 2. Application Table 2 contained emissions from substances that are not considered to be HAPs in the HAP total. No change will be made to the permit.

Comment 14

"Please clarify the need for a new permit application. This will require Wolfspeed to submit a permit application following each testing. The permit already requires use of the scrubber efficiency from initial testing," in regard to Section 2.2 A.4.o.

DAQ Response: A permit application is required after the initial stack test to incorporate the results of the stack test into the calculations required by Sections 2.2 A.2.j and 2.2 A.4.n of the permit. If the Permittee would like to re-test the scrubbers and incorporate the results into the permit, then the Permittee would be required to submit a permit application. This language may be added to the permit during the initial Title V application. No change will be made to the permit.

Comment 15

"Wolfspeed requests removal of this condition that seems to imply Siler City Factory is synthetically limited to be an area source of HAPs. The HAPs potential as shown in Application Table 2 is just 2.8 tons/yr. The permit already requires extensive recordkeeping and reporting requirements for rolling 12-month HAPs emissions," in regard to Section 2.2 A.4.p.

DAQ Response: Application Table 2 shows HAP potentials for HCl and HF *after controls* of 1.2 and 1.15 tons per year, respectively, assuming a 90 percent control efficiency. Thus, the uncontrolled potential HAP emissions for HCl and HF, respectively, are 12 and 11.5 tons per year. Additionally, potential uncontrolled total HAP emissions are calculated to be 27.31 tons per year as seen in Table 6.0-1 of this review. Therefore, the potential HAP emissions are above major source thresholds of 10 tons per year of individual HAPs and 25 tons per year of total HAPs. Since the facility has the potential to be a major source of HAPs, the facility must take a condition to avoid applicability of NESHAP Subpart BBBBB. Otherwise, a condition for compliance with NESHAP Subpart BBBBB must be added. Since the permit will have a HAP avoidance condition for avoidance of NESHAP Subpart BBBB, the Permittee must maintain records to

verify that the facility is not subject to the requirements of NESHAP Subpart BBBBB. No change will be made to the permit.

Comment 16

"Should this be applicable since Subpart BBBBB is not applicable?" in regard to Section 2.2 A.4.r.

DAQ Response: This is a requirement since the facility is avoiding applicability of NESHAP Subpart BBBBB. The facility must notify DAQ if the source changes from an area source to a major source. No change will be made to the permit.

Comment 17

"Please clarify, the wafer production sources will already be operating by the time Title V permit application is submitted" in regard to Section 2.2 A.5.c.

DAQ Response: The intention of this condition is to verify and review the control device specifications prior to the construction of the wafer production emissions sources. DAQ asks for submittal of vendor specifications for our review prior to construction. It is reasonable that Wolfspeed will have this information available prior to construction of the wafer production operations. No change will be made to the permit.

Comment 18

"Does this apply since it is a Title V air construction permit and a Title V operating permit application is required within 12 months of operation begins?" in regard to Section 2.2 A.7.

DAQ Response: This condition is included since this permit is issued under 15A NCAC 02Q .0300. This will be removed with the issuance of the initial Title V permit. No change will be made to the permit.

- This permit engineer recommends the issuance of Air Permit No. 10771R00.

Attachment 1.

Wolfspeed Responses to PFAS Questionnaire

1. Will your facility use any material or products in your operations that contain fluorinated chemicals? If so, please identify such materials or products and the fluorinated chemicals they contain.
    a. **Please see answer to Question 4.**
2. Will your facility formulate/create products or byproducts (directly or indirectly) containing fluorinated chemicals (across multiple media)? If so, please identify such products or byproducts and the fluorinated chemical they contain.
    a. **No.**
3. Will your facility generate solid, liquid, or gaseous related emissions, discharges, or wastes/products containing fluorinated chemicals? If so, please identify such waste streams or materials and the fluorinated chemicals they contain.
    a. **Air: Hydrogen fluoride**
    b. **Wastewater: Hydrogen fluoride, trace ammonium fluoride**
    c. **Acid contaminated solids (wipes, empty drum and totes): Hydrogen fluoride, ammonium fluoride**
    d. **Discarded or scrapped parts from equipment maintenance: PFA**
4. Do your facility's processes or operations use equipment, material, or components that contain fluorinated chemicals (e.g., surface coating, clean room applications, solvents, lubricants, fittings, tubing, processing tools, packaging, facility infrastructure, air pollution control units)? Could these processes or operations directly or indirectly (e.g., through leaching, chemical process, heat treatment, pressurization, etc.) result in the release of fluorinated chemicals into the environment?
    a. **PFA tubing, gaskets, and o-rings will be used throughout the facility because they provide the best material of construction for the harsh environment encountered during the semiconductor manufacturing process. These will not result in the release of fluorinated chemicals into the environment.**
    b. **R-134a will be the refrigerant of choice in chillers.**
5. List the fluorinated chemicals identified (i.e., through testing or desktop review) above in your response under the appropriate methods/approaches? If one is not, are they on any other know US or International target lists?
    a. **Hydrofluoric Acid**
        i. **Desktop review and knowledge of processes**
    b. **Ammonium Fluoride in Buffered Oxide Etchant**
        i. **Desktop review and knowledge of processes**
    c. **1,1,1,2-Tetrafluoroethane (R-134a) as a refrigerant in chillers.**
        i. **Desktop review and knowledge of equipment and refrigerant selection.**
        ii. **On Ozone Depleting Substances list**
        iii. **On HFC Phasedown List. Exemption for use in semiconductor manufacturing is not applicable since it will be used as refrigerant at Siler City Factory.**
6. Are there other facilities or operations in the U.S. or internationally engaged in the same or similar activities involving fluorinated chemicals addressed in your response to the above questions? If so, please provide facility identification information? In addition, are there any ISO (international Organization of Standardization) certification requirements?
    a. **Yes, the Wolfspeed facility located at 4600 Silicon Drive, Durham, NC conducts the same operations that will be performed at the Wolfspeed Siler City Factory. Identification information for the Durham facility includes:**
        i. **Air Permit: 08540R30**
        ii. **Wastewater Permit: DC-076**
        iii. **RCRA EPA ID Number: NCD 981014749 (LQG)**
        iv. **NC SERC: 3200299**
        v. **Tier II: 7133437**
        vi. **TRI: 27703CRRSR4600S**
        vii. **RMP Facility ID: 100000180788**
    b. **There are not ISO certification requirements for fluorinated compounds. However, the Durham and RTP facilities are ISO 14001 certified and working towards ISO 45001 certification.**

i. **ISO 14001 (Durham and RTP):**
    1. **Recertification Audit conducted February 2021**
    2. **Surveillance Audit conducted April 2022**
    3. **Next Surveillance Audit scheduled for April 2023**
ii. **ISO 45001 (Durham and RTP): In progress**
    1. **Initial Certification Audit conducted December 2022**

7. Do you plan to store AFFF on site, use it in fire training at the site, use it for fighting fires at the facility, or include it in a fire fighting system at the site?
    a. **No**
8. Are other emerging contaminants (e.g., 1,4-dioxane, brome, perchlorate, 1,2,3-Trichlorpropane) used in some capacity with your facility or operations?
    a. None of the above listed emerging contaminants will be used at the Wolfspeed Siler City Factory.
9. Do you need technical assistance to answer the above questions?
    a. No.

In identifying any fluorinated chemicals or emerging contaminants in response to any of the above questions, please use CAS numbers (if available) and specify the relevant quantities of any such chemicals. If your answers to any of the above questions rely on assumption or, if information necessary to respond to any of these questions is unavailable, please state. If any of the information requested is deemed a "trade secret" under N.C.G.S. 66-152(3) and subject to confidential treatment under N.C.G.S 132-1.2(1) as required under the Public Record Act, please contact us to discuss proper designation of this information.