Statement of Basis

Tier II Operating Permit No. T2-2023.0008
Project ID 63057

onsemi - Nampa
Nampa, Idaho

Facility ID 027-00095

Final

N.V

February 27, 2026
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Air Quality Permit Engineer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE....3
FACILITY INFORMATION....5
Application Scope....5
Facility Description....5
Permitting History....10
Application Chronology....11
TECHNICAL ANALYSIS....12
Emissions Units and Control Equipment....12
Emissions Inventories....14
Ambient Air Quality Impact Analyses....22
REGULATORY ANALYSIS....23
Attainment Designation (40 CFR 81.313)....23
Facility Classification....23
Tier II Operating Permit/Permit to Construct (Tier II Operating Permit)....23
Rules for Control of Fugitive Dust Emissions (IDAPA 58.01.01.650-651)....24
Visible Emissions (IDAPA 58.01.01.625)....24
Rules for Open Burning (IDAPA 58.01.01.600-616)....24
Fuel Burning Equipment (IDAPA 58.01.01.675-677)....24
Sulfur Content (IDAPA 58.01.01.725)....24
Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)....24
PSD Classification (40 CFR 52.21)....24
NSPS Applicability (40 CFR 60)....25
NESHAP Applicability (40 CFR 61)....25
GACT/MACT Applicability (40 CFR 63)....25
Permit Conditions Review....26
PUBLIC REVIEW....28
Public Comment Period....28
APPENDIX A – EMISSIONS INVENTORIES....29
APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES....30
APPENDIX C – 40 CFR 63 SUBPART *ZZZZ* AND 40 CFR 60 SUBPART IIII....31
APPENDIX D – FACILITY DRAFT COMMENTS....45
APPENDIX E – PROCESSING FEE....49

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
Btu	British thermal units
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CAS No.	Chemical Abstracts Service registry number
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CI	compression ignition
CMS	continuous monitoring systems
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EI	emissions inventory
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
FEC	Facility Emissions Cap
GHG	greenhouse gases
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
hp	horsepower
hr/yr	hours per consecutive 12 calendar month period
IC	internal combustion engine
ICE	internal combustion engine
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
m	meters
MACT	Maximum Achievable Control Technology
mg/dscm	milligrams per dry standard cubic meter
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_X	nitrogen oxides
NR	Nonroad
NSPS	New Source Performance Standards
ON	ON Semiconductor
O_2	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million

PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
RICE	reciprocating internal combustion engines
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
TDS	total dissolved solids
TPU	thermal processing unit
ULSD	ultra-low sulfur diesel
U.S.C.	United States Code
VOC	volatile organic compounds
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Application Scope

This is a renewal of Tier II operating permit that contains the facility emissions cap (FEC) limits.

The applicant has proposed to:

- Change name from ON Semiconductor to onsemi
- Update the two Gas Abatement Units (previously described as Thermal Processing Units) with the corresponding rated heat input capacity
- Increase routine testing and maintenance activities from 2 to 8 hours per day for each emergency generator
- Correct makeup air unit (MAU5B) heat input rating from 6.0 MMBtu/hr to 4.8 MMBtu/hr
- Include a new facility-wide modeling analysis using the most current version of AERMOD (v22112) for dispersion modeling with an updated property boundary to show the current leased land.
- Use an updated calculation method which relies on process-specific emission factors developed based on fab process knowledge and chemical properties
- Remove the Gas Abatement Unit (previously described as Thermal Processing Units) flow rate permit condition as this record keeping requirement was used to ensure the gas abatement unit is operating within the design capacity and measuring the volumetric flow rate (acfm) is not possible since the inlet line is 2 inches. The emissions inventory only includes natural gas combustion emissions for the gas abatement unit.

Facility Description

onsemi manufactures semiconductor devices (also called chips or die) on silicon wafers. Due to changing manufacturing demands, onsemi must constantly adapt its product mix, architecture, and functionality. The nature and rapid pace of constant technology change affects the type, number, and configuration of equipment (also known as “tools” in the industry) required to fabricate chips or die. Current plans for the facility generally include photolithography processes, although in the future, the facility may perform the other basic processes described in detail below: cleaning, diffusion, wet etch, implant, metallization, and assembly.

Effective production of semiconductor products requires utilization of advanced semiconductor manufacturing techniques and effective deployment of these techniques across multiple facilities. onsemi is continuously enhancing production processes, reducing die sizes and transitioning to higher density products.

Manufacturing

The semiconductor fabrication (manufacture) process includes cleaning, diffusion, photolithography, etch, doping, metallization, and assemble.

Cleaning/Wet Process

Silicon wafers are cleaned to remove particles and contaminants such as dust. Aqueous acid or acid mixtures are the most commonly used cleaning solutions. Use of acids is generally necessary because of the solubility characteristics of silicon, silicon oxide, and common contaminants. A variety of acids may be used depending on the nature of the material to be removed. The onsemi Nampa facility uses hydrochloric acid, and hydrofluoric acid for preventative maintenance. Phosphoric acid is used for reimaging of wafers.

Diffusion

The next step in the process depends on the type (i.e., imager, flash, DRAM) of integrated circuit device being produced, but commonly involves the diffusion of growth of a layer or layers of silicon dioxide, silicon nitride, or polycrystalline silicon (see Figure 2-1). For example, an initial layer of silicon dioxide with the subsequent deposition of a silicon nitride layer is commonly applied to metal oxide silicon devices. Diffusion processes can

be conducted at atmospheric pressure or in a vacuum chamber and are typically conducted at temperatures between 400 and 1,200°C. Chemicals and gasses necessary to obtain the desired effect are flowed for a limited time into the chambers where a reaction takes place, depositing a layer of the element or compound on the surface of the wafer. Wafer residence times in the chamber can range from several minutes to twenty-four hours. Several products containing volatile organic compounds (VOC) may be used in the diffusion step depending on the desired composition of the layer. As gases react in the diffusion process, a small amount of particulate matter may be produced and emitted.

Figure 2-1

Schematic Representation of a Wafer after Diffusion

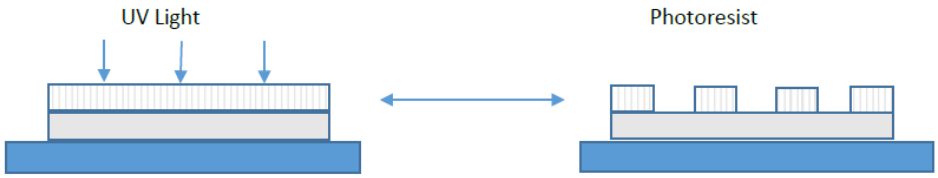


Photolithography

The wafer then proceeds to the photo process. Vapor priming occurs first to remove any moisture present on the surface of the wafer to prepare it for optimum photoresist adhesion. The wafer continues on to coat tracks where it is coated with a photoresist, a photosensitive emulsion, followed by a rinse to remove excess photoresist from the edges and backside of the wafer. The wafer is next exposed to ultraviolet light using glass photo masks that allow the light to strike only selected areas and depolymerize the photoresist in these areas (see Figure 2-2). After exposure to the ultraviolet light, exposed photoresist is removed from the wafer on develop tracks and rinsed off with deionized (DI) water. Photo allows subsequent processes to affect only the exposed portions of the wafer. Wafer residence times during chemical application in the photo process can vary from several seconds to ten or fifteen minutes.

Figure 2-2

Schematic Representation of a Wafer after Diffusion



Etch

Etching of the wafer is then conducted to selectively remove deposited layers not protected by the photoresist material (see Figure 2-3). Either dry or wet etch processes may be used depending on the type of layer being removed. Dry etch uses a high energy plasma to remove the target layer. Process gases are ionized under vacuum pressure to form plasmas capable of etching specific layers. Wet etch may also be used to remove specific layers from the wafer. Some wet etch processes, however, also perform cleaning functions and prepare the wafer for subsequent processing. Wet etch is generally conducted at atmospheric pressure. Both etch processes may be conducted at ambient temperature or elevated temperatures (400°C or higher). Chemicals and gases used in both etch processes may be used in varying quantities depending on the specific objective of the etch being conducted. Wafer etching can be conducted for anywhere from two minutes to more than two hours.

Figure 2-3

Schematic Representation of a Wafer after Etching

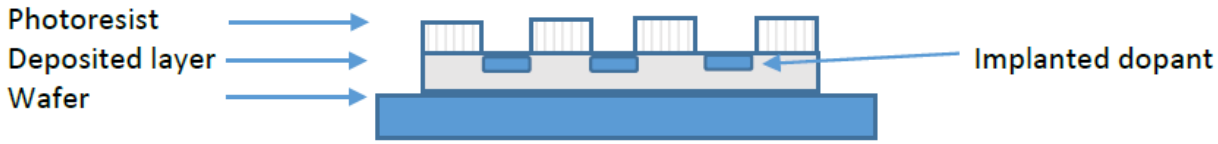


Doping (Diffusion and Implant)

Following etch, the wafer moves on to a process where dopants are added to the wafer or layers. Dopants are impurities such as boron, phosphorous, or arsenic. Adding small quantities of these impurities to the wafer substrate alters its electrical properties. Implant and diffusion are two methods currently used to add dopants. During implant a chemical is ionized and accelerated in a beam to velocities approaching the speed of light. Scanning the beam across the wafer surface implants the energized ions into the wafer. A subsequent heating step, termed annealing, is necessary to make the implanted dopants electrically active. Diffusion is a vapor phase process in which the dopant, in the form of gas, is injected into a furnace containing the wafers. The gaseous compound breaks down into its elemental constituents on the hot wafer surface. Continued heating of the wafer allows diffusion of the dopant into the surface at controlled depths to form the electrical pathways within the wafer (see Figure 2-4). Solid forms of the dopant may also be used.

Figure 2-4

Schematic Representation of a Wafer after Implant



Metallization

Metallization is a process that can be used to add metal layers to a wafer. Sputtering and vacuum deposition are forms of metallization that may be used to deposit a layer of metal on the wafer surface. In the sputtering process the source metal and the target wafer are electrically charged, as the cathode and anode, respectively, in a partially evacuated chamber. The electric field ionizes the gas in the chamber and these ions bombard the source metal cathode, ejecting metal which deposits on the wafer surface. In the vacuum deposition process the source metal is heated in a high vacuum chamber by resistance or electron beam hearing to the vaporization temperature. The vaporized metal condenses on the surface of the silicon wafer. Some VOCs may be used in the diffusion process, but are generally not used in the implant or metallization processes.

Other Wafer Fabrication Steps

The wafer is then rinsed in an acid or solvent solution to remove the remainder of the hardened photoresist material. A second oxide layer is grown on the wafer and the process is repeated. This photolithographic-etching-implant-oxide process sequence may occur a number of times depending upon the application of the semiconductor. During these processes the wafer may be cleaned many times in acid solutions followed by DI water rinses and solvent drying. This is necessary to maintain wafer cleanliness. The rinsing and drying steps may involve the use of a VOC-containing material.

The wafer –fabrication phase of manufacture ends with an electrical test (probe). Each die on the wafer is probed to determine whether it functions correctly. Defective die are marked to indicate they should be discarded. A computer-controlled testing machine quickly tests each circuit.

Wafer-Level Packaging

Rather than being assembled into protective packages as described below, some semiconductor chips are processed further at the wafer level. Front-end wafer-level packaging consists of extending the wafer fab process to include device inter-connection and device protection processes prior to final assembly. Back-end wafer-level packaging processes are described in the assembly section.

Assembly

After the fabrication processes are completed, most semiconductor chips are assembled into protective packages. The wafers are first mounted on tape in a metal frame where the wafer is sectioned by a wafer saw to separate the individual chips or die. Die attach cure ovens heat treat the die/leadframe assembly for several hours. The die is then connected to the legs of the leadframe by fine bonding wire. A protective coating is applied to the die and hardened in die coat cure ovens. The entire die is then encapsulated with a protective molding compound. The leadframe strip is trimmed and individual die leads formed. The legs of the individual die packages are then plated to provide reliable electrical contacts. Individual die may then be sold as die or assembled further into modules. Several VOC-containing materials are used in the assembly process.

The primary difference between the assembly process described above and back-end wafer level packaging is that the thin conductive wire and the lead frames are eliminated and replaced by metal balls that allow the chips to be attached directly to the electronic device.

Air Pollution Control Equipment

The facility has three wet packed bed acid scrubbers to treat acid emissions, two VOC abatement units to oxidize VOC, and one Gas Abatement Unit to treat specific manufacturing process gas streams such as perfluorinated compound gas species. The other Gas Abatement Unit is also permitted as operation variability for this facility. How these control devices are used at the facility is described in Table 1.

Support Operations

Numerous operations are conducted at the facility in support of the manufacturing process. These include:

- Natural gas boilers and a hot water heater used to supply steam for general heating and humidification;
- Makeup air unit (MAU) used for supplemental general heating;
- Cooling towers used to dissipate heat with non-contact cooling water;
- Temporary storage of solid and liquid hazardous waste and secondary materials generated at the facility pending shipment to a licensed off-site treatment, storage, and disposal facility or for lawful reuse or other recycling;
- Storage of diesel fuels;
- General maintenance of existing equipment and facilities; and
- Emergency generators

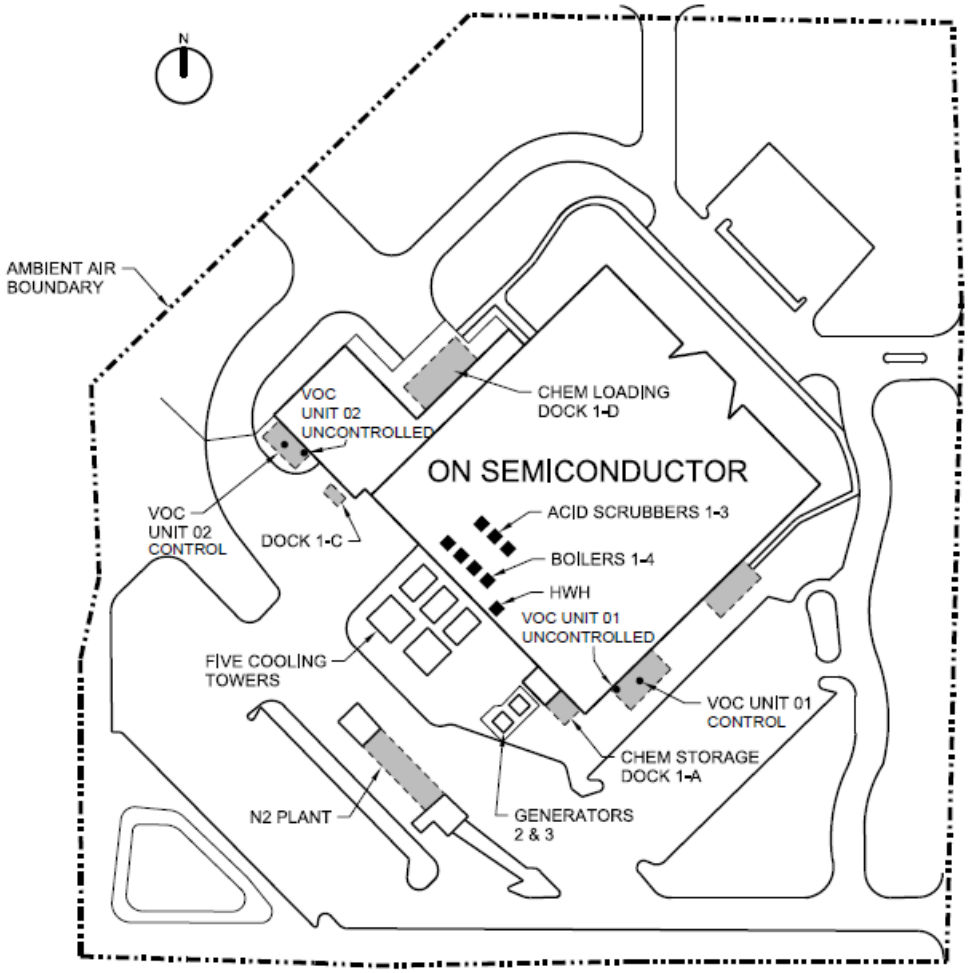
The following is the screen capture from Google Earth on 11/14/2024.



The following is the site location taken from the application:



The following are the source locations and ambient boundary from the application:



The manufacturing process has two main exhaust streams. The primary exhaust stream from manufacturing contains VOCs and TAPs and will either be treated (controlled) through a VOC Abatement Unit (VOC-01) or bypass the VOC Abatement Unit as uncontrolled emissions. During maximum manufacturing production, a second exhaust stream from manufacturing will either be controlled through a second VOC Abatement Unit (VOC-02) or bypass the unit as uncontrolled emissions. Both VOC-01 and VOC-02 also contribute emissions from natural gas combustion in the controlled operating scenario. The other main exhaust stream consists of particulate matter and acid TAP emissions associated with manufacturing tool operations and is controlled and treated through any of three wet scrubbers. Two gas abatement units operate upstream of the VOC abatement units and scrubbers. The gas abatement unit exhausts through the VOC abatement units in the controlled scenario and through the scrubbers in the uncontrolled scenario.

Permitting History

The following information was derived from a review of the permit files available to DEQ. Permit status is noted as active and in effect (A) or superseded (S).

August 17, 2018	T2-2016.0064 a renewal of Permit to Construct and Tier II Operation Permit (PTC/T2) combo permit that contains FEC (A, but will become S upon issuance of this permit)
June 26, 2014	T2-2010.0185 project 61389, automatic ownership transfer from Micron Technology, Inc. to Aptina, LLC, Permit status (refer to July 25, 2011 permit)

July 25, 2011	T2-2010.0185 project 60899, responsible official and facility contact name changes, Permit status (S)
April 1, 2011	T2-2010.0185 project 60671, renewal of PTC/T2 combo permit with FEC, Permit status (S)
July 14, 2006	P-060013, Initial FEC permit, Permit status (S)

Application Chronology

February 7, 2023	DEQ received an application.
March 21, 2023	DEQ received updated emissions inventory spreadsheet from the applicant.
August 12, 2025	DEQ received supplemental information from the applicant.
September 24, 2025	DEQ determined that the application was complete.
October 2 – 8, 2025	DEQ made available the draft permit and statement of basis for peer and regional office review.
October 30 – December 15, 2025	DEQ made available the draft permit and statement of basis for applicant review.
January 8 – 14, 2026	DEQ made available the second draft permit and statement of basis for applicant review.
January 21 – February 20, 2026	DEQ provided a public comment period on the proposed action
February 27, 2026	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
Manufacturing			
N/A	Manufacturing Processes: Including processes as listed in the following: cleaning, diffusion, photolithography, etch, doping, metallization, and assembly.	There are two types of exhaust streams from the manufacturing processes. One contains VOC and TAP, and the other one contains PM and acid TAP. VOC Abatement Units (refer to the details under Sources) The exhaust stream from manufacturing contains VOC and TAP. They will be either treated through a VOC Abatement Unit (as a controlled operating scenario, an operating scenario using VOC abatement unit) or bypass the VOC Abatement Unit without treatment (as an uncontrolled operating scenario, an operating scenario without using VOC abatement unit) Side note: as operational variability component defined in IDAPA 58.01.01.176.03.f , during maximum manufacturing production, a second exhaust stream from manufacturing containing VOC and TAP will either be controlled through a second VOC Abatement Unit (as a controlled operating scenario, an operating scenario using VOC abatement unit) or bypass the second VOC Abatement Unit without treatment (as an uncontrolled operating scenario, an operating scenario without using VOC abatement unit.)	VOC abatement unit stacks, or VOC abatement unit bypass stacks [(a)]
		The other main exhaust stream consisting of PM and acid TAP emissions associated with manufacturing tool operations is controlled and treated through one of three wet scrubbers. Wet Packed Bed Scrubbers (3): Manufacturer: Lantec Model: H9610601	One, two, or three wet scrubber stacks [(a)]

Source ID No.	Sources	Control Equipment	Emission Point ID No.
VOC01 VOC02	VOC Abatement Unit (2): Manufacturer: Munters Model: 1ZS-2946-TH (VOC01) 1ZS-D1500-TH (VOC02) Manufacture Date: 2006 Heat input rating: 2.0 MMBtu/hr Fuel: Natural Gas	These units are control equipment for the manufacturing processes. They are also combustion sources and emit air pollutants when destroying VOCs through combustion.	VOC Abatement Unit Stacks [a]
Support Operations			
BLR01 BLR02 BLR03[b]	Boiler (3 units): Manufacturer: Cleaver Brooks Model: MTHG-105 Heat input rating: 8.37 MMBtu/hr Fuel: Natural Gas	9 ppm ultra-low NOx burners	(a)
BLR04[b]	Boiler (1 unit): Manufacturer: Cleaver Brooks Model: ICB-700-200-125 Heat input rating: 8.165 MMBtu/hr Fuel: Natural Gas	None	(a)
HEAT	Hot Water Heater: Manufacturer: A.O. Smith Model: BT 100 400 Heat input rating: 75,100 Btu/hr Date of construction: 4/7/2025 Fuel: Natural Gas	None	(a)
MAU5B	Makeup Air Unit: Heat input rating: 4.8 MMBtu/hr Fuel: Natural Gas	None	(a)
GAS01 GAS02	Process Gas Abatement Units: GAS01 Manufacturer: BOC Edwards Model: Kronis-S Rating: 60,000 BTU/hr Fuel: Natural Gas GAS02 Manufacturer: DAS Model: STYRAX DUO 1.3 Rating: 21,000 BTU/hr Fuel: Natural Gas These units are process safety and optimization equipment for treating specific manufacturing process gas streams, such as tetraethoxysilane (TEOS) gas. The process gas abatement units consist of natural gas direct fired combustors to oxidize gas species at a high temperature followed by an integral scrubber system for the removal of treated exhaust gases. Process gas abatement units are combustion sources and emit air pollutants when oxidizing toxic exhaust gases. In the absence of air quality regulations, these units would still operate for process safety and optimization.	None	Exhaust will be drawn to the existing packed-bed wet chemical scrubber system when VOC Abatement Units are not operating. When a VOC Abatement Unit is operational, emissions are drawn through the VOC abatement process.

Source ID No.	Sources	Control Equipment	Emission Point ID No.
CT01 CT02 CT03 CT04 CT05	Cooling Towers (5): Recirculation Rate: 1,150 GPM (3units) Air Flow: 239,500 acfm (3 units) Recirculation Rate: 1,694 GPM (2 units) Air Flow: 418,800 acfm (2units)	None	(a)
GEN 2	CI Emergency Engine: Manufacturer: Cummins Model: QST30-G4 Manufacture Date: 2002 commissioning date: 8/6/2006 Brake Horsepower: 1,490 bhp Fuel: ASTM No. 1, 2, or mix of No. 1 and No.2 diesel with a maximum sulfur content of 15 ppm (0.0015%)	None	(a)
GEN 3	CI Emergency Engine: Manufacturer: Cummins Model: KTA50-G9 Manufacture Date: 2004 commissioning date: 6/20/2007 Brake Horsepower: 2,220 bhp Fuel: ASTM No. 1, 2, or mix of No. 1 and No.2 diesel with a maximum sulfur content of 15 ppm (0.0015%)	None	(a)
N/A	Storage Tanks:	None	N/A

(a) Refer to modeling memo for stack/emissions point parameters.
(b) BOI03 is identified as a Cleaver Brooks Boiler, and BOI04 is identified as a Kewanee Boiler in the emission calculations, modeling files and modeling report of the application.

Emission sources at onsemi are divided into two general emission units consisting of manufacturing and support operations. Support operations emissions consist of boiler, emergency generators, MAU, hot water heater, cooling towers, and tanks.

Emissions Inventories

FEC Emissions Calculations

Emissions data have been collected for January 1, 2020 through December 31, 2021 to establish new actual baseline emissions. The proposed FEC is evaluated using 2020 and 2021 actual baseline emissions data including emissions for future growth and operational variability.

Baseline actual emission units include:

- One natural gas fired gas abatement unit based on actual use
- One natural gas fired makeup air unit (MAU) based on actual use
- One natural gas Volatile Organic Compounds (VOC) abatement unit based on actual use. VOC abatement controls were in use over the baseline operating period.
- Four natural gas fired boilers based on actual use
- One natural gas fired hot water boiler based on actual use
- Two diesel-fired emergency generators based on actual use for maintenance and testing
- Cooling towers based on actual use
- Manufacturing emissions based on actual use. Particulate Matter (PM) emissions controlled using three wet scrubbers. VOC abatement controls were in use over the baseline operating period.

Operational variability emission units include:

- Natural gas fired equipment including two gas abatement units, one makeup air unit (MAU), two VOC abatement units, four boilers, and one hot water boiler. Operational variability emissions are based on 8,760 hr/yr of operation at full capacity, less the baseline actual emissions from each unit.

- Two diesel-fired emergency generators using a proposed operating limit of 100 hr/yr for each emergency generator, less baseline actual emissions.
- Cooling towers based on 8,760 hr/yr, less baseline actual emissions.
- Manufacturing emissions represent a 50% incremental increase in operations over the next 5 years. PM emissions are controlled using three wet scrubbers. VOC abatement controls will be in use over the next 5 years.

onsemi established a new potential to emit (PTE) profile based on the combined aggregate of baseline actual emissions and operational variability. Proposed growth was established by taking the proposed FEC limits and subtracting the facility PTE.

As mentioned in the 2/7/2023 application, "onsemi calculated baseline actual emissions from January 1, 2021, through December 31, 2021." (p.24 of the 159 PDF application). The Rules specifically define how baseline actual emissions need to be calculated (see IDAPA 58.01.01.176.03.a and 007.02.b or c). onsemi has revised the EI and emailed it to DEQ on March 21, 2023. The PTE in the revised EI is slightly lower than the PTE modeled in the 2/7/2023 application submittal because the revised manufacturing emissions actual is slightly lower and consequently, the manufacturing emissions PTE based 50% increment increase is slightly lower.

Manufacturing Process

VOC and TAP Emissions

In this renewal application, onsemi has proposed a new approach to estimate VOC and TAP emissions. The new approach assumes that only a certain fraction of the chemical used will be emitted into the air. onsemi uses that emissions fraction factor to estimate emissions. onsemi provided the following reasons for the change as in the following:

> *"Historically, the facility has utilized a conservative mass balance method to estimate VOC and HAP emissions. The quantity of materials issued from the onsemi warehouse and the quantity of bulk liquid solvent waste shipped offsite formed the basic inputs and outputs of the mass balance. This historic method also utilized samples of the chemical composition of the waste shipped offsite and used the results to calculate emissions from the mass balance. However, in recent years, onsemi has found that sample results from the bulk liquid solvent waste have become less accurate and the mass-balance approach may no longer be the most appropriate calculation methodology. For example, several recent sample results for propylene glycol monomethyl ether acetate (PGMEA), the primary constituent present in most all photoresists and contained in the bulk liquid solvent waste have showed a weight percent of 100% in the bulk liquid hazardous waste. onsemi recognizes that this is an overestimate of the amount of PGMEA contained in the bulk solvent waste since the waste is a mixture of numerous chemicals.*
>
> *In addition, it has also been increasingly difficult to find a laboratory to complete this analytical test and there has been variability in the sample results between different laboratories. onsemi does not want to have variability in analytical data or low confidence in the data be a confound for demonstrating compliance. Therefore, onsemi is proposing an updated calculation method which relies on process-specific emission factors developed based on fab process knowledge and chemical properties.*
>
> *onsemi accounts for all sources of VOC or TAP emissions in the manufacturing process, including: cleaning, diffusion, photolithography, etch, doping, metallization, packaging, and assembly. Production materials containing VOCs and TAPs are used throughout the semiconductor manufacturing process and in related support operations. The production material throughput quantities are documented and tracked on a monthly basis. Chemicals are delivered to the production area on an as-needed basis, therefore the quantities tracked are also representative of the timing of actual usage (and associated air emissions), because only small quantities of chemicals are delivered at a time.*
>
> *Individual sources of manufacturing emissions are not fully described discretely (e.g. various tools, baths, etc.), but are instead included as part of the manufacturing emissions unit. The following emission factors are used to estimate emissions from the various processes and organic chemicals utilized in the manufacturing process. These emission factors have been derived from process knowledge consistent*

with how each material is being used in the process, as well as the chemical properties associated with each chemical (e.g. volatility and water solubility). These emission factors are summarized as follows, with each emission factor as the fractional mass of chemical usage that is emitted to air.

- *Organic compounds contained in photoresist, edge bead removal (EBR), and photoresist strippers.*
  - *Emission factor of 0.20.*
  - *The majority of these materials (estimated to be 80%) end up in the bulk liquid hazardous waste stream.*

- *Acetone, ethylene glycol, methanol, hexamethyldisilazane (HMDS), spin-on glass (SOG) organic compounds, and isopropanol that is used for wipe cleaning.*
  - *Emission factor of 1.0 is used due to the high volatility of these chemicals.*

- *Positive developer (tetramethylammonium hydroxide (TMAH)).*
  - *Emission factor of 0.001 is used due to TMAH being a highly water soluble and non-volatile chemical.*

The constituents of production materials can change at any time and be replaced with non-VOC or non-TAP constituents, or with different volatile constituents. To account for these changes, the specific chemical constituents contained in each material are identified and documented. Even if the material constituents change, the calculation method can account for the changes and reflect any impact on emissions.

The supporting documentation for these emissions factors is provided in the application.

VOC Abatement Units

There are two existing permitted VOC abatement units (VOC-01 and VOC-02) located at the onsemi Nampa facility. Each VOC abatement unit has a manufacturer rating of 98.5% destruction and removal efficiency for VOC emissions. The rated heat input capacity for each VOC unit is 2.0 MMBtu/hr and uses natural gas for pilot light operation. Emission rates are based on AP-42, Section 1.4 Natural Gas Combustion emission factors. The emissions and stack properties were determined using the manufacturer's engineering specifications and professional engineering measurements or calculations. onsemi has no future plan to install any additional VOC abatement units.

During a "controlled operating scenario", VOC and TAP emissions from the manufacturing process are treated through a VOC Abatement Unit using natural gas combustion for the abatement process prior to releasing into the atmosphere. During maximum production, a second exhaust stream consisting of VOC and TAP emissions from the manufacturing will be treated through a second VOC Abatement Unit.

During an "uncontrolled operating scenario", VOC and TAP emissions from the manufacturing process may bypass either VOC Abatement Unit (VOC01 and VOC02) when not in operation as uncontrolled emissions through a separate bypass stack per VOC Abatement Unit located on either side of the facility.

PM Emissions

The primary source of particulate matter (PM) emissions from the manufacturing processes is gas-to-particle conversion. This may occur after oxidation of gases in control devices or as materials evaporated from heated liquid materials condense. PM emissions from manufacturing are exhausted through one of three wet scrubbers. At least one wet scrubber is in operation at any given time.

Wet Scrubbers

onsemi uses up to three wet packed bed acid scrubbers to control PM emissions from manufacturing tool operations. The scrubbers remove PM emissions generated in the manufacturing process based on individual control efficiencies per acid TAP.

A wet packed bed scrubber is designed to promote the contact of a gas and a liquid stream. PM emissions are removed from a gas exhaust stream by dissolving or absorbing them into a concentrated water stream. The gases in the exhaust are transferred out of the air stream into the water stream where it goes through a pH adjustment for

neutralization prior to being discharged as industrial waste water from the facility. The treated exhaust streams are then sent out to the atmosphere via a stack.

PM emissions from the manufacturing processes are formed by evaporation and condensation of liquid materials. In the wet process area, hydrofluoric acid (HF) and hydrochloric acid (HCl), among other chemicals, are used in liquid form in baths. During processing of waters, some of the chemical bath will be depleted as wafers are removed from the chemical bath and placed in a rinse bath. After certain time intervals, baths need to be 'topped off' due to loss of chemicals from drag out and evaporation. The wet process baths are connected to wet scrubbers to remove the particulate acids. An example calculation of HCl emissions from the wet process (assuming 99 percent control by the associated wet scrubber) is shown below:

0.70 lb/yr * (1-0.99) = 0.003 lb/yr

Usage * (1-control efficiency) = Total Emissions

In this renewal application, onsemi has proposed to use a difference calculation method from the above method used for the previous permitting actions. onsemi is proposing to use updated process-based emission factors, similar to what is discussed in the VOC and TAP Emissions section for VOC and TAP emissions and lower scrubber control efficiencies. The historically used control efficiencies provided by the scrubber manufacturer have been conservatively adjusted downward to account for the typical concentration of each pollutant in the exhaust gas stream and compound-specific affinity to be captured by the high pH process water in the scrubber. The following acid solution emission factors were estimated using fab process experience and chemical properties.

Table 2 Scrubber Control and Emissions

Chemical	Emission Factor (lbs/lbs)	Scrubber Control Efficiency (%)	Overall Emission Factor
Hydrochloric acid	0.05	60%	0.02
Phosphoric acid	0.001	40%	0.0006
Hydrofluoric acid	0.05	60%	0.02
Nitric acid	0.1	40%	0.06
Hydrogen peroxide	0.001	40%	0.0006
Sulfuric acid	0.001	40%	0.0006

a. All above emission factors will also be used in mixtures containing these compounds.

Manufacturing PM emissions are based on controlled emissions because at a minimum one of the three wet scrubbers is always operating. Therefore, for emission estimating purposes, controlled operational scenario PM emissions are equal to uncontrolled operational scenario PM emissions from the manufacturing. PM emissions are assumed to equal PM10 and PM2.5.

Baseline actual PM emissions from manufacturing operations were calculated based on an aggregate of each individual acid TAP from one year of facility data. PM emissions were based on individual TAP control efficiencies. Operational variability PM emissions from manufacturing operations were calculated based on a 50 percent increase in facility operations over the next 5 years. onsemi has no future plan to install any additional wet scrubbers.

The supporting documentation for these emissions factors is provided in the application.

Boilers

The ON Nampa facility uses four natural gas boilers to provide steam to heat the facility as well as to humidify portions of the manufacturing process. The boilers are physically limited by ambient conditions such that they cannot run at their rated capacities for an entire year. However, the boilers may operate at rated capacities for a short period of time during periods of extreme cold. Three of the boilers each have a rated heat input capacity of 8.37 MMBtu/hr with 9 ppm rated low NO_x burners. The fourth boiler has a rated heat input capacity of 8.165 MMBtu/hr. Emission rates are based on manufacture data and AP-42, Section 1.4 Natural Gas Combustion emission factors.

Baseline actual criteria pollutant and TAP emissions from boiler operations were calculated as uncontrolled based on one year of facility data. Operational variability for criteria pollutant and TAP emissions were calculated as uncontrolled using the delta from potential operating hours of 8,760 hr/yr for each natural gas boiler subtracting out boiler baseline actual emissions. onsemi has no future plan to install any additional boilers.

Emergency CI Engines

ON currently operates two emergency diesel internal combustion engines which supply emergency power to electrical generators at the facility. ON performs routine testing and maintenance on these emergency generators. ON has summarized the relevant information for the two existing permitted emergency generators identified as Generator 2 and Generator 3 by the facility

CI Engine 2

- Cummins model QST30-G4
- 1,490 bhp
- No 2 fuel oil
- Ultra-low sulfur diesel (ULSD) (15 ppm sulfur content)
- Operating limit of 100 hours of operation per year for maintenance and testing

CI Engine 3

- Cummins model KTA50-G9
- 2,220 bhp
- No 2 fuel oil
- ULSD (15 ppm sulfur content)
- Operating limit of 100 hours of operation per year for maintenance and testing

onsemi is requesting a short term maximum daily limit not to exceed 8 hours per day and an annual limit of 100 hours per year in any consecutive 12-month period for routine testing and maintenance per emergency engine generator.

Criteria pollutant emission estimates are based on Cummins manufacturer provided emission factors and from AP-42 Section 3.4, *Large Stationary Diesel and All Stationary Duel Fuel Engines*.

Baseline actual criteria pollutant emissions from emergency generator routine testing and maintenance operations were calculated as uncontrolled based on one year of facility data. Operational variability for criteria pollutant emissions were calculated as uncontrolled using the delta from a proposed operating limit of 100 hr/yr for each emergency generator subtracting out baseline actual emissions.

Makeup Air Unit

An existing 4.8 MMBtu/hr natural gas-fired makeup air unit (MAU 5B) is located on the roof of the main building. Baseline actual criteria pollutant and TAP emissions from MAU 5B operations were calculated as uncontrolled based on one year of facility data. Operational variability for criteria pollutant and TAP emissions from MAU 5B operations were calculated as uncontrolled using the delta from potential operating hours of 8,760 hr/yr subtracting out MAU5B baseline actual emissions.

MAU 5B provides supplemental heat throughout a portion of the facility. The MAU includes an assembly and fan that draws outside air into a horizontal hood. The outside air is heated (direct fired with natural gas) before blowing downward into the facility. The products of combustion are discharged with the heated make-up air directly into the facility. It is assumed that there is one exhaust pipe associated with this MAU and three doors where fugitive emissions could escape.

Natural Gas Hot Water Heater

An existing 75,100 Btu/hr natural gas-fired hot water heater is located inside the main fabrication building. Emission rates are based on AP-42, Section 1.4 Natural Gas Combustion emission factors.

Baseline actual criteria pollutant and TAP emissions from hot water heater operations were calculated as uncontrolled based on one year of facility data. Operational variability for criteria pollutant and TAP emissions

from hot water heater operations were calculated as uncontrolled using the delta from potential operating hours of 8,760 hr/yr subtraction out hot water heater baseline actual emissions.

Cooling towers

Cooling towers are used at onsemi to dissipate heat from non-contact cooling water. An on-demand system is used with the cooling towers to accommodate fluctuating demand for cooling. Cooling demand will dictate when the different cells within a cooling tower configuration are utilized. No chromium-based water treatment chemicals will be used in the circulating water of any of the cooling towers at onsemi.

Emission rates have been calculated for five cooling towers. Emissions from cooling towers are based on the drift loss, amount of total dissolved solids (TDS) in the circulating water, water flow rate, and hours of operation. Particulate matter is the only emission relevant to cooling towers and results from dissolved solids in the water carried with drift. Drift loss is the percent of water entrained in the air exhausted from the cooling tower.

There are currently five existing cooling tower systems located at the facility. Three of these cooling towers have water recirculation rates of 1,150 gallons per minute (gpm) and air flows of 239,500 actual cubic feet per minute (acfm). Each of these three cooling towers has four-foot circular exhausts. onsemi estimated the drift loss from these towers to be 0.02% drift (derived from AP-42, Table 13.4-1 by converting the drift emission factor into a percentage). The other two existing cooling towers have water recirculation rates of 1,694 gpm and air flows of 418,800 acfm. Each of these two cooling towers has eleven foot circular exhausts. onsemi used the design manufacturing, Marlely MH Fluid Cooler, drift emission factor of 0.02% for these two towers.

Water circulated through the cooling towers is maintained with a maximum TDS concentration of 750 ppm. Cooling tower operations depends on cooling demand and may, therefore, fluctuate throughout the year. onsemi does not intend to monitor water circulation rate at each tower. Therefore, cooling tower baseline actual emissions are based on operating for 8,760 hours in any consecutive 12-month period.

onsemi has no plans to install any additional cooling towers.

Gas Abatement Unit

A Gas Abatement Unit will be used to treat specific manufacturing process gas streams, such as perfluorinated compound gas species. A gas abatement unit consists of natural gas direct fired combustor coupled with its own scrubber system for the removal of toxic exhaust gases. Each gas abatement unit will be drawn to the existing packed-bed wet chemical scrubber system when VOC Abatement Units are not operating. When a VOC Abatement Unit is operational, gas abatement unit emissions are drawn through the VOC abatement process.

The facility currently has one gas abatement unit with a rated heat input capacity of 60,000 BTU/hr. onsemi plans to install a second gas abatement unit with a rated heat input capacity of 21,000 Btu/hr. Baseline actual criteria pollutant and TAP emissions were calculated as uncontrolled based on one year of facility data operating one gas abatement unit. Two gas abatement units are proposed for operational variability for this facility. Criteria pollutant and TAP emissions were calculated as uncontrolled (drawn through wet scrubber system) and controlled (drawn through VOC Abatement system) for two gas abatement units based on each operating on natural gas 8,760 hr/yr. Emission rates for the gas abatement unit are based on AP-42, Section 1.4 Natural Gas Combustion emission factors.

Tanks

Tanks are maintained on-site for the storage and distribution of diesel fuels and temporary storage of hazardous waste. The emergency generators will have dedicated fuel storage tanks. These tanks emit negligible quantities of VOCs.

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary

emissions do not count in determining the potential to emit of a facility or stationary source.

Using this definition of Potential to Emit, an emission inventory was developed for the semiconductor manufacturing processes and associated equipment operations at the facility (see Appendix A).

Proposed FEC – Criteria Pollutant and HAP Emissions

Table 3 summarizes onsemi's estimated baseline actual emissions for the period January 1, 2020, through December 31, 2021. Prior to this time, the facility was operated under the name ON Semiconductors. The facility is now operated as onsemi and this statement of basis is to review and update the FEC limits established in the T2 permit issued on August 17, 2018. Table 3 presents the maximum emission rate over the 2-year period as a baseline, the proposed operational variability components of the FECs for the criteria pollutants, the proposed growth component allows for potential future business growth or facility changes that may increase emissions, and the existing 2018 limits for reference.

The following tables present the baseline potential to emit, operational variability, total PTE, potential growth, current FECs, and proposed FECs for all criteria from all emissions units at the facility for both uncontrolled and controlled operational scenarios as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit. "*Uncontrolled operational scenario*" means no VOC abatement units are used to control VOC. "*Controlled operational scenario*" means VOC abatement units are used to control VOC.

Table 3 CRITERIA POLLUTANTS, BASELINE EMISSIONS, AND PROPOSED FEC (UNCONTROLLED OPERATIONAL SCENARIO)

Source	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	Lead
	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	lbs/yr[c]
Baseline Actual Emissions	0.82	0.05	0.006	0.53	0.35	5.54	0.00
Operational Variability Component	2.45	1.09	0.24	9.49	13.08	3.73	0.16
Total PTE	**3.27**	**1.14**	**0.24**	**10.01**	**13.42**	**9.27**	**0.16**
Proposed Growth Component	1.71	0.84	5.76	15.99	12.58	44.00	39.84
Existing 2018 FEC Limits[b]	5	2	6	26	26	53	40
Total Proposed FEC	5	2	6	26	26	53	40

a) Tons per rolling 12-month period
b) Existing permit limits included for reference
c) Tons per rolling 12-month period

Table 4 CRITERIA POLLUTANTS, BASELINE EMISSIONS, AND PROPOSED FEC (CONTROLLED OPERATIONAL SCENARIO)

Source	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	Lead
	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	lbs/yr[c]
Baseline Actual Emissions	0.82	0.06	0.007	0.58	0.39	0.68	0.00
Operational Variability Component	2.58	1.21	0.25	11.16	14.48	1.39	0.18
Total PTE	**3.40**	**1.27**	**0.25**	**11.73**	**14.87**	2.07	0.18
Proposed Growth Component	1.58	0.71	5.75	14.27	12.49	51.57	39.81
Existing 2018 FEC Limits[b]	5	2	6	26	26	53	40
Total Proposed FEC	5	2	6	26	26	**53**	**40**
Approved FEC Limits[d]	**3.40**	**1.27**	**0.25**	**11.73**	**14.87**	**53**	**40**

a) Tons per rolling 12-month period
b) Existing permit limits included for reference
c) Tons per rolling 12-month period
d) The approved FEC limit is different from the proposed FEC limit for PM_{10}, $PM_{2.5}$, NO_X, CO and SO_2 as the growth component was not modeled for these pollutants. Therefore, FEC will be set at the modeled level for PM_{10}, $PM_{2.5}$, NO_X, CO and SO_2.

In accordance with IDAPA 58.01.01.177.02.c, the applicant must demonstrate that the FEC will not cause or significantly contribute to a violation of any ambient air quality standard (NAAQS). However, onsemi modeled emissions at the Potential to Emit (PTE) of the sources and did not model at the proposed FEC while

the PTE is significantly lower than the FEC. Therefore, FEC will be set at the modeled level for PM_{10}, $PM_{2.5}$, NO_X, CO and SO_2.

For VOC FEC Limits

There are no NAAQS or other ambient air quality standards for VOC, however VOC and NOx are precursors to ozone which does have a NAAQS standard. Additional calculations (see Appendix A, Emissions Inventory) for secondary ozone formation show that including the proposed growth component of NOx and VOC emissions results in estimated potential ozone formation at a level that would not cause or contribute an exceedance of the NAAQS. This is conservative because it also includes the proposed growth portion of NOx. Therefore, the proposed growth component of VOC is maintained, and the VOC FEC limit is set at 53 T/yr.

For Lead FEC Limits

In accordance with the State of Idaho Air Quality Modeling Guideline, modeling would not be required for an existing facility if post-project facility wide emissions are below ¼ SER. The ¼ SER threshold for lead is 24.7 lbs/month. The current FEC limit is 40 lbs per year. The Lead NAAQS are assessed on a 3-month average. If the entire 40 lbs/year were emitted in a single 3-month period it would result in 13.33 lbs/month on average, which is less than the 24.7 lbs/month ¼ SER threshold. Therefore, the current Lead FEC limit of 40 lbs/year is retained because it would not be above thresholds for modeling to assess NAAQS compliance.

TAP Emissions

The facility-wide TAP PTE is provided in the following table:

Table 5 BASELINE PROJECT POTENTIAL TO EMIT FOR TOXIC AIR POLLUTANTS

Pollutant	Facility-Wide Total (PTE) (lb/hr)	IDAPA 58.01.01.585/586 EL (lb/hr)	Exceeds EL	TAP Type
Ammonia	**1.67E+00**	**1.20E+00**	**Exceeds**	**Non-Carcinogenic TAP**
Hydrogen Chloride	1.59E-05	5.00E-02	Below	Non-Carcinogenic TAP
Fluorides (as F)	9.17E-02	1.67E-01	Below	Non-Carcinogenic TAP
Ethanol	1.03E-03	1.25E+02	Below	Non-Carcinogenic TAP
Hydrogen Peroxide	8.39E-04	1.00E-01	Below	Non-Carcinogenic TAP
Isopropyl Alcohol	6.60E-02	6.53E+01	Below	Non-Carcinogenic TAP
Ethylene Glycol	6.27E-05	8.46E-01	Below	Non-Carcinogenic TAP
Carbon black	9.57E-06	2.30E-01	Below	Non-Carcinogenic TAP
Diacetone Alcohol	3.18E-02	1.60E+01	Below	Non-Carcinogenic TAP
Nitric Acid	1.72E-04	3.33E-01	Below	Non-Carcinogenic TAP
Phosphoric acid	9.11E-04	6.70E-02	Below	Non-Carcinogenic TAP
Acetone	5.11E-02	1.19E+02	Below	Non-Carcinogenic TAP
PGME	8.83E-05	2.40E+01	Below	Non-Carcinogenic TAP
PGMEA	5.23E-02	2.40E+01	Below	Non-Carcinogenic TAP
Cyclohexanone	2.07E-04	6.67E+00	Below	Non-Carcinogenic TAP
Methanol	1.59E-01	1.73E+01	Below	Non-Carcinogenic TAP
2-heptanone	8.36E-06	1.57E+01	Below	Non-Carcinogenic TAP
Ethyl silicate	0.00E+00	5.67E+00	Below	Non-Carcinogenic TAP
Sulfuric Acid	2.79E-04	6.70E-02	Below	Non-Carcinogenic TAP
Diethanolamine	4.19E-04	1.00E+00	Below	Non-Carcinogenic TAP
1.4-Dioxane	1.94E-05	4.80E-03	Below	Carcinogenic TAP

Pollutant	Facility-Wide Total (PTE) (lb/hr)	IDAPA 58.01.01.585/586 EL (lb/hr)	Exceeds EL	TAP Type
ethylbenzene	6.50E-06	2.90E+01	Below	Non-Carcinogenic TAP
Cresol	1.23E-06	1.47E+00	Below	Non-Carcinogenic TAP
n-AMYl ACETATE	1.23E-05	3.53E+01	Below	Non-Carcinogenic TAP

The TAP PTE for ammonia exceeded the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586, therefore, modeling is performed for ammonia.

TAP emitted from the emergency generators that are HAPs are not included in the above tables because the emergency generators is regulated by 40 CFR 63, Subpart ZZZZ. It is presumed that EPA evaluated the 187 HAPs when developing the emission standards for new, modified or existing stationary sources regulated by 40 CFR Part 63; therefore, no further review is required under IDAPA 58.01.01.210 for these pollutants for sources subject to 40 CFR Part 63, including sources specifically exempted within the subpart. The Toxic Air Pollutants that are not one of the 187 Hazardous Air Pollutants will still need to be evaluated for compliance with IDAPA 58.01.01.210. Regardless, DEQ may also require a source to evaluate any pollutant under IDAPA Section 161 to ensure that pollutant alone, or in combination with any other contaminants, does not injure or unreasonably affect human or animal life or vegetation.

Post Project HAP Emissions

The facility takes HAP emissions limits to stay as a Synthetic Minor source as previously permitted. There are no NAAQS modeling requirements for HAPs, only for TAPs which are addressed separately in the Chi/Q analysis. Therefore, the proposed FEC limits would remain the same as the current FEC limits (<10/25 T/yr single/combined HAP).

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of certain criteria air pollutants and TAP from this project exceed applicable screening emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline[1]. Refer to the Emissions Inventories section for additional information concerning the emission inventories.

The applicant has demonstrated pre-construction compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated pre-construction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP). For ammonia where the hourly emissions exceed the EL, onsemi calculated its ambient impact by multiplying the hourly rate in lb/hr with the "Chi/Q" in ($\mu g/m^3$) / (lb/hr) and then compared the impact with the respective acceptable ambient concentration. Refer to the Modeling Memo for how each Chi/Q is developed.

An ambient air quality impact analyses document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (see Appendix B).

[1] Criteria pollutant thresholds in Table 2, State of Idaho Guideline for Performing Air Quality Impact Analyses, Doc ID AQ-011, September 2013.

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Canyon County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

Facility Classification

This T2/PTC combo FEC renewal permitting action does not change Facility Classification.

The AIRS/AFS facility classification codes are as follows:

For HAPs (Hazardous Air Pollutants) Only:

A = Use when any one HAP has actual or potential emissions ≥ 10 T/yr or if the aggregate of all HAPS (Total HAPs) has actual or potential emissions ≥ 25 T/yr.

SM80 = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the permit sets limits ≥ 8 T/yr of a single HAP or ≥ 20 T/yr of THAP.

SM = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the potential HAP emissions are limited to < 8 T/yr of a single HAP and/or < 20 T/yr of THAP.

B = Use when the potential to emit without permit restrictions is below the 10 and 25 T/yr major source threshold

UNK = Class is unknown

For All Other Pollutants:

A = Actual or potential emissions of a pollutant are ≥ 100 T/yr.

SM80 = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are ≥ 80 T/yr.

SM = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are < 80 T/yr.

B = Actual and potential emissions are < 100 T/yr without permit restrictions.

UNK = Class is unknown.

Table 2 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted FEC Limits (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM_{10}	< 100	3.40	**100**	B
$PM_{2.5}$	< 100	1.27	**100**	B
SO_2	< 100	0.25	**100**	B
NO_X	< 100	11.73	**100**	B
CO	< 100	14.87	**100**	B
VOC	> 100	53	**100**	SM
HAP (single)	unknown	< 10	**10**	SM
HAP (Total)	> 25	< 25	**25**	SM

Tier II Operating Permit/Permit to Construct (Tier II Operating Permit)

IDAPA 58.01.01.401/IDAPA 58.01.01.201..... Tier II Operating Permit /Permit to Construct Required

The permittee has requested that a Tier II operating permit be issued to the facility for the renewal of the FEC

permit. Therefore, a Tier II is required to be issued in accordance with IDAPA 58.01.01.175 (Procedures and Requirements for Permits Establishing a Facility Emissions Cap). This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.400-461.

Rules for Control of Fugitive Dust Emissions (IDAPA 58.01.01.650-651)

IDAPA 58.01.01.650-651..... Rules for Control of Fugitive Dust – General Rules

All sources of fugitive dust emissions at the facility are subject to the State of Idaho rules for controlling fugitive dust. Reasonable precautions shall be taken to prevent particulate matter from becoming airborne. This requirement is assured by Permit Conditions 2.1, 2.2, 2.3, and 2.4.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625..... Visible Emissions

The sources of PM emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 2.5, 2.6, and 2.7.

Rules for Open Burning (IDAPA 58.01.01.600-616)

IDAPA 58.01.01.600-616..... Rules for Control of Open Burning

The permittee shall comply with the requirements of IDAPA 58.01.01.600-616. This requirement is assured by permit condition 2.8.

Fuel Burning Equipment (IDAPA 58.01.01.675-677)

IDAPA 58.01.01.675-677..... Fuel Burning Equipment – Particulate Matter

The fuel burning equipment located at the facility, with a maximum rated input of 10 MMBtu/hr or more or the fuel burning equipment located at the facility, with a maximum rated input of less 10 MMBtu/hr, are subject to particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. This requirement is assured by Permit Conditions 2.11 and 6.3.

Sulfur Content (IDAPA 58.01.01.725)

IDAPA 58.01.01.725..... Rules for Sulfur Content of Fuels

The permittee shall comply with the requirements of IDAPA 58.01.01.725. The permittee shall maintain documentation of supplier verification of distillate fuel oil sulfur content on an as-received basis. This requirement is assured by permit condition 2.12 and 2.13.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301..... Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for PM_{10}, SO_2, NO_X, CO, and VOC or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006 and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 ..... Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary

source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is/is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

Applicable

40 CFR 60, Subpart IIII..... Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The two emergency generators are subject to 40 CFR 63 Subpart ZZZZ and are required to meet the requirements of 40 CFR 63 Subpart ZZZZ by meeting the requirements of 40 CFR part 60 subpart IIII in accordance with 40 CFR 63.6590(c).

Detailed regulatory analysis of 40 CFR 63 Subpart ZZZZ and 40 CFR part 60 subpart IIII can be found in Appendix C.

Non-applicable

40 CFR 60, Subpart Dc ..... Standards of Performance for Small Industrial–Commercial–Institutional Steam Generating Units

In accordance with 40 CFR 60.40c, the affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr)) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr).

The steam generating units (i.e., the four boilers) at the facility were constructed after June 9, 1989 but are rate at less than 10 MMBtu/hr. Therefore, they are not subject to this subpart.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

GACT/MACT Applicability (40 CFR 63)

Applicable

40 CFR 63, Subpart ZZZZ ..... National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

The two emergency engines were manufactured in 2002 and 2004, respectively, but commenced construction after 6/12/2006. They are new RICE in accordance with 40 CFR63.6590(a)(2)(iii). They are subject to 40 CFR 63 Subpart ZZZZ and are required to meet the requirements of 40 CFR 63 Subpart ZZZZ by meeting the requirements of 40 CFR part 60 subpart IIII in accordance with 40 CFR 63.6590(c).

Non-applicable

40 CFR 63, Subpart BBBBB..... National Emission Standards for Hazardous Air Pollutants for Semiconductor Manufacturing

In accordance with 40 CFR63.7181(a), the permittee is subject to this subpart if the permittee owns or operates a semiconductor manufacturing process unit that is a major source of hazardous air pollutants (HAP) emissions or that is located at, or is part of, a major source of HAP emissions. Because onsemi is not a major source of HAP emissions and is therefore not subject to this subpart.

40 CFR 63, Subpart JJJJJJ..... National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources

In accordance with 40 CFR 63.11195, the types of boilers listed in 40 CFR 63.11195(a) through (k) are not

subject to 40 CFR 63 Subpart JJJJJJ and are not subject to any requirements in 40 CFR 63 Subpart JJJJJJ. The listed boilers include a gas-fired boiler as defined in 40 CFR 63 Subpart JJJJJJ. onsemi operates industrial boilers which are gas-fired. Therefore, the facility is not subject to this subpart.

Permit Conditions Review

This section describes only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action. New text is in bold. The deleted text is shown with strikethrough.

All descriptions of Thermal Processing Units (TPUs) in the permit are changed to Gas Abatement Unit as this reflects more generalized equipment descriptions for this process. TPU is a relic of a single equipment vendor's nomenclature but is not necessarily descriptive of like-kind equipment from other vendors.

The nomenclature of boilers (i.e. BOI#) is changed from "BOI" to "BLR" throughout the permit. This is simply to bring it to consistency with facility nomenclature.

PERMIT SCOPE

Permit Conditions 1.1, 1.2, 1.3 and Table 1.1

Permit Condition 1.1 states the purpose of this permitting action. Permit Condition 1.2 states that those permit conditions that have been modified or revised by this permitting action are identified by the permit issue date citation located directly under the permit condition and on the right-hand margin. Permit Condition 1.3 states that this permit will replace T2-2016.0064 project 61813 issued August 17, 2018.

Table 1.1 was updated with the details of the sources permitted. A footnote was added to mention that Table 1.1 lists the regulated sources at the time of permit renewal, and this list might change. This list will be updated and maintained onsite throughout the term of the permit by the permittee as the sources are allowed to change under the conditions of this FEC permit.

FACILITY EMISSIONS CAP REQUIREMENTS

Revised Permit Conditions 3.2

Table 3.1 is revised to move the process gas abatement units to emission unit section from the control devices section. The gas abatement unit is treated as an emissions unit to be consistent across different facilities.

Revised Permit Conditions 3.3, 3.4, and 3.5

Permit Condition 3.3 is revised to reflect approved FEC limits. The approved FEC limit is different from the proposed FEC limit for PM_{10}, $PM_{2.5}$, NO_X, CO and SO_2 as the growth component was not modeled for these pollutants. Therefore, the FEC limits will be set at the modeled level for PM_{10}, $PM_{2.5}$, NO_X, CO and SO_2.

Source Description	$PM_{2.5}$	PM_{10}	SO_2	NO_X	CO	VOC	Lead	Individual HAPs	Aggregate HAPs
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	lbs/yr	T/yr	T/yr
Total Facility Emissions Cap	1.27	3.40	0.25	11.73	14.87	53	40	<10	<25

Permit Conditions 3.4.1, 3.4.2 and 3.4.3 are updated by replacing "identified in the permittee's application, dated November 9, 2016, the revised modeling file received December 1, 2017, and the revised emissions inventory spreadsheet received May 9, 2018" with "identified in Appendix A of this permit…".

Permit Conditions 3.5.1 and 3.5.2 are updated by replacing "identified in the permittee's application, dated November 9, 2016, the revised modeling file received December 1, 2017, and the revised emissions inventory spreadsheet received May 9, 2018" with "identified in Appendix A…".

Revised Permit Conditions 3.7

Permit Condition 3.7 is updated to include an email option for the submission of the annual emissions report.

Revised Permit Conditions 3.11

Permit Condition 3.11 is revised by updating the Chi/Q factors to the most recent application submittal factors (14.31 for 24-hr, 2.91 for annual) and by updating the references to point to the most recent application submittal.

SEMICONDUCTOR AND SUPPORT OPERATIONS

Revised Permit Condition 4.1

Permit Condition 4.1 is the process description for semiconductor and support operations. It was updated by including a description of the gas abatement unit.

Revised Permit Condition 4.2

Table 4.2 revised to move the process gas abatement units to emission unit section from the control devices section. The gas abatement unit is treated as an emissions unit to be consistent across different facilities.

Revised Permit Condition 4.4.7

The control efficiency of the scrubber and the emissions factor for each chemical controlled by the scrubber is updated in the permit condition. The emission factors are estimated using fab process experience and chemical properties and lower scrubber efficiency is used. Historically, the facility calculated emissions, assuming all acid usage volatilized and was then controlled by the scrubber using control efficiencies provided by the scrubber manufacturer. onsemi is proposing to use updated process-based emission factors and lower scrubber control efficiencies. The historically used control efficiencies provided by the scrubber manufacturer have been conservatively adjusted downward to account for the typical concentration of each pollutant in the exhaust gas stream and compound-specific affinity to be captured by the high pH process water in the scrubber.

Removed Permit Condition 4.9 (4.9.1 and 4.9.2) and 4.6.4

These permit conditions were removed so as to be consistent with way DEQ treats gas abatement units across the different facilities.

Removed Permit Condition 4.9.2

The gas abatement unit flow rate permit condition is removed as this record keeping requirement was used to ensure the gas abatement unit is operating within the design capacity and measuring the volumetric flow rate (acfm) is not possible since the inlet line is 2 inches. The emissions inventory only includes natural gas combustion emissions for the gas abatement unit.

TOXIC AIR POLLUTANTS

Permit condition 5 REQUIREMENTS FOR POLLUTANTS REGULATED BY IDAPA 58.01.01.585-586 is renamed to be 5 Toxic Air Pollutants as it is easy to understand.

Revised Permit Condition 5.2

Chi/Q values are updated based on the information in the modeling report submitted by the facility. They read:

> "CQ24-hr =Chi/Q value for 24-hour averaging period = 25.17 ~~**33.34**~~ µg/m^3 per lb/hr
> *CQannual = Chi/Q value for annual averaging period = 5.38 ~~**5.29**~~ µg/m^3 per 1b/hr"*

The Chi/Q value was not evaluated by DEQ as part of the modeling review. DEQ assumes that the Chi/Q values provided by the facility in their modeling report are done correctly.

NATURAL GAS-FIRED BOILERS AND AIR MAKEUP UNIT

Revised Permit Condition 6.5

Permit Condition 6.5 is revised to point to the emission factors identified in Appendix A of the current permit instead of the 2017-2018 submittal for the prior permitting action.

EMERGENCY CI ENGINES

Revised Permit Conditions 7.2

Permit Conditions 7.2 is updated by replacing “identified in the permittee’s application, dated November 9, 2016, the revised modeling file received December 1, 2017, and the revised emissions inventory spreadsheet received May 9, 2018” with “identified in Appendix A of this permit…”.

Revised Permit Conditions 7.4

Permit Conditions 7.4 is revised to reflect new proposed daily hours for emergency engine routine testing and maintenance activities. 2 hr/day is changed to 8 hr/day.

PUBLIC REVIEW

Public Comment Period

The draft permit was made available to the public in accordance with IDAPA 58.01.01.404.02. During this time, comments were not submitted in response to DEQ’s proposed action. Refer to the chronology for public comment period dates.

APPENDIX A – EMISSIONS INVENTORIES

		2018 modeled rates lb/hr	2023 modeled rates lb/hr	
FS_01	Manufacturing Emissions	0.00331	0.0021	was modeled at 0.0264 lb/hr for controlled and at 0.0114 lb/hr for uncontrolled operating scenario based on the footnotes in the modeling memo for the 2018 permit.
FS_02	Manufacturing Emissions	0.00331	0.0021	
FS_03	Manufacturing Emissions	0.00331	0.0021	

Modeling Applicability Analysis for a new facility or for an initial permit for an existing facility.

Version: 1/9/2025

Purpose:	The following table is to help applicants to determine which criteria pollutant needs to be modeled. The table is developed based on Figure 1 and Table 2 of the "Guideline for Performing Air Quality Impact Analyses" dated July 2021 (https://www2.deq.idaho.gov/admin/LEIA/api/document/download/5962). Figure 1 is included at the end of this worksheet. O_3, 8-hr modeling applicability determination is based on EPA's "Guidance for Ozone and Fine Particulate Matter Permit Modeling" (https://www.epa.gov/system/files/documents/2022-07/Guidance_for_O3_PM25_Permit_Modeling.pdf). SO_2, 3-hr thresholds are taken from General Modeling Review Memorandum template (2019AAH1)
Instructions:	a. Please fill out all the yellow cells under columns C by entering your facility-wide emissions for each pollutant. Use units of lb/hr for pollutants with a short-term averaging period (1-hr, 3-hr, 8-hr, or 24-hr) and T/yr for pollutants with an annual averaging period. b. The cell formatting will change from yellow to green once a value has been entered.
IMPORTANT:	To clear the cells, choose the cells and click "delete" otherwise column N won't reset. click space key won't work.

Pollutant and Averaging Period	Post-Project Facility-Wide Emissions using lb/hr for short-term averaging time and T/yr or tpy for annual averaging time	Unit	Threshold Values[3]					Modeling Applicability Flow Chart Procedure for New Facilities				
			BRC[a] (T/yr, 10% SER)	SIL Threshold [c, d, f, g] (lb/hr)	BRC	1/4 SER (using tpy for annual NAAQS and lb/hr for short-term NAAQS)	SER (T/yr)	Post Project Facility-Wide Emissions of Pollutant < BRC (T/yr)?	Project Related Emissions of Pollutant X Qualify for a BRC Exemption [a,b]	Post-Project Facility-Wide Emissions < 1/4 SER for annual NAAQS and (1/4 SER)/8760 for short term NAAQS? [c,d]	Project Emission Increase < SIL Threshold?	Modeling Required?
$PM_{2.5}$ 24-hr	0.57 (lb/hr)	lb/hr[3]	NA	NA	NA	0.57 (lb/hr)	10	No	NA	No	NA	Yes
$PM_{2.5}$ Annual	1.27 (T/Yr)	T/Yr or tpy for facility-wide	1 (tpy)	NA	NA	2.50 (tpy)	10	No	NA	Yes	NA	No
PM_{10} 24-hr	1.06 (lb/hr)	lb/hr[3]	NA	NA	NA	0.86 (lb/hr)	15	No	NA	No	NA	Yes
PM_{10} annual	3.40 (T/Yr)	T/Yr or tpy for facility-wide	1.5 (tpy)	NA	NA	NA	15	NA	NA	NA	NA	NA
NO_2 (1-hr) [6]	1.95 (lb/hr)	lb/hr[3]	NA	NA	NA	2.28 (lb/hr)	40	No	NA	Yes	NA	No
NO_2 (Annual)	11.73 (T/Yr)	T/Yr or tpy for facility-wide	4 (tpy)	NA	NA	10.00 (tpy)	40	No	NA	No	NA	Yes
SO_2 1-hr	<BRC	lb/hr[3]	NA	NA	NA	2.3 (lb/hr)	40	Yes	NA	No	NA	No
SO_2 3-hr [7]	<BRC	lb/hr[3]	NA	NA	NA	2.3 (lb/hr)	40	Yes	NA	No	NA	No
SO_2 annual	0.25 (T/Yr)	T/yr	4	NA		NA	40	NA	NA	NA	NA	NA
CO 1-hr	14.56 (lb/hr)	lb/hr[3]	NA	84 (lb/hr)	NA	5.7 (lb/hr)	100	No	NA	Yes	NA	No
CO 8-hr	14.56 (lb/hr)	lb/hr[3]	NA	26 (lb/hr)	NA	5.7 (lb/hr)	100	No	NA	Yes	Yes	No
CO annual	14.87 (T/Yr)	T/yr	10.0	NA	NA	NA	100.0	NA	NA	NA	NA	NA
O_3, 8-hr (NOx and VOC precursors) (based on EPA final Ozone modeling guidance)												
NOx (tpy)	11.73 (tpy)	T/Yr or tpy	NA	NA	NA	NA	40	NA	NA	NA	NA	No
VOC (tpy)	9.27 (tpy)											

a) If the project would have qualified for a Category I BRC permitting exemption for the criteria pollutant in question, as per Idaho Air Rules Section 221.01, except for the emissions quantities of another criteria pollutant, then a NAAQS compliance analysis is not required under Section 203.02 or 403.02 for that criteria pollutant. The BRC exemption cannot generally be used to exempt a project from a pollutant-specific NAAQS compliance demonstration where a PTC is required for the action regardless of emission quantities, such as the modification of an existing emission or throughput limit. However, in this instance, if post-project facility-wide annual emissions of the criteria pollutant are also below BRC thresholds, then a NAAQS compliance demonstration is not required.

The following are footnotes for Figure 2 of the July 2021 modeling guidance:

a)This evaluation is DEQ's regulatory interpretation of permit exemption rules, as described in: Policy on NAAQS Compliance Demonstration Requirements. Idaho Department of Environmental Quality Policy Memorandum. July 11, 2014. The evaluation is based only on annual emissions, and emissions qualifying as "fugitive" as defined by Idaho Air Rules for permit applicability are not included in the evaluation.

b)Examples:

1.A company proposes to construct a widget maker at their existing facility. The project would qualify for a BRC permitting exemption under Idaho Air Rules Section 221.01, with emissions of Pollutant X below the BRC threshold, except emissions of Pollutant Y exceed the BRC threshold and trigger the requirement to obtain a PTC. By DEQ regulatory interpretation, a NAAQS compliance demonstration for Pollutant X is not required by Idaho Air Rules for permit issuance.

2.A facility proposes to increase production at their existing, permitted widget maker. The existing permit limits widget production at 50 widgets per hour. The project proposes to increase production to 100 widgets per hour. The increase in emissions of Pollutant X is below the BRC threshold, but total emissions of Pollutant X from the unit are above the BRC threshold. A NAAQS compliance demonstration for Pollutant X is required because the project could not qualify for a permitting exemption, regardless of the emissions from other pollutants. The modification requires changing an existing permit condition, and therefore, could not qualify for a BRC exemption.

c) Fugitive emissions associated with the project are included in this evaluation.

1. Short-term lb/hr emission increases expressed as a proposed increase in permitted potential hourly emissions.

2. Long-term tpy emission increases expressed as a proposed increase in permitted potential annual emissions. (taken from

3. Values in pounds/hour as averaged over the averaging period of the NAAQS, unless noted otherwise. Pound/hour values listed as a function of the SER were calculated by dividing the annual SER value by 8,760. lb/hr values are taken from Table 2 of the July 2021 modeling guidance.

4. These values are more restrictive than the SIL Threshold. Therefore, the SIL Threshold may be used in place of these values. (taken from footnote (b) of Table 2 in the July, 2021 modeling guidance.)

5. Previously performed modeling must be DEQ approved in the past five years, representative of the existing facility and operations, and include the pollutant of interest.

6. Intermittent sources such as diesel pressure pumps, mining, dirt dumping, engine testing, etc. Emissions of NOx from intermittent testing of engines powering emergency generators and fire suppression water pumps can typically be excluded from the modeling applicability determination for 1-hour NO_2 NAAQS compliance demonstrations. (taken from p.12-13, July 2021 DEQ modeling guidance.)

7. taken from General Modeling Review Memorandum template (2019AAH1)

i) Refer to Emission Increase Calculation for Project-Specific Modeling Applicability", Section 3.3 of "Guideline for Performing Air Quality Impact Analyses" dated July 2021 for details (p.13).

ii) instead of using respective NAAQS averaging time, you may use maximum lb/hr rate as that is the worst case lb/hr rate. If modeling is not required at max. lb/hr, you are good to go. If modeling is required, you may refine your lb/hr rate based on the respective NAAQS averaging time to see if modeling is required.

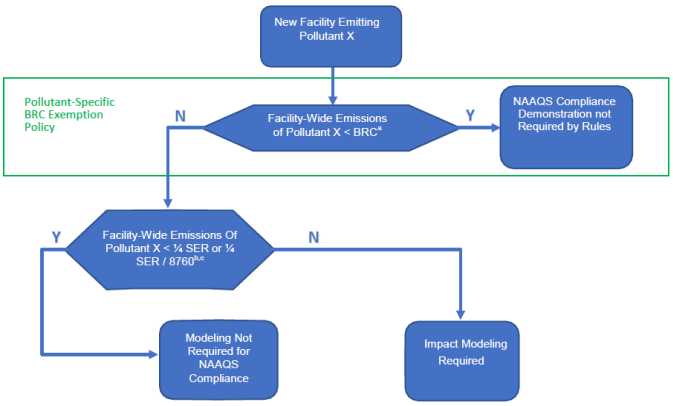


Figure 1. Pollutant-Specific Modeling Applicability Flow Chart for New Facilities in Attainment or Unclassifiable Areas

Table A-1. Controlled Site-Wide Emissions Summary

Emission System	Baseline Actual Emissions (tpy)								
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	Lead [2]	HAPs	Single HAP
VOC Abatement System (Manufacturing Emissions)	0.004	0.004	0.05	0.00	0.04	0.65	4.67E-04	0.359	0.36
Scrubbers (Manufacturing Emissions)	0.022	0.022	--	--	--	0.002	--	0.01	0.01
Boiler 1	4.52E-03	3.39E-03	0.01	1.01E-03	0.04	3.27E-03	5.83E-04	1.10E-03	--
Boiler 2	4.52E-03	3.39E-03	0.01	1.01E-03	0.04	3.27E-03	5.83E-04	1.10E-03	--
Boiler 4	4.52E-03	3.39E-03	0.01	1.01E-03	0.04	3.27E-03	5.83E-04	1.10E-03	--
Boiler 3	5.74E-03	5.74E-03	0.08	4.53E-04	0.06	4.15E-03	7.55E-04	1.43E-03	--
MAU5B	8.53E-03	8.53E-03	0.11	6.73E-04	0.09	6.17E-03	1.12E-03	2.12E-03	--
Water Heater	1.33E-04	1.33E-04	1.76E-03	1.05E-05	1.47E-03	9.65E-05	1.76E-05	3.31E-05	--
TPU	1.07E-04	1.07E-04	1.40E-03	8.41E-06	1.18E-03	7.71E-05	1.40E-05	2.65E-05	--
Generator 2	1.64E-03	1.64E-03	0.11	2.14E-03	0.02	4.93E-03	--	1.71E-04	--
Generator 3	2.69E-03	2.69E-03	0.21	1.35E-04	0.03	4.16E-03	--	2.95E-04	--
Cooling Towers	0.77	0.003	--	--	--	--	--	--	--
Baseline Actual Emissions (tpy)	**0.82**	**0.06**	**0.58**	**0.007**	**0.39**	**0.68**	**0.00**	**0.38**	**0.37**
Operational Variability	**Operational Variability Emissions (tpy)**								
VOC Abatement System (Manufacturing Emissions)	0.127	0.127	1.67	0.01	1.40	0.41	1.67E-02	0.21	0.18
Scrubbers (Manufacturing Emissions)	0.011	0.011	--	--	--	1.21E-03	--	7.50E-03	7.48E-03
Boiler 1	2.74E-01	2.06E-01	0.39	6.13E-02	2.67	1.98E-01	3.54E-02	6.68E-02	--
Boiler 2	2.74E-01	2.06E-01	0.39	6.13E-02	2.67	1.98E-01	3.54E-02	6.68E-02	--
Boiler 4	2.74E-01	2.06E-01	0.39	6.13E-02	2.67	1.98E-01	3.54E-02	6.68E-02	--
Boiler 3	2.61E-01	2.61E-01	3.43	2.06E-02	2.88	1.89E-01	3.43E-02	6.48E-02	--
MAU5B	1.48E-01	1.48E-01	1.95	1.17E-02	1.64	1.07E-01	1.95E-02	3.68E-02	--
Water Heater	2.32E-03	2.32E-03	3.05E-02	1.83E-04	2.56E-02	1.68E-03	3.05E-04	5.76E-04	--
TPU	2.54E-03	2.54E-03	3.34E-02	2.00E-04	2.80E-02	1.84E-03	3.34E-04	6.30E-04	--
Generator 2	1.48E-02	1.48E-02	0.99	1.92E-02	0.22	4.43E-02	--	1.54E-03	--
Generator 3	2.42E-02	2.42E-02	1.87	1.21E-03	0.29	3.74E-02	--	2.65E-03	--
Cooling Towers	1.17	0.005	--	--	--	--	--	--	--
Operational Variability Emissions (tpy)	**2.58**	**1.21**	**11.16**	**0.25**	**14.48**	**1.39**	**0.18**	**0.53**	**0.19**
Total Potential Emissions (tpy) [3]	**3.40**	**1.27**	**11.73**	**0.25**	**14.87**	**2.07**	**0.18**	**0.91**	**0.56**
Proposed Growth	**1.60**	**0.73**	**14.27**	**5.75**	**11.13**	**50.93**	**39.82**	**23.09**	**8.44**
Facility FEC (tpy)[2]	**5**	**2**	**26**	**6**	**26**	**53**	**40**	**24**	**9**

[1] Actual emissions are based on the 24-month consecutive period from 1/1/2020 to 12/31/2021 production levels. Proposed growth scaled comparing actual to maximum wafer starts; scaling factor of 1.10 applied to actual emissions

[2] Lead emissions are in lb/yr

[3] PTE is the sum of baseline actual and operational variability emissions

[4] Operational variability for manufacturing VOC emissions is based on a 9.4% increase in production based on the actual wafer starts compared to maximum wafer starts per year

Table A-2. Uncontrolled Site-Wide Emissions Summary

Emission System	Baseline Actual Emissions (tpy)								
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	Lead [2]	HAPs	Single HAP
VOC Abatement System (Manufacturing Emissions)	0.000	0.000	0.00	0.00	0.00	0.00	0.00E+00	0.000	0.00
Scrubbers (Manufacturing Emissions)	0.022	0.022	--	--	--	5.512	--	0.38	0.37
Boiler 1	4.52E-03	3.39E-03	0.01	1.01E-03	0.04	3.27E-03	5.83E-04	1.10E-03	--
Boiler 2	4.52E-03	3.39E-03	0.01	1.01E-03	0.04	3.27E-03	5.83E-04	1.10E-03	--
Boiler 4	4.52E-03	3.39E-03	0.01	1.01E-03	0.04	3.27E-03	5.83E-04	1.10E-03	--
Boiler 3	5.74E-03	5.74E-03	0.08	4.53E-04	0.06	4.15E-03	7.55E-04	1.43E-03	--
MAU5B	8.53E-03	8.53E-03	0.11	6.73E-04	0.09	6.17E-03	1.12E-03	2.12E-03	--
Water Heater	1.33E-04	1.33E-04	1.76E-03	1.05E-05	1.47E-03	9.65E-05	1.76E-05	3.31E-05	--
TPU	1.07E-04	1.07E-04	1.40E-03	8.41E-06	1.18E-03	7.71E-05	1.40E-05	2.65E-05	--
Generator 2	1.64E-03	1.64E-03	0.11	2.14E-03	0.02	4.93E-03	--	1.71E-04	--
Generator 3	2.69E-03	2.69E-03	0.21	1.35E-04	0.03	4.16E-03	--	2.95E-04	--
Cooling Towers	0.77	0.003	--	--	--	--	--	--	--
Baseline Actual Emissions (tpy)	**0.82**	**0.05**	**0.53**	**0.006**	**0.35**	**5.54**	**0.00**	**0.39**	**0.37**
Operational Variability	**Operational Variability Emissions (tpy)**								
VOC Abatement System (Manufacturing Emissions)	0.000	0.000	0.00	0.00	0.00	0.00	0.00E+00	0.00	0.00
Scrubbers (Manufacturing Emissions)	0.011	0.011	--	--	--	2.76E+00	--	1.89E-01	1.86E-01
Boiler 1	2.74E-01	2.06E-01	0.39	6.13E-02	2.67	1.98E-01	3.54E-02	6.68E-02	--
Boiler 2	2.74E-01	2.06E-01	0.39	6.13E-02	2.67	1.98E-01	3.54E-02	6.68E-02	--
Boiler 4	2.74E-01	2.06E-01	0.39	6.13E-02	2.67	1.98E-01	3.54E-02	6.68E-02	--
Boiler 3	2.61E-01	2.61E-01	3.43	2.06E-02	2.88	1.89E-01	3.43E-02	6.48E-02	--
MAU5B	1.48E-01	1.48E-01	1.95	1.17E-02	1.64	1.07E-01	1.95E-02	3.68E-02	--
Water Heater	2.32E-03	2.32E-03	3.05E-02	1.83E-04	2.56E-02	1.68E-03	3.05E-04	5.76E-04	--
TPU	2.54E-03	2.54E-03	3.34E-02	2.00E-04	2.80E-02	1.84E-03	3.34E-04	6.30E-04	--
Generator 2	1.48E-02	1.48E-02	0.99	1.92E-02	0.22	4.43E-02	--	1.54E-03	--
Generator 3	2.42E-02	2.42E-02	1.87	1.21E-03	0.29	3.74E-02	--	2.65E-03	--
Cooling Towers	1.17	0.005	--	--	--	--	--	--	--
Operational Variability Emissions (tpy)	**2.45**	**1.09**	**9.49**	**0.24**	**13.08**	**3.73**	**0.16**	**0.50**	**0.19**
Total Potential Emissions (tpy) [3]	**3.27**	**1.14**	**10.01**	**0.24**	**13.42**	**9.27**	**0.16**	**0.88**	**0.56**
Proposed Growth	**1.73**	**0.86**	**15.99**	**5.76**	**12.58**	**43.73**	**39.84**	**23.12**	**8.44**
Facility FEC (tpy)[2]	**5**	**2**	**26**	**6**	**26**	**53**	**40**	**24**	**9**

[1] Actual emissions are based on the 24-month consecutive period from 1/1/2020 to 12/31/2021 production levels. Proposed growth scaled comparing actual to maximum wafer starts; scaling factor of 1.10 applied to actual emissions

[2] Lead emissions are in lb/yr

[3] PTE is the sum of baseline actual and operational variability emissions

[4] Operational variability for manufacturing VOC emissions is based on a 9.4% increase in production based on the actual wafer starts compared to maximum wafer starts per year

[5] In the uncontrolled scenario all manufacturing emissions are routed through the scrubbers, and none through the VOC abatement units. There are also no natural gas combustion emissions from the VOC abatement units in this scenario.

Table A-3. VOC-HAP-PM Emissions Summary

Name	CAS #	PM10?	VOC?	HAP?	Scrubber Gases and Acid/Bases [lb/yr]	VOC ABUs Photoresist and Other Organics [lb/yr]	Baseline Actual Emissions [lb/yr]
Ammonia	7664-41-7	No	No	No	7502.50	0.00	7502.50
Hydrogen Chloride	7647-01-0	Yes	No	Yes	0.07	0.00	0.07
Hydrogen Fluoride	7664-39-3	Yes	No	Yes	29.92	0.00	29.92
Carbon Dioxide	124-38-9	No	No	No	318.35	0.00	318.35
Carbon Monoxide	630-08-0	No	No	No	63.32	0.00	63.32
Silicon Dioxide	7631-86-9	Yes	No	No	6.01	0.00	6.01
Hexafluoroethane	76-16-4	No	No	No	26.49	0.00	26.49
Carbon tetrafluoride	75-73-0	No	No	No	197.55	0.00	197.55
Trifluoromethane	75-46-7	No	No	No	22.33	0.00	22.33
Octafluorocyclopentene	1400-2-01	No	Yes	No	0.21	0.00	0.21
Octafluorocyclobutane	115-25-3	No	No	No	18.84	0.00	18.84
Ethanol	64-17-5	No	Yes	No	4.61	0.00	4.61
Sulfur Hexafluoride	2551-62-4	No	No	No	42.52	0.00	42.52
Sulfur Dioxide	7446-09-5	No	No	No	33.94	0.00	33.94
Fluorine	7782-41-4	No	No	No	0.00	0.00	0.00
Acetic Acid	64-19-7	Yes	Yes	No	0.00	0.00	0.00
Ammonium Hydroxide	1336-21-6	No	Yes	No	0.00	0.00	0.00
Tetramethylammonium hydroxide	75-59-2	No	Yes	No	0.00	18.52	18.52
Ethylene glycol	107-21-1	No	Yes	Yes	0.00	0.28	0.28
Hydrogen Peroxide	7722-84-1	Yes	No	No	3.77	0.00	3.77
Isopropyl Alcohol	67-63-0	No	Yes	No	0.00	296.65	296.65
Sulfuric Acid	7664-93-9	No	No	No	1.26	0.00	1.26
Nitric Acid	7697-37-2	Yes	No	No	0.77	0.00	0.77
n-Methylpyrrolidinone	872-50-4	No	Yes	No	0.00	2.68	2.68
Phosphoric acid	7664-38-2	Yes	No	No	4.09	0.00	4.09
Proprietary Additive	Additive	No	Yes	No	0.00	2.31	2.31
Acetone	67-64-1	No	No	No	0.00	229.64	229.64
PGME	107-98-2	No	Yes	No	0.00	0.40	0.40
Acrylic monomer	Acrylic monomer	No	Yes	No	0.00	1.19	1.19
PGMEA	108-65-6	No	Yes	No	0.00	234.83	234.83
Cyclohexanone	108-94-1	No	Yes	No	0.00	0.93	0.93
Crosslinker	Crosslinker	No	Yes	No	0.00	0.02	0.02
Ethyl-S-Lactate	97-64-3	No	Yes	No	0.00	1.51	1.51
Methanol	67-56-1	No	Yes	Yes	0.00	713.83	713.83
n-Butyl acetate	123-86-4	No	Yes	No	0.00	0.00	0.00
Coupling agent	Coupling agent	No	Yes	No	0.00	0.00	0.00
Gamma-butyrolactone	96-48-0	No	Yes	No	0.00	0.47	0.47
Hexamethyldisilazane	999-97-3	No	Yes	No	0.00	1.45	1.45
Anisole	100-66-3	No	Yes	No	0.00	0.35	0.35
2-Methyl butyl acetate	624-41-9	No	Yes	No	0.00	0.06	0.06
2-heptanone	110-43-0	No	Yes	No	0.00	0.04	0.04
Sensitizer	Sensitizer	No	Yes	No	0.00	0.02	0.02
Acrylic resin	9063-87-0	No	Yes	No	0.00	4.68	4.68
Ethyl silicate	78-10-4	No	No	No	0.00	0.00	0.00
Diethanolamine	111-42-2	No	Yes	Yes	0.00	1.88	1.88
Methyl 3-methoxy propionate	3852-09-3	No	Yes	No	0.00	0.27	0.27
Ethyl Lactate	97-64-3	No	Yes	No	0.00	1.51	1.51
1.4-Dioxane	123-91-1	No	Yes	Yes	0.00	0.11	0.11
Propyleneglycol monoethylether acetate (PGMEEA)	98516-30-4	No	Yes	No	0.00	0.21	0.21
ethyl 3-ethoxypropionate	763-69-9	No	Yes	No	0.00	1.08	1.08
ethylbenzene	100-41-4	No	Yes	Yes	0.00	0.03	0.03
Cresol	1319-77-3	No	Yes	Yes	0.00	0.01	0.01
n-AMYl ACETATE	628-63-7	No	Yes	No	0.00	0.06	0.06
				Total PM_{10} [lb/yr]	**45**	**0.0**	**45**
				Total PM_{10} [tpy]	**0.02**	**0.00**	**0.02**
				Total VOC [lb/yr]	**4.8**	**1,285**	**1,290**
				Total VOC [tpy]	**0.002**	**0.64**	**0.65**
				Total HAP [lb/yr]	**30.0**	**716.1**	**746.13**
				Total HAP [tpy]	**0.01**	**0.36**	**0.37**
				Max Single HAP [tpy]	**0.01**	**0.36**	**0.36**

Table A-4. TAP Emissions Summary

Name	CAS #	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	Scrubber Gases and Acid/Bases [lb/hr]	VOC ABUs Photoresist and Other Organics [lb/hr]	Baseline Actual Emissions + Operational Variability[1] [lb/hr]	IDAPA 585/586 EL [lb/hr]	Exceeds EL [lb/hr]
Ammonia	7664-41-7	Yes	No	1.28E+00	0.00E+00	1.67E+00	1.20E+00	Yes
Hydrogen Chloride	7647-01-0	Yes	No	1.22E-05	0.00E+00	1.59E-05	5.00E-02	No
Fluorides (as F)	7664-39-3	Yes	No	7.05E-02	0.00E+00	9.17E-02	1.67E-01	No
Ethanol	64-17-5	Yes	No	7.90E-04	0.00E+00	1.03E-03	1.25E+02	No
Hydrogen Peroxide	7722-84-1	Yes	No	6.46E-04	0.00E+00	8.39E-04	1.00E-01	No
Isopropyl Alcohol	67-63-0	Yes	No	0.00E+00	5.08E-02	6.60E-02	6.53E+01	No
Ethylene Glycol	107-21-1	Yes	No	0.00E+00	4.82E-05	6.27E-05	8.46E-01	No
Carbon black	1333-86-4	Yes	No	0.00E+00	7.36E-06	9.57E-06	2.30E-01	No
Diacetone Alcohol	123-42-2	Yes	No	0.00E+00	2.44E-02	3.18E-02	1.60E+01	No
Nitric Acid	7697-37-2	Yes	No	1.32E-04	0.00E+00	1.72E-04	3.33E-01	No
Phosphoric acid	7664-38-2	Yes	No	7.01E-04	0.00E+00	9.11E-04	6.70E-02	No
Acetone	67-64-1	Yes	No	0.00E+00	3.93E-02	5.11E-02	1.19E+02	No
PGME	107-98-2	Yes	No	0.00E+00	6.79E-05	8.83E-05	2.40E+01	No
PGMEA	108-65-6	Yes	No	0.00E+00	4.02E-02	5.23E-02	2.40E+01	No
Cyclohexanone	108-94-1	Yes	No	0.00E+00	1.59E-04	2.07E-04	6.67E+00	No
Methanol	67-56-1	Yes	No	0.00E+00	1.22E-01	1.59E-01	1.73E+01	No
2-heptanone	110-43-0	Yes	No	0.00E+00	6.43E-06	8.36E-06	1.57E+01	No
Ethyl silicate	78-10-4	Yes	No	0.00E+00	0.00E+00	0.00E+00	5.67E+00	No
Sulfuric Acid	7664-93-9	Yes	No	2.15E-04	0.00E+00	2.79E-04	6.70E-02	No
Diethanolamine	111-42-2	Yes	No	0.00E+00	3.22E-04	4.19E-04	1.00E+00	No
1.4-Dioxane	123-91-1	No	Yes	0.00E+00	1.94E-05	1.94E-05	4.80E-03	No
ethylbenzene	100-41-4	Yes	No	0.00E+00	5.00E-06	6.50E-06	2.90E+01	No
Cresol	1319-77-3	Yes	No	0.00E+00	9.43E-07	1.23E-06	1.47E+00	No
n-AMYl ACETATE	628-63-7	Yes	No	0.00E+00	9.43E-06	1.23E-05	3.53E+01	No

1. Calculated as TAPs PTE divided by 8,760 hours per year. Additional 30% safety factor added for §585 TAPs to account for daily fluctuation in material usage, because §585 TAPs utilize a 24-hr averaging period for Acceptible Ambient Concentrations (AACs).

Table A-5. Natural Gas Boiler 1,2,4 (Each) Emissions Input Parameters

Fuel	Natural Gas	
Boiler Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate	8.37	(MMBtu/hr)
	0.0082	(MMscf/hr)
	71.88	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Total Boilers Rate	33.3	(MMBtu/hr)
Boilers actual fuel usage	4.64	(MMscf/yr)
Baseline Actual Fuel Usage [1]	1.17	(MMscf/yr)
Baseline Actual Fuel Usage	1,190	(MMBtu/yr)
Operational Variability Fuel Usage [2]	70.72	(MMscf/yr)
Operational Variability Fuel Usage	72,131	(MMBtu/yr)

[1] Based on ratio of facility wide BTU and total NG usage over consecutive 24-month period 1/1/2020-12/31/2021; Boiler 3 fuel usage (scf) estimated based on MMBtu/hr rating and separated out from other boilers since it does not have low-NOx burners

[2] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage

Table A-6. Natural Gas Boiler 1,2,4 (Each) Total Criteria and GHG Baseline Actual and Operational Flexibility Emissions

Pollutant	Emission Factor[1] (lb/MMBtu)/ (lb/MMscf)	Boiler 1,2,4 Baseline Actual		Boiler 1,2,4 Operational Variability	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM_{10} [4]	0.0076	0.064	4.52E-03	0.063	2.74E-01
$PM_{2.5}$ [5]	0.0057	0.048	3.39E-03	0.047	2.06E-01
CO [3]	0.0739	0.619	4.40E-02	0.609	2.67
NO_X [3]	0.0109	0.091	6.49E-03	0.090	3.93E-01
SO_2 [3]	0.0017	0.014	1.01E-03	0.014	6.13E-02
VOC [3]	0.0055	0.046	3.27E-03	0.045	1.98E-01
Lead [2]	4.90E-07	4.10E-06	2.92E-07	4.04E-06	1.77E-05
CH_4 [7]	2.3	0.02	1.34E-03	0.02	8.13E-02
N_2O [7]	2.20	0.02	1.28E-03	0.02	7.78E-02
CO_2 [7]	120,000	984.7	70.0	968.7	4,243
CO_2e [6]	NA	990.6	70.4	974.5	4,268

[1] Based on ratio of facility wide BTU and total NG usage over consecutive 24-month period 1/1/2020-12/31/2021; Three identical boilers, therefore emissions calculations are presented for only one boiler.

[2] Lead emission factor, small uncontrolled boilers (EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-1 and 1.4-2), converted to lb/MMBtu dated 07/98.

[3] Manufacturer emission factors Cleaver Brooks 11/12/15; NOx based on 9 ppm Low NOx burners.

[4] PM_{10} based on Cleaver Brooks manufacturer data sheet dated 11/12/15

[5] $PM_{2.5}$ based on Cleaver Brooks manufacturer data sheet dated 11/25/15.

[6] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

[7] CH_4, N_2O, and CO_2 emissions factors lb/MMscf EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-2

Table A-7. Boiler 1,2,4 (Each) Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)	Baseline Actual				Operational Variability			
						HAP Emissions		TAP Emissions		HAP Emissions		TAP Emissions	
						(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Benzene	71-43-2	Yes	No	Yes	2.10E-03	1.72E-05	1.23E-06	1.72E-05	1.23E-06	1.70E-05	7.43E-05	1.70E-05	7.43E-05
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02	6.15E-04	4.38E-05	6.15E-04	4.38E-05	6.05E-04	2.65E-03	6.05E-04	2.65E-03
Toluene	108-88-3	Yes	Yes	No	3.40E-03	2.79E-05	1.98E-06	2.79E-05	1.98E-06	2.74E-05	1.20E-04	2.74E-05	1.20E-04
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05	1.97E-07	1.40E-08	1.97E-07	1.40E-08	1.94E-07	8.49E-07	1.94E-07	8.49E-07
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06	1.48E-08	1.05E-09	1.48E-08	1.05E-09	1.45E-08	6.36E-08	1.45E-08	6.36E-08
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05	1.31E-07	9.33E-09	1.31E-07	9.33E-09	1.29E-07	5.66E-07	1.29E-07	5.66E-07
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06	1.48E-08	1.05E-09	1.48E-08	1.05E-09	1.45E-08	6.36E-08	1.45E-08	6.36E-08
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06	9.85E-09	7.00E-10	9.85E-09	7.00E-10	9.69E-09	4.24E-08	9.69E-09	4.24E-08
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06	1.48E-08	1.05E-09	1.48E-08	1.05E-09	1.45E-08	6.36E-08	1.45E-08	6.36E-08
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06	1.48E-08	1.05E-09	1.48E-08	1.05E-09	1.45E-08	6.36E-08	1.45E-08	6.36E-08
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06	9.85E-09	7.00E-10	9.85E-09	7.00E-10	9.69E-09	4.24E-08	9.69E-09	4.24E-08
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03	9.85E-06	7.00E-07	9.85E-06	7.00E-07	9.69E-06	4.24E-05	9.69E-06	4.24E-05
Hexane	110-54-3	Yes	Yes	No	1.80E+00	1.48E-02	1.05E-03	1.48E-02	1.05E-03	1.45E-02	6.36E-02	1.45E-02	6.36E-02
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04	5.01E-06	3.56E-07	5.01E-06	3.56E-07	4.92E-06	2.16E-05	4.92E-06	2.16E-05
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06	1.48E-08	1.05E-09	1.48E-08	1.05E-09	1.45E-08	6.36E-08	1.45E-08	6.36E-08
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06	1.97E-08	1.40E-09	1.97E-08	1.40E-09	1.94E-08	8.49E-08	1.94E-08	8.49E-08
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06	1.48E-08	1.05E-09	1.48E-08	1.05E-09	1.45E-08	6.36E-08	1.45E-08	6.36E-08
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06	9.85E-09	7.00E-10	9.85E-09	7.00E-10	9.69E-09	4.24E-08	9.69E-09	4.24E-08
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06	1.48E-08	1.05E-09	1.48E-08	1.05E-09	1.45E-08	6.36E-08	1.45E-08	6.36E-08
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06	2.46E-08	1.75E-09	2.46E-08	1.75E-09	2.42E-08	1.06E-07	2.42E-08	1.06E-07
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06	2.30E-08	1.63E-09	2.30E-08	1.63E-09	2.26E-08	9.90E-08	2.26E-08	9.90E-08
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06	1.48E-08	1.05E-09	1.48E-08	1.05E-09	1.45E-08	6.36E-08	1.45E-08	6.36E-08
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05	1.40E-07	9.92E-09	1.40E-07	9.92E-09	1.37E-07	6.01E-07	1.37E-07	6.01E-07
Pentane	109-66-0	No	Yes	No	2.60E+00	-	-	2.13E-02	1.52E-03	-	-	2.10E-02	9.19E-02
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06	4.10E-08	2.92E-09	4.10E-08	2.92E-09	4.04E-08	1.77E-07	4.04E-08	1.77E-07
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04	1.64E-06	1.17E-07	1.64E-06	1.17E-07	1.61E-06	7.07E-06	1.61E-06	7.07E-06
Barium	7440-39-3	No	Yes	No	4.40E-03	-	-	3.61E-05	2.57E-06	-	-	3.55E-05	1.56E-04
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05	9.85E-08	7.00E-09	9.85E-08	7.00E-09	9.69E-08	4.24E-07	9.69E-08	4.24E-07
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03	9.03E-06	6.42E-07	9.03E-06	6.42E-07	8.88E-06	3.89E-05	8.88E-06	3.89E-05
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03	1.15E-05	8.17E-07	1.15E-05	8.17E-07	1.13E-05	4.95E-05	1.13E-05	4.95E-05
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05	6.89E-07	4.90E-08	6.89E-07	4.90E-08	6.78E-07	2.97E-06	6.78E-07	2.97E-06
Copper	7440-50-8	No	Yes	No	8.50E-04	-	-	6.98E-06	4.96E-07	-	-	6.86E-06	3.01E-05
Lead	-	Yes	No	No	5.00E-04	4.10E-06	2.92E-07	-	-	4.04E-06	1.77E-05	-	-
Manganese	7439-96-5	Yes	Yes	No	3.80E-04	3.12E-06	2.22E-07	3.12E-06	2.22E-07	3.07E-06	1.34E-05	3.07E-06	1.34E-05
Mercury	7439-97-6	Yes	No	No	2.60E-04	2.13E-06	1.52E-07	-	-	2.10E-06	9.19E-06	-	-
Molybdenum	7439-98-7	No	Yes	No	1.10E-03	-	-	9.03E-06	6.42E-07	-	-	8.88E-06	3.89E-05
Nickel	7440-02-0	Yes	No	Yes	2.10E-03	1.72E-05	1.23E-06	1.72E-05	1.23E-06	1.70E-05	7.43E-05	1.70E-05	7.43E-05
Selenium	7782-49-2	Yes	Yes	No	2.40E-05	1.97E-07	1.40E-08	1.97E-07	1.40E-08	1.94E-07	8.49E-07	1.94E-07	8.49E-07
Vanadium	7440-62-2	No	Yes	No	2.30E-03	-	-	1.89E-05	1.34E-06	-	-	1.86E-05	8.13E-05
7-PAH	-	Yes	No	Yes	N/A	9.35E-08	6.65E-09	9.35E-08	6.65E-09	9.20E-08	4.03E-07	9.20E-08	4.03E-07
POM	-	Yes	No	Yes	N/A	7.24E-07	5.15E-08	7.24E-07	5.15E-08	7.12E-07	3.12E-06	7.12E-07	3.12E-06
Total HAPs							1.10E-03				6.68E-02		

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-8. Natural Gas Boiler 3 Emissions Input Parameters

Fuel	Natural Gas	
Boiler Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate	8.165	(MMBtu/hr)
	0.0080	(MMscf/hr)
	70.12	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Total Boilers Rate	33.3	(MMBtu/hr)
Boiler actual fuel usage	1.51	(MMscf/yr)
Baseline Actual Fuel Usage [1]	1.51	(MMscf/yr)
Operational Variability Fuel Usage [2]	68.61	(MMscf/yr)

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021; Boiler 3 fuel usage (scf) estimated based on MMBtu/hr rating and separated out from other boilers since it does not have low-NOx burners

[2] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage

Table A-9. Natural Gas Boiler 3 Total Criteria and GHG Baseline Actual and Operational Flexibility Emissions

Pollutant	Emission Factor[1] (lb/MMScf)	Boiler 3 Baseline Actual		Boiler 3 Operational Variability	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM_{10}	7.6	6.08E-02	5.74E-03	0.060	2.61E-01
$PM_{2.5}$	7.6	6.08E-02	5.74E-03	0.060	2.61E-01
CO	84	0.67	6.34E-02	0.658	2.88
NO_X	100	0.80	7.55E-02	0.783	3.43
SO_2	0.6	0.005	4.53E-04	0.005	2.06E-02
VOC	5.5	0.044	4.15E-03	0.043	1.89E-01
Lead	0.0005	4.00E-06	3.77E-07	3.92E-06	1.72E-05
CH_4	2.3	0.02	1.74E-03	0.02	7.89E-02
N_2O	2.20	0.02	1.66E-03	0.02	7.55E-02
CO_2	120,000	960.59	90.56	939.9	4,117
CO_2e[2]	NA	966	91	945.5	4,141

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-10. Boiler 3 Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)	Baseline Actual				Operational Variability			
						HAP Emissions		TAP Emissions		HAP Emissions		TAP Emissions	
						(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Benzene	71-43-2	Yes	No	Yes	2.10E-03	1.68E-05	1.58E-06	1.68E-05	1.58E-06	1.64E-05	7.20E-05	1.64E-05	7.20E-05
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02	6.00E-04	5.66E-05	6.00E-04	5.66E-05	5.87E-04	2.57E-03	5.87E-04	2.57E-03
Toluene	108-88-3	Yes	Yes	No	3.40E-03	2.72E-05	2.57E-06	2.72E-05	2.57E-06	2.66E-05	1.17E-04	2.66E-05	1.17E-04
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05	1.92E-07	1.81E-08	1.92E-07	1.81E-08	1.88E-07	8.23E-07	1.88E-07	8.23E-07
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06	1.44E-08	1.36E-09	1.44E-08	1.36E-09	1.41E-08	6.18E-08	1.41E-08	6.18E-08
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05	1.28E-07	1.21E-08	1.28E-07	1.21E-08	1.25E-07	5.49E-07	1.25E-07	5.49E-07
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06	1.44E-08	1.36E-09	1.44E-08	1.36E-09	1.41E-08	6.18E-08	1.41E-08	6.18E-08
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06	9.61E-09	9.06E-10	9.61E-09	9.06E-10	9.40E-09	4.12E-08	9.40E-09	4.12E-08
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06	1.44E-08	1.36E-09	1.44E-08	1.36E-09	1.41E-08	6.18E-08	1.41E-08	6.18E-08
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06	1.44E-08	1.36E-09	1.44E-08	1.36E-09	1.41E-08	6.18E-08	1.41E-08	6.18E-08
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06	9.61E-09	9.06E-10	9.61E-09	9.06E-10	9.40E-09	4.12E-08	9.40E-09	4.12E-08
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03	9.61E-06	9.06E-07	9.61E-06	9.06E-07	9.40E-06	4.12E-05	9.40E-06	4.12E-05
Hexane	110-54-3	Yes	Yes	No	1.80E+00	1.44E-02	1.36E-03	1.44E-02	1.36E-03	1.41E-02	6.18E-02	1.41E-02	6.18E-02
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04	4.88E-06	4.60E-07	4.88E-06	4.60E-07	4.78E-06	2.09E-05	4.78E-06	2.09E-05
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06	1.44E-08	1.36E-09	1.44E-08	1.36E-09	1.41E-08	6.18E-08	1.41E-08	6.18E-08
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06	1.92E-08	1.81E-09	1.92E-08	1.81E-09	1.88E-08	8.23E-08	1.88E-08	8.23E-08
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06	1.44E-08	1.36E-09	1.44E-08	1.36E-09	1.41E-08	6.18E-08	1.41E-08	6.18E-08
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06	9.61E-09	9.06E-10	9.61E-09	9.06E-10	9.40E-09	4.12E-08	9.40E-09	4.12E-08
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06	1.44E-08	1.36E-09	1.44E-08	1.36E-09	1.41E-08	6.18E-08	1.41E-08	6.18E-08
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06	2.40E-08	2.26E-09	2.40E-08	2.26E-09	2.35E-08	1.03E-07	2.35E-08	1.03E-07
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06	2.24E-08	2.11E-09	2.24E-08	2.11E-09	2.19E-08	9.61E-08	2.19E-08	9.61E-08
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06	1.44E-08	1.36E-09	1.44E-08	1.36E-09	1.41E-08	6.18E-08	1.41E-08	6.18E-08
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05	1.36E-07	1.28E-08	1.36E-07	1.28E-08	1.33E-07	5.83E-07	1.33E-07	5.83E-07
Pentane	109-66-0	No	Yes	No	2.60E+00	-	-	2.08E-02	1.96E-03	-	-	2.04E-02	8.92E-02
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06	4.00E-08	3.77E-09	4.00E-08	3.77E-09	3.92E-08	1.72E-07	3.92E-08	1.72E-07
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04	1.60E-06	1.51E-07	1.60E-06	1.51E-07	1.57E-06	6.86E-06	1.57E-06	6.86E-06
Barium	7440-39-3	No	Yes	No	4.40E-03	-	-	3.52E-05	3.32E-06	-	-	3.45E-05	1.51E-04
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05	9.61E-08	9.06E-09	9.61E-08	9.06E-09	9.40E-08	4.12E-07	9.40E-08	4.12E-07
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03	8.81E-06	8.30E-07	8.81E-06	8.30E-07	8.62E-06	3.77E-05	8.62E-06	3.77E-05
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03	1.12E-05	1.06E-06	1.12E-05	1.06E-06	1.10E-05	4.80E-05	1.10E-05	4.80E-05
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05	6.72E-07	6.34E-08	6.72E-07	6.34E-08	6.58E-07	2.88E-06	6.58E-07	2.88E-06
Copper	7440-50-8	No	Yes	No	8.50E-04	-	-	6.80E-06	6.41E-07	-	-	6.66E-06	2.92E-05
Lead	-	Yes	No	No	5.00E-04	4.00E-06	3.77E-07	-	-	3.92E-06	1.72E-05	-	-
Manganese	7439-96-5	Yes	Yes	No	3.80E-04	3.04E-06	2.87E-07	3.04E-06	2.87E-07	2.98E-06	1.30E-05	2.98E-06	1.30E-05
Mercury	7439-97-6	Yes	No	No	2.60E-04	2.08E-06	1.96E-07	-	-	2.04E-06	8.92E-06	-	-
Molybdenum	7439-98-7	No	Yes	No	1.10E-03	-	-	8.81E-06	8.30E-07	-	-	8.62E-06	3.77E-05
Nickel	7440-02-0	Yes	No	Yes	2.10E-03	1.68E-05	1.58E-06	1.68E-05	1.58E-06	1.64E-05	7.20E-05	1.64E-05	7.20E-05
Selenium	7782-49-2	Yes	Yes	No	2.40E-05	1.92E-07	1.81E-08	1.92E-07	1.81E-08	1.88E-07	8.23E-07	1.88E-07	8.23E-07
Vanadium	7440-62-2	No	Yes	No	2.30E-03	-	-	1.84E-05	1.74E-06	-	-	1.80E-05	7.89E-05
7-PAH	-	Yes	No	Yes	N/A	9.13E-08	8.60E-09	9.13E-08	8.60E-09	8.93E-08	3.91E-07	8.93E-08	3.91E-07
POM	-	Yes	No	Yes	N/A	7.06E-07	6.66E-08	7.06E-07	6.66E-08	6.91E-07	3.03E-06	6.91E-07	3.03E-06
Total HAPs							1.43E-03				6.48E-02		

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-11. Natural Gas Fired MAU5B Emissions Input Parameters

Fuel	Natural Gas	
Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate	4.8	(MMBtu/hr)
	0.0047	(MMscf/hr)
	41.2	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Non-boiler Rate	38.7	(MMBtu/hr)
Non-boiler actual fuel usage	18.1	(MMscf/yr)
Actual Fuel Usage [1]	2.2	(MMscf/yr)
Operational Variability Fuel Usage [2]	38.98	(MMscf/yr)

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021

[2] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage

Table A-12. MAU5B Total Criteria and GHG Baseline Actual and Operational Flexibility Emissions

Pollutant	Emission Factor[1] (lb/MMScf)	MAU5B Baseline Actual		MAU5B Operational Variability	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM_{10}	7.6	0.04	0.01	0.034	0.15
$PM_{2.5}$	7.6	0.04	0.01	0.034	0.15
CO	84	0.40	0.09	0.37	1.64
NO_X	100	0.47	0.11	0.44	1.95
SO_2	0.6	0.00	0.00	0.00	0.01
VOC	5.5	0.03	0.01	0.02	0.11
Lead	0.0005	2.35E-06	5.61E-07	2.22E-06	0.00
CH_4	2.3	0.01	2.58E-03	0.01	0.04
N_2O	2.20	0.01	2.47E-03	0.01	0.04
CO_2	120,000	564.71	134.61	534.0	2338.80
CO_2e[2]	NA	568	135	537.1	2,353

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-13. MAU5B Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)	Baseline Actual				Operational Variability			
						HAP Emissions		TAP Emissions		HAP Emissions		TAP Emissions	
						(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Benzene	71-43-2	Yes	No	Yes	2.10E-03	9.88E-06	2.36E-06	9.88E-06	2.36E-06	9.34E-06	4.09E-05	9.34E-06	4.09E-05
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02	3.53E-04	8.41E-05	3.53E-04	8.41E-05	3.34E-04	1.46E-03	3.34E-04	1.46E-03
Toluene	108-88-3	Yes	Yes	No	3.40E-03	1.60E-05	3.81E-06	1.60E-05	3.81E-06	1.51E-05	6.63E-05	1.51E-05	6.63E-05
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05	1.13E-07	2.69E-08	1.13E-07	2.69E-08	1.07E-07	4.68E-07	1.07E-07	4.68E-07
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06	8.47E-09	2.02E-09	8.47E-09	2.02E-09	8.01E-09	3.51E-08	8.01E-09	3.51E-08
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05	7.53E-08	1.79E-08	7.53E-08	1.79E-08	7.12E-08	3.12E-07	7.12E-08	3.12E-07
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06	8.47E-09	2.02E-09	8.47E-09	2.02E-09	8.01E-09	3.51E-08	8.01E-09	3.51E-08
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06	5.65E-09	1.35E-09	5.65E-09	1.35E-09	5.34E-09	2.34E-08	5.34E-09	2.34E-08
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06	8.47E-09	2.02E-09	8.47E-09	2.02E-09	8.01E-09	3.51E-08	8.01E-09	3.51E-08
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06	8.47E-09	2.02E-09	8.47E-09	2.02E-09	8.01E-09	3.51E-08	8.01E-09	3.51E-08
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06	5.65E-09	1.35E-09	5.65E-09	1.35E-09	5.34E-09	2.34E-08	5.34E-09	2.34E-08
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03	5.65E-06	1.35E-06	5.65E-06	1.35E-06	5.34E-06	2.34E-05	5.34E-06	2.34E-05
Hexane	110-54-3	Yes	Yes	No	1.80E+00	8.47E-03	2.02E-03	8.47E-03	2.02E-03	8.01E-03	3.51E-02	8.01E-03	3.51E-02
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04	2.87E-06	6.84E-07	2.87E-06	6.84E-07	2.71E-06	1.19E-05	2.71E-06	1.19E-05
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06	8.47E-09	2.02E-09	8.47E-09	2.02E-09	8.01E-09	3.51E-08	8.01E-09	3.51E-08
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06	1.13E-08	2.69E-09	1.13E-08	2.69E-09	1.07E-08	4.68E-08	1.07E-08	4.68E-08
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06	8.47E-09	2.02E-09	8.47E-09	2.02E-09	8.01E-09	3.51E-08	8.01E-09	3.51E-08
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06	5.65E-09	1.35E-09	5.65E-09	1.35E-09	5.34E-09	2.34E-08	5.34E-09	2.34E-08
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06	8.47E-09	2.02E-09	8.47E-09	2.02E-09	8.01E-09	3.51E-08	8.01E-09	3.51E-08
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06	1.41E-08	3.37E-09	1.41E-08	3.37E-09	1.33E-08	5.85E-08	1.33E-08	5.85E-08
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06	1.32E-08	3.14E-09	1.32E-08	3.14E-09	1.25E-08	5.46E-08	1.25E-08	5.46E-08
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06	8.47E-09	2.02E-09	8.47E-09	2.02E-09	8.01E-09	3.51E-08	8.01E-09	3.51E-08
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05	8.00E-08	1.91E-08	8.00E-08	1.91E-08	7.56E-08	3.31E-07	7.56E-08	3.31E-07
Pentane	109-66-0	No	Yes	No	2.60E+00	-	-	1.22E-02	2.92E-03	-	-	1.16E-02	5.07E-02
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06	2.35E-08	5.61E-09	2.35E-08	5.61E-09	2.22E-08	9.74E-08	2.22E-08	9.74E-08
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04	9.41E-07	2.24E-07	9.41E-07	2.24E-07	8.90E-07	3.90E-06	8.90E-07	3.90E-06
Barium	7440-39-3	No	Yes	No	4.40E-03	-	-	2.07E-05	4.94E-06	-	-	1.96E-05	8.58E-05
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05	5.65E-08	1.35E-08	5.65E-08	1.35E-08	5.34E-08	2.34E-07	5.34E-08	2.34E-07
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03	5.18E-06	1.23E-06	5.18E-06	1.23E-06	4.89E-06	2.14E-05	4.89E-06	2.14E-05
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03	6.59E-06	1.57E-06	6.59E-06	1.57E-06	6.23E-06	2.73E-05	6.23E-06	2.73E-05
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05	3.95E-07	9.42E-08	3.95E-07	9.42E-08	3.74E-07	1.64E-06	3.74E-07	1.64E-06
Copper	7440-50-8	No	Yes	No	8.50E-04	-	-	4.00E-06	9.54E-07	-	-	3.78E-06	1.66E-05
Lead	-	Yes	No	No	5.00E-04	2.35E-06	5.61E-07	-	-	2.22E-06	9.74E-06	-	-
Manganese	7439-96-5	Yes	Yes	No	3.80E-04	1.79E-06	4.26E-07	1.79E-06	4.26E-07	1.69E-06	7.41E-06	1.69E-06	7.41E-06
Mercury	7439-97-6	Yes	No	No	2.60E-04	1.22E-06	2.92E-07	-	-	1.16E-06	5.07E-06	-	-
Molybdenum	7439-98-7	No	Yes	No	1.10E-03	-	-	5.18E-06	1.23E-06	-	-	4.89E-06	2.14E-05
Nickel	7440-02-0	Yes	No	Yes	2.10E-03	9.88E-06	2.36E-06	9.88E-06	2.36E-06	9.34E-06	4.09E-05	9.34E-06	4.09E-05
Selenium	7782-49-2	Yes	Yes	No	2.40E-05	1.13E-07	2.69E-08	1.13E-07	2.69E-08	1.07E-07	4.68E-07	1.07E-07	4.68E-07
Vanadium	7440-62-2	No	Yes	No	2.30E-03	-	-	1.08E-05	2.58E-06	-	-	1.02E-05	4.48E-05
7-PAH	-	Yes	No	Yes	N/A	5.36E-08	1.28E-08	5.36E-08	1.28E-08	5.07E-08	2.22E-07	5.07E-08	2.22E-07
POM	-	Yes	No	Yes	N/A	4.15E-07	9.89E-08	4.15E-07	9.89E-08	3.92E-07	1.72E-06	3.92E-07	1.72E-06
Total HAPs						2.12E-03				3.68E-02			

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-14. Natural Gas Water Heater Emissions Input Parameters

Fuel	Natural Gas	
Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate	0.0751	(MMBtu/hr)
	0.0001	(MMscf/hr)
	0.64	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Non-boiler Rate	38.7	(MMBtu/hr)
Non-boiler actual fuel usage	18.1	(MMscf/yr)
Actual Fuel Usage [1]	0.04	(MMscf/yr)
Operational Variability Fuel Usage [2]	0.61	(MMscf/yr)

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021

[2] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage

Table A-15. Natural Gas Water Heater Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (lb/MMScf)	Water Heater Baseline Actual		Water Heater Operational Variability	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM_{10}	7.6	5.60E-04	1.33E-04	5.29E-04	2.32E-03
$PM_{2.5}$	7.6	5.60E-04	1.33E-04	5.29E-04	2.32E-03
CO	84	0.01	1.47E-03	0.01	2.56E-02
NO_X	100	0.01	1.76E-03	0.01	0.03
SO_2	0.6	4.42E-05	1.05E-05	4.18E-05	1.83E-04
VOC	5.5	4.05E-04	9.65E-05	3.83E-04	1.68E-03
Lead	0.0005	3.68E-08	8.78E-09	3.48E-08	1.52E-07
CH_4	2.3	1.69E-04	4.04E-05	1.60E-04	7.01E-04
N_2O	2.20	1.62E-04	3.86E-05	1.53E-04	6.71E-04
CO_2	120,000	8.84	2.11	8.4	36.59
CO_2e[2]	NA	9	2	8.4	37

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-16. Water Heater Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)	Baseline Actual				Operational Variability			
						HAP Emissions		TAP Emissions		HAP Emissions		TAP Emissions	
						(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Benzene	71-43-2	Yes	No	Yes	2.10E-03	1.55E-07	3.69E-08	1.55E-07	3.69E-08	1.46E-07	6.40E-07	1.46E-07	6.40E-07
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02	5.52E-06	1.32E-06	5.52E-06	1.32E-06	5.22E-06	2.29E-05	5.22E-06	2.29E-05
Toluene	108-88-3	Yes	Yes	No	3.40E-03	2.50E-07	5.97E-08	2.50E-07	5.97E-08	2.37E-07	1.04E-06	2.37E-07	1.04E-06
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05	1.77E-09	4.21E-10	1.77E-09	4.21E-10	1.67E-09	7.32E-09	1.67E-09	7.32E-09
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06	1.33E-10	3.16E-11	1.33E-10	3.16E-11	1.25E-10	5.49E-10	1.25E-10	5.49E-10
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05	1.18E-09	2.81E-10	1.18E-09	2.81E-10	1.11E-09	4.88E-09	1.11E-09	4.88E-09
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06	1.33E-10	3.16E-11	1.33E-10	3.16E-11	1.25E-10	5.49E-10	1.25E-10	5.49E-10
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06	8.84E-11	2.11E-11	8.84E-11	2.11E-11	8.35E-11	3.66E-10	8.35E-11	3.66E-10
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06	1.33E-10	3.16E-11	1.33E-10	3.16E-11	1.25E-10	5.49E-10	1.25E-10	5.49E-10
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06	1.33E-10	3.16E-11	1.33E-10	3.16E-11	1.25E-10	5.49E-10	1.25E-10	5.49E-10
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06	8.84E-11	2.11E-11	8.84E-11	2.11E-11	8.35E-11	3.66E-10	8.35E-11	3.66E-10
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03	8.84E-08	2.11E-08	8.84E-08	2.11E-08	8.35E-08	3.66E-07	8.35E-08	3.66E-07
Hexane	110-54-3	Yes	Yes	No	1.80E+00	1.33E-04	3.16E-05	1.33E-04	3.16E-05	1.25E-04	5.49E-04	1.25E-04	5.49E-04
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04	4.49E-08	1.07E-08	4.49E-08	1.07E-08	4.25E-08	1.86E-07	4.25E-08	1.86E-07
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06	1.33E-10	3.16E-11	1.33E-10	3.16E-11	1.25E-10	5.49E-10	1.25E-10	5.49E-10
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06	1.77E-10	4.21E-11	1.77E-10	4.21E-11	1.67E-10	7.32E-10	1.67E-10	7.32E-10
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06	1.33E-10	3.16E-11	1.33E-10	3.16E-11	1.25E-10	5.49E-10	1.25E-10	5.49E-10
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06	8.84E-11	2.11E-11	8.84E-11	2.11E-11	8.35E-11	3.66E-10	8.35E-11	3.66E-10
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06	1.33E-10	3.16E-11	1.33E-10	3.16E-11	1.25E-10	5.49E-10	1.25E-10	5.49E-10
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06	2.21E-10	5.27E-11	2.21E-10	5.27E-11	2.09E-10	9.15E-10	2.09E-10	9.15E-10
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06	2.06E-10	4.91E-11	2.06E-10	4.91E-11	1.95E-10	8.54E-10	1.95E-10	8.54E-10
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06	1.33E-10	3.16E-11	1.33E-10	3.16E-11	1.25E-10	5.49E-10	1.25E-10	5.49E-10
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05	1.25E-09	2.98E-10	1.25E-09	2.98E-10	1.18E-09	5.18E-09	1.18E-09	5.18E-09
Pentane	109-66-0	No	Yes	No	2.60E+00	-	-	1.91E-04	4.56E-05	-	-	1.81E-04	7.93E-04
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06	3.68E-10	8.78E-11	3.68E-10	8.78E-11	3.48E-10	1.52E-09	3.48E-10	1.52E-09
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04	1.47E-08	3.51E-09	1.47E-08	3.51E-09	1.39E-08	6.10E-08	1.39E-08	6.10E-08
Barium	7440-39-3	No	Yes	No	4.40E-03	-	-	3.24E-07	7.72E-08	-	-	3.06E-07	1.34E-06
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05	8.84E-10	2.11E-10	8.84E-10	2.11E-10	8.35E-10	3.66E-09	8.35E-10	3.66E-09
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03	8.10E-08	1.93E-08	8.10E-08	1.93E-08	7.66E-08	3.35E-07	7.66E-08	3.35E-07
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03	1.03E-07	2.46E-08	1.03E-07	2.46E-08	9.75E-08	4.27E-07	9.75E-08	4.27E-07
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05	6.18E-09	1.47E-09	6.18E-09	1.47E-09	5.85E-09	2.56E-08	5.85E-09	2.56E-08
Copper	7440-50-8	No	Yes	No	8.50E-04	-	-	6.26E-08	1.49E-08	-	-	5.92E-08	2.59E-07
Lead	-	Yes	No	No	5.00E-04	3.68E-08	8.78E-09	-	-	3.48E-08	1.52E-07	-	-
Manganese	7439-96-5	Yes	Yes	No	3.80E-04	2.80E-08	6.67E-09	2.80E-08	6.67E-09	2.65E-08	1.16E-07	2.65E-08	1.16E-07
Mercury	7439-97-6	Yes	No	No	2.60E-04	1.91E-08	4.56E-09	-	-	1.81E-08	7.93E-08	-	-
Molybdenum	7439-98-7	No	Yes	No	1.10E-03	-	-	8.10E-08	1.93E-08	-	-	7.66E-08	3.35E-07
Nickel	7440-02-0	Yes	No	Yes	2.10E-03	1.55E-07	3.69E-08	1.55E-07	3.69E-08	1.46E-07	6.40E-07	1.46E-07	6.40E-07
Selenium	7782-49-2	Yes	Yes	No	2.40E-05	1.77E-09	4.21E-10	1.77E-09	4.21E-10	1.67E-09	7.32E-09	1.67E-09	7.32E-09
Vanadium	7440-62-2	No	Yes	No	2.30E-03	-	-	1.69E-07	4.04E-08	-	-	1.60E-07	7.01E-07
7-PAH	-	Yes	No	Yes	N/A	8.39E-10	2.00E-10	8.39E-10	2.00E-10	7.94E-10	3.48E-09	7.94E-10	3.48E-09
POM	-	Yes	No	Yes	N/A	6.49E-09	1.55E-09	6.49E-09	1.55E-09	6.14E-09	2.69E-08	6.14E-09	2.69E-08
Total HAPs							3.31E-05				5.76E-04		

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-17. Natural Gas VOC Abatement Units Emissions Input Parameters

Fuel	Natural Gas	
Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate [2]	2.00	(MMBtu/hr)
	0.0020	(MMscf/hr)
	17.18	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Non-boiler Rate	38.7	(MMBtu/hr)
Non-boiler actual fuel usage	18.1	(MMscf/yr)
Actual Fuel Usage [1]	0.93	(MMscf/yr)
Operational Variability Fuel Usage [3]	33.42	(MMscf/yr)

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021

[2] Two identical unit, 2 MMBtu/hr each

[3] Operational variability rate calculated as the difference between maximum potential fuel usage (assuming 2 units operating) and baseline actual fuel usage (1 unit operating)

Table A-18. Natural Gas VOC Abatement Units Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (lb/MMScf)	VOC ABU Baseline Actual		VOC ABU Operational Variability	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM_{10}	7.6	1.49E-02	3.55E-03	2.90E-02	1.27E-01
$PM_{2.5}$	7.6	1.49E-02	3.55E-03	2.90E-02	1.27E-01
CO	84	0.16	3.93E-02	0.32	1.40E+00
NO_X	100	0.20	4.67E-02	0.38	1.67
SO_2	0.6	0.00	2.80E-04	2.29E-03	1.00E-02
VOC	5.5	0.01	2.57E-03	2.10E-02	9.19E-02
Lead	0.0005	9.80E-07	2.34E-07	1.91E-06	8.35E-06
CH_4	2.3	0.00	1.08E-03	8.77E-03	3.84E-02
N_2O	2.20	0.00	1.03E-03	8.39E-03	3.68E-02
CO_2	120,000	235.29	56.09	457.8	2005.09
CO_2e[2]	NA	237	56	460.5	2,017

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-19. VOC Abatement Units Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)	Baseline Actual				Operational Variability			
						HAP Emissions		TAP Emissions		HAP Emissions		TAP Emissions	
						(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Benzene	71-43-2	Yes	No	Yes	2.10E-03	4.12E-06	9.82E-07	4.12E-06	9.82E-07	8.01E-06	3.51E-05	8.01E-06	3.51E-05
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02	1.47E-04	3.51E-05	1.47E-04	3.51E-05	2.86E-04	1.25E-03	2.86E-04	1.25E-03
Toluene	108-88-3	Yes	Yes	No	3.40E-03	6.67E-06	1.59E-06	6.67E-06	1.59E-06	1.30E-05	5.68E-05	1.30E-05	5.68E-05
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05	4.71E-08	1.12E-08	4.71E-08	1.12E-08	9.16E-08	4.01E-07	9.16E-08	4.01E-07
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06	3.53E-09	8.41E-10	3.53E-09	8.41E-10	6.87E-09	3.01E-08	6.87E-09	3.01E-08
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05	3.14E-08	7.48E-09	3.14E-08	7.48E-09	6.10E-08	2.67E-07	6.10E-08	2.67E-07
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06	3.53E-09	8.41E-10	3.53E-09	8.41E-10	6.87E-09	3.01E-08	6.87E-09	3.01E-08
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06	2.35E-09	5.61E-10	2.35E-09	5.61E-10	4.58E-09	2.01E-08	4.58E-09	2.01E-08
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06	3.53E-09	8.41E-10	3.53E-09	8.41E-10	6.87E-09	3.01E-08	6.87E-09	3.01E-08
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06	3.53E-09	8.41E-10	3.53E-09	8.41E-10	6.87E-09	3.01E-08	6.87E-09	3.01E-08
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06	2.35E-09	5.61E-10	2.35E-09	5.61E-10	4.58E-09	2.01E-08	4.58E-09	2.01E-08
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03	2.35E-06	5.61E-07	2.35E-06	5.61E-07	4.58E-06	2.01E-05	4.58E-06	2.01E-05
Hexane	110-54-3	Yes	Yes	No	1.80E+00	3.53E-03	8.41E-04	3.53E-03	8.41E-04	6.87E-03	3.01E-02	6.87E-03	3.01E-02
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04	1.20E-06	2.85E-07	1.20E-06	2.85E-07	2.33E-06	1.02E-05	2.33E-06	1.02E-05
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06	3.53E-09	8.41E-10	3.53E-09	8.41E-10	6.87E-09	3.01E-08	6.87E-09	3.01E-08
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06	4.71E-09	1.12E-09	4.71E-09	1.12E-09	9.16E-09	4.01E-08	9.16E-09	4.01E-08
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06	3.53E-09	8.41E-10	3.53E-09	8.41E-10	6.87E-09	3.01E-08	6.87E-09	3.01E-08
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06	2.35E-09	5.61E-10	2.35E-09	5.61E-10	4.58E-09	2.01E-08	4.58E-09	2.01E-08
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06	3.53E-09	8.41E-10	3.53E-09	8.41E-10	6.87E-09	3.01E-08	6.87E-09	3.01E-08
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06	5.88E-09	1.40E-09	5.88E-09	1.40E-09	1.14E-08	5.01E-08	1.14E-08	5.01E-08
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06	5.49E-09	1.31E-09	5.49E-09	1.31E-09	1.07E-08	4.68E-08	1.07E-08	4.68E-08
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06	3.53E-09	8.41E-10	3.53E-09	8.41E-10	6.87E-09	3.01E-08	6.87E-09	3.01E-08
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05	3.33E-08	7.95E-09	3.33E-08	7.95E-09	6.49E-08	2.84E-07	6.49E-08	2.84E-07
Pentane	109-66-0	No	Yes	No	2.60E+00	-	-	5.10E-03	1.22E-03	-	-	9.92E-03	4.34E-02
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06	9.80E-09	2.34E-09	9.80E-09	2.34E-09	1.91E-08	8.35E-08	1.91E-08	8.35E-08
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04	3.92E-07	9.35E-08	3.92E-07	9.35E-08	7.63E-07	3.34E-06	7.63E-07	3.34E-06
Barium	7440-39-3	No	Yes	No	4.40E-03	-	-	8.63E-06	2.06E-06	-	-	1.68E-05	7.35E-05
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05	2.35E-08	5.61E-09	2.35E-08	5.61E-09	4.58E-08	2.01E-07	4.58E-08	2.01E-07
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03	2.16E-06	5.14E-07	2.16E-06	5.14E-07	4.20E-06	1.84E-05	4.20E-06	1.84E-05
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03	2.75E-06	6.54E-07	2.75E-06	6.54E-07	5.34E-06	2.34E-05	5.34E-06	2.34E-05
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05	1.65E-07	3.93E-08	1.65E-07	3.93E-08	3.20E-07	1.40E-06	3.20E-07	1.40E-06
Copper	7440-50-8	No	Yes	No	8.50E-04	-	-	1.67E-06	3.97E-07	-	-	3.24E-06	1.42E-05
Lead	-	Yes	No	No	5.00E-04	9.80E-07	2.34E-07	-	-	1.91E-06	8.35E-06	-	-
Manganese	7439-96-5	Yes	Yes	No	3.80E-04	7.45E-07	1.78E-07	7.45E-07	1.78E-07	1.45E-06	6.35E-06	1.45E-06	6.35E-06
Mercury	7439-97-6	Yes	No	No	2.60E-04	5.10E-07	1.22E-07	-	-	9.92E-07	4.34E-06	-	-
Molybdenum	7439-98-7	No	Yes	No	1.10E-03	-	-	2.16E-06	5.14E-07	-	-	4.20E-06	1.84E-05
Nickel	7440-02-0	Yes	No	Yes	2.10E-03	4.12E-06	9.82E-07	4.12E-06	9.82E-07	8.01E-06	3.51E-05	8.01E-06	3.51E-05
Selenium	7782-49-2	Yes	Yes	No	2.40E-05	4.71E-08	1.12E-08	4.71E-08	1.12E-08	9.16E-08	4.01E-07	9.16E-08	4.01E-07
Vanadium	7440-62-2	No	Yes	No	2.30E-03	-	-	4.51E-06	1.08E-06	-	-	8.77E-06	3.84E-05
7-PAH	-	Yes	No	Yes	N/A	2.24E-08	5.33E-09	2.24E-08	5.33E-09	4.35E-08	1.90E-07	4.35E-08	1.90E-07
POM	-	Yes	No	Yes	N/A	1.73E-07	4.12E-08	1.73E-07	4.12E-08	3.36E-07	1.47E-06	3.36E-07	1.47E-06
Total HAPs								8.83E-04				3.16E-02	

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-20. Natural Gas TPU Emissions Input Parameters

Fuel	Natural Gas	
Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate (existing TPU)	0.060	(MMBtu/hr)
Maximum Rate (new TPU)	0.021	(MMBtu/hr)
Maximum Rate (existing TPU)	0.00006	(MMscf/hr)
Maximum Rate (new TPU)	0.00002	(MMscf/hr)
	0.70	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Non-boiler Rate	38.7	(MMBtu/hr)
Non-boiler actual fuel usage	18.1	(MMscf/yr)
Actual Fuel Usage [1]	0.03	(MMscf/yr)
Operational Variability Fuel Usage [2, 3]	0.67	(MMscf/yr)

Both TPUs operating (PTE)

PM_{10}	**6.04E-04**	lb/hr
$PM_{2.5}$	**6.04E-04**	lb/hr
CO	**6.67E-03**	lb/hr
NO_X	**7.94E-03**	lb/hr
SO_2	**4.76E-05**	lb/hr

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021

[2] Two unit, 60,000 Btu/hr (existing) and 21,000 Btu/hr (new)

[3] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage; Includes operation of two TPU units

Table A-21. Natural Gas TPU Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (lb/MMScf)	TPU Baseline Actual		TPU Operational Variability	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM_{10}	7.6	4.47E-04	1.07E-04	5.79E-04	2.54E-03
$PM_{2.5}$	7.6	4.47E-04	1.07E-04	5.79E-04	2.54E-03
CO	84	0.00	1.18E-03	0.01	2.80E-02
NO_X	100	0.01	1.40E-03	0.01	0.03
SO_2	0.6	3.53E-05	8.41E-06	4.57E-05	2.00E-04
VOC	5.5	3.24E-04	7.71E-05	4.19E-04	1.84E-03
Lead	0.0005	2.94E-08	7.01E-09	3.81E-08	1.67E-07
CH_4	2.3	1.35E-04	3.23E-05	1.75E-04	7.68E-04
N_2O	2.20	1.29E-04	3.08E-05	1.68E-04	7.34E-04
CO_2	120,000	7.06	1.68	9.15	40.06
CO_2e[2]	NA	7.10	1.69	9.20	40.29

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-22. TPU Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)	Baseline Actual				Operational Variability			
						HAP Emissions		TAP Emissions		HAP Emissions		TAP Emissions	
						(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Benzene	71-43-2	Yes	No	Yes	2.10E-03	1.24E-07	2.94E-08	1.24E-07	2.94E-08	1.60E-07	7.01E-07	1.60E-07	7.01E-07
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02	4.41E-06	1.05E-06	4.41E-06	1.05E-06	5.72E-06	2.50E-05	5.72E-06	2.50E-05
Toluene	108-88-3	Yes	Yes	No	3.40E-03	2.00E-07	4.77E-08	2.00E-07	4.77E-08	2.59E-07	1.13E-06	2.59E-07	1.13E-06
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05	1.41E-09	3.37E-10	1.41E-09	3.37E-10	1.83E-09	8.01E-09	1.83E-09	8.01E-09
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06	1.06E-10	2.52E-11	1.06E-10	2.52E-11	1.37E-10	6.01E-10	1.37E-10	6.01E-10
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05	9.41E-10	2.24E-10	9.41E-10	2.24E-10	1.22E-09	5.34E-09	1.22E-09	5.34E-09
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06	1.06E-10	2.52E-11	1.06E-10	2.52E-11	1.37E-10	6.01E-10	1.37E-10	6.01E-10
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06	7.06E-11	1.68E-11	7.06E-11	1.68E-11	9.15E-11	4.01E-10	9.15E-11	4.01E-10
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06	1.06E-10	2.52E-11	1.06E-10	2.52E-11	1.37E-10	6.01E-10	1.37E-10	6.01E-10
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06	1.06E-10	2.52E-11	1.06E-10	2.52E-11	1.37E-10	6.01E-10	1.37E-10	6.01E-10
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06	7.06E-11	1.68E-11	7.06E-11	1.68E-11	9.15E-11	4.01E-10	9.15E-11	4.01E-10
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03	7.06E-08	1.68E-08	7.06E-08	1.68E-08	9.15E-08	4.01E-07	9.15E-08	4.01E-07
Hexane	110-54-3	Yes	Yes	No	1.80E+00	1.06E-04	2.52E-05	1.06E-04	2.52E-05	1.37E-04	6.01E-04	1.37E-04	6.01E-04
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04	3.59E-08	8.55E-09	3.59E-08	8.55E-09	4.65E-08	2.04E-07	4.65E-08	2.04E-07
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06	1.06E-10	2.52E-11	1.06E-10	2.52E-11	1.37E-10	6.01E-10	1.37E-10	6.01E-10
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06	1.41E-10	3.37E-11	1.41E-10	3.37E-11	1.83E-10	8.01E-10	1.83E-10	8.01E-10
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06	1.06E-10	2.52E-11	1.06E-10	2.52E-11	1.37E-10	6.01E-10	1.37E-10	6.01E-10
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06	7.06E-11	1.68E-11	7.06E-11	1.68E-11	9.15E-11	4.01E-10	9.15E-11	4.01E-10
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06	1.06E-10	2.52E-11	1.06E-10	2.52E-11	1.37E-10	6.01E-10	1.37E-10	6.01E-10
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06	1.76E-10	4.21E-11	1.76E-10	4.21E-11	2.29E-10	1.00E-09	2.29E-10	1.00E-09
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06	1.65E-10	3.93E-11	1.65E-10	3.93E-11	2.13E-10	9.35E-10	2.13E-10	9.35E-10
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06	1.06E-10	2.52E-11	1.06E-10	2.52E-11	1.37E-10	6.01E-10	1.37E-10	6.01E-10
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05	1.00E-09	2.38E-10	1.00E-09	2.38E-10	1.30E-09	5.67E-09	1.30E-09	5.67E-09
Pentane	109-66-0	No	Yes	No	2.60E+00	-	-	1.53E-04	3.65E-05	-	-	1.98E-04	8.68E-04
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06	2.94E-10	7.01E-11	2.94E-10	7.01E-11	3.81E-10	1.67E-09	3.81E-10	1.67E-09
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04	1.18E-08	2.80E-09	1.18E-08	2.80E-09	1.52E-08	6.68E-08	1.52E-08	6.68E-08
Barium	7440-39-3	No	Yes	No	4.40E-03	-	-	2.59E-07	6.17E-08	-	-	3.35E-07	1.47E-06
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05	7.06E-10	1.68E-10	7.06E-10	1.68E-10	9.15E-10	4.01E-09	9.15E-10	4.01E-09
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03	6.47E-08	1.54E-08	6.47E-08	1.54E-08	8.38E-08	3.67E-07	8.38E-08	3.67E-07
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03	8.24E-08	1.96E-08	8.24E-08	1.96E-08	1.07E-07	4.67E-07	1.07E-07	4.67E-07
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05	4.94E-09	1.18E-09	4.94E-09	1.18E-09	6.40E-09	2.80E-08	6.40E-09	2.80E-08
Copper	7440-50-8	No	Yes	No	8.50E-04	-	-	5.00E-08	1.19E-08	-	-	6.48E-08	2.84E-07
Lead	-	Yes	No	No	5.00E-04	2.94E-08	7.01E-09	-	-	3.81E-08	1.67E-07	-	-
Manganese	7439-96-5	Yes	Yes	No	3.80E-04	2.24E-08	5.33E-09	2.24E-08	5.33E-09	2.90E-08	1.27E-07	2.90E-08	1.27E-07
Mercury	7439-97-6	Yes	No	No	2.60E-04	1.53E-08	3.65E-09	-	-	1.98E-08	8.68E-08	-	-
Molybdenum	7439-98-7	No	Yes	No	1.10E-03	-	-	6.47E-08	1.54E-08	-	-	8.38E-08	3.67E-07
Nickel	7440-02-0	Yes	No	Yes	2.10E-03	1.24E-07	2.94E-08	1.24E-07	2.94E-08	1.60E-07	7.01E-07	1.60E-07	7.01E-07
Selenium	7782-49-2	Yes	Yes	No	2.40E-05	1.41E-09	3.37E-10	1.41E-09	3.37E-10	1.83E-09	8.01E-09	1.83E-09	8.01E-09
Vanadium	7440-62-2	No	Yes	No	2.30E-03	-	-	1.35E-07	3.23E-08	-	-	1.75E-07	7.68E-07
7-PAH	-	Yes	No	Yes	N/A	6.71E-10	1.60E-10	6.71E-10	1.60E-10	8.69E-10	3.81E-09	8.69E-10	3.81E-09
POM	-	Yes	No	Yes	N/A	5.19E-09	1.24E-09	5.19E-09	1.24E-09	6.72E-09	2.94E-08	6.72E-09	2.94E-08
Total HAPs								2.65E-05				6.30E-04	

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-23. Diesel Generator 02 Emissions Input Parameters

Fuel	Diesel	
Fuel Heat Value	0.138	(MMBtu/gal)
Size (QST30-G4)	1490	(BHP)
Fuel usage [1]	60.20	(gal/hr)
Maximum Operation [2]	100	(hr/yr)
Annual Operation	10	(hr/yr)
Operational Variability [3]	90	(hr/yr)

[1] Cummins Power manufacturer specification sheet

[2] Currently permitted to operate no more than 100 hr/yr for maintenance and testing

[3] Operational variability rate calculated as the difference between maximum hours of operation and baseline actual hours of operation

Table A-24. Diesel Generator 02 Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (g/BHP-hr)	Gen 02 Baseline Actual		Gen 02 Operational Variability	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM_{10} [1, 2]	0.10	0.33	0.002	0.33	0.015
$PM_{2.5}$ [1, 2]	0.10	0.33	0.002	0.33	0.015
CO [1]	1.50	4.93	0.02	4.93	0.222
NO_X [1]	6.70	22.01	0.11	22.01	0.990
SO_2 [1]	0.13	0.43	0.002	0.43	0.019
VOC [1, 3]	0.30	0.99	0.005	0.99	0.044
CH_4 [4]	3.00E-03	0.055	0.0003	0.055	0.002
N_2O [4]	6.00E-04	0.011	0.0001	0.011	0.0005
CO_2 [4]	73.96	1,355	6.77	1,355	60.956
CO_2e [5]		1,359	7	1,359	61.17

[1] PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, and HC emission factors are provided by engine manufacturer

[2] PM emission factor is assumed to equal PM_{10} and $PM_{2.5}$

[3] HC emission factor is used to estimate VOCs.

[4] CH_4, N_2O, and CO_2 emissions factors kg/MMBtu; per 40 CFR Part 98, Subpart C, Table C-1 and C-2

[5] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-25. Diesel Generator 02 Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Diesel Combustion Emission Factor[1]	Baseline Actual				Operational Variability			
						HAP Emissions		TAP Emissions		HAP Emissions		TAP Emissions	
					(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Benzene	71-43-2	Yes	No	Yes	9.33E-04	7.75E-03	3.88E-05	7.75E-03	3.88E-05	7.75E-03	3.49E-04	7.75E-03	3.49E-04
Formaldehyde	50-00-0	Yes	No	Yes	1.18E-03	9.80E-03	4.90E-05	9.80E-03	4.90E-05	9.80E-03	4.41E-04	9.80E-03	4.41E-04
Toluene	108-88-3	Yes	Yes	No	4.09E-04	3.40E-03	1.70E-05	3.40E-03	1.70E-05	3.40E-03	1.53E-04	3.40E-03	1.53E-04
Xylene	1330-20-7	Yes	Yes	No	2.85E-04	2.37E-03	1.18E-05	2.37E-03	1.18E-05	2.37E-03	1.07E-04	2.37E-03	1.07E-04
1,3-Butadiene	106-99-0	Yes	No	Yes	3.91E-05	3.25E-04	1.62E-06	3.25E-04	1.62E-06	3.25E-04	1.46E-05	3.25E-04	1.46E-05
Acetaldehyde	75-07-0	Yes	No	Yes	7.67E-04	6.37E-03	3.19E-05	6.37E-03	3.19E-05	6.37E-03	2.87E-04	6.37E-03	2.87E-04
Acrolein	107-02-8	Yes	Yes	No	9.25E-05	7.68E-04	3.84E-06	7.68E-04	3.84E-06	7.68E-04	3.46E-05	7.68E-04	3.46E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	5.06E-06	4.20E-05	2.10E-07	4.20E-05	2.10E-07	4.20E-05	1.89E-06	4.20E-05	1.89E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.88E-07	1.56E-06	7.81E-09	1.56E-06	7.81E-09	1.56E-06	7.03E-08	1.56E-06	7.03E-08
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	9.91E-08	8.23E-07	4.12E-09	8.23E-07	4.12E-09	8.23E-07	3.70E-08	8.23E-07	3.70E-08
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.55E-07	1.29E-06	6.44E-09	1.29E-06	6.44E-09	1.29E-06	5.79E-08	1.29E-06	5.79E-08
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	5.83E-07	4.84E-06	2.42E-08	4.84E-06	2.42E-08	4.84E-06	2.18E-07	4.84E-06	2.18E-07
Naphthalene	91-20-3	Yes	Yes	No	8.48E-05	7.04E-04	3.52E-06	7.04E-04	3.52E-06	7.04E-04	3.17E-05	7.04E-04	3.17E-05
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.42E-06	1.18E-05	5.90E-08	1.18E-05	5.90E-08	1.18E-05	5.31E-07	1.18E-05	5.31E-07
Anthracene [3]	120-12-7	Yes	No	Yes	1.87E-06	1.55E-05	7.77E-08	1.55E-05	7.77E-08	1.55E-05	6.99E-07	1.55E-05	6.99E-07
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	0.0623927	1.68E-06	1.40E-05	6.98E-08	-	FALSE	1.40E-05	6.28E-07	-	FALSE
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	4.89E-07	4.06E-06	2.03E-08	4.06E-06	2.03E-08	4.06E-06	1.83E-07	4.06E-06	1.83E-07
Chrysene [2, 3]	218-01-9	Yes	No	Yes	3.53E-07	2.93E-06	1.47E-08	2.93E-06	1.47E-08	2.93E-06	1.32E-07	2.93E-06	1.32E-07
Fluoranthene [3]	206-44-0	Yes	No	Yes	7.61E-06	6.32E-05	3.16E-07	6.32E-05	3.16E-07	6.32E-05	2.84E-06	6.32E-05	2.84E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.92E-05	2.43E-04	1.21E-06	2.43E-04	1.21E-06	2.43E-04	1.09E-05	2.43E-04	1.09E-05
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	3.75E-07	3.12E-06	1.56E-08	3.12E-06	1.56E-08	3.12E-06	1.40E-07	3.12E-06	1.40E-07
Phenanthrene [3]	85-01-8	Yes	No	Yes	2.94E-05	2.44E-04	1.22E-06	2.44E-04	1.22E-06	2.44E-04	1.10E-05	2.44E-04	1.10E-05
Pyrene [3]	129-00-0	Yes	No	Yes	4.78E-06	3.97E-05	1.99E-07	3.97E-05	1.99E-07	3.97E-05	1.79E-06	3.97E-05	1.79E-06
Total PAH	-	Yes	No	Yes	1.68E-04	1.40E-03	6.98E-06	1.40E-03	6.98E-06	1.40E-03	6.28E-05	1.40E-03	6.28E-05
POM	-	Yes	No	Yes	N/A	6.92E-04	3.46E-06	#VALUE!	#VALUE!	6.92E-04	3.11E-05	#VALUE!	#VALUE!
Total HAPs							1.71E-04				1.54E-03		

[1] AP-42 Section 3.3 Diesel Combustion (10/96) Table 3.3-2

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of fifteen pollutants

Table A-26. Diesel Generator 03 Emissions Input Parameters

Fuel	Diesel	
Fuel Heat Value	0.138	(MMBtu/gal)
Size (KTA50-G9)	2220	(BHP)
Fuel usage [1]	103.60	(gal/hr)
Maximum Operation [2]	100	(hr/yr)
Annual Operation	10	(hr/yr)
Operational Variability [3]	90	(hr/yr)

[1] Cummins Power manufacturer specification sheet

[2] Currently permitted to operate no more than 100 hr/yr for maintenance and testing

[3] Operational variability rate calculated as the difference between maximum hours of operation and baseline actual hours of operation

Table A-27. Diesel Generator 03 Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (g/BHP-hr)	Gen 03 Baseline Actual		Gen 03 Operational Variability	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
PM_{10} [1, 2]	0.11	0.54	0.00	0.54	0.024
$PM_{2.5}$ [1, 2]	0.11	0.54	0.00	0.54	0.024
CO [1]	1.30	6.36	0.03	6.36	0.286
NO_x [1]	8.50	41.60	0.21	41.60	1.872
SO_2 [4]	5.50E-03	0.03	0.00	0.03	0.001
VOC [1, 3]	0.17	0.83	0.00	0.83	0.037
CH_4 [4]	3.00E-03	0.095	0.00	0.095	0.004
N_2O [4]	6.00E-04	0.019	0.00	0.019	0.0009
CO_2 [5]	73.96	2,331	11.66	2,331	104.902
CO_2e [6]		2,339	12	2,339	105.26

[1] PM_{10}, $PM_{2.5}$, NO_x, CO, and HC emission factors are provided by engine manufacturer

[2] PM emission factor is assumed to equal PM_{10} and $PM_{2.5}$

[3] HC emission factor is used to estimate VOCs.

[4] SO_2 emission factor lb/hp-hr; multiplied by percent sulfur content of fuel (EPA AP-42 Table 3.4-1) EF = 8.09E-03 x 0.0015 = 1.21E-05, then converted to g/hp-hr.

[5] CH_4, N_2O, and CO_2 emissions factors kg/MMBtu; per 40 CFR Part 98, Subpart C, Table C-1 and C-2

[6] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-28. Diesel Generator 03 Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Diesel Combustion Emission Factor[1]	Baseline Actual				Operational Variability			
						HAP Emissions		TAP Emissions		HAP Emissions		TAP Emissions	
					(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Benzene	71-43-2	Yes	No	Yes	9.33E-04	1.33E-02	6.67E-05	1.33E-02	6.67E-05	1.33E-02	6.00E-04	1.33E-02	6.00E-04
Formaldehyde	50-00-0	Yes	No	Yes	1.18E-03	1.69E-02	8.44E-05	1.69E-02	8.44E-05	1.69E-02	7.59E-04	1.69E-02	7.59E-04
Toluene	108-88-3	Yes	Yes	No	4.09E-04	5.85E-03	2.92E-05	5.85E-03	2.92E-05	5.85E-03	2.63E-04	5.85E-03	2.63E-04
Xylene	1330-20-7	Yes	Yes	No	2.85E-04	4.07E-03	2.04E-05	4.07E-03	2.04E-05	4.07E-03	1.83E-04	4.07E-03	1.83E-04
1,3-Butadiene	106-99-0	Yes	No	Yes	3.91E-05	5.59E-04	2.80E-06	5.59E-04	2.80E-06	5.59E-04	2.52E-05	5.59E-04	2.52E-05
Acetaldehyde	75-07-0	Yes	No	Yes	7.67E-04	1.10E-02	5.48E-05	1.10E-02	5.48E-05	1.10E-02	4.93E-04	1.10E-02	4.93E-04
Acrolein	107-02-8	Yes	Yes	No	9.25E-05	1.32E-03	6.61E-06	1.32E-03	6.61E-06	1.32E-03	5.95E-05	1.32E-03	5.95E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	5.06E-06	7.23E-05	3.62E-07	7.23E-05	3.62E-07	7.23E-05	3.26E-06	7.23E-05	3.26E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.88E-07	2.69E-06	1.34E-08	2.69E-06	1.34E-08	2.69E-06	1.21E-07	2.69E-06	1.21E-07
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	9.91E-08	1.42E-06	7.08E-09	1.42E-06	7.08E-09	1.42E-06	6.38E-08	1.42E-06	6.38E-08
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.55E-07	2.22E-06	1.11E-08	2.22E-06	1.11E-08	2.22E-06	9.97E-08	2.22E-06	9.97E-08
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	5.83E-07	8.34E-06	4.17E-08	8.34E-06	4.17E-08	8.34E-06	3.75E-07	8.34E-06	3.75E-07
Naphthalene	91-20-3	Yes	Yes	No	8.48E-05	1.21E-03	6.06E-06	1.21E-03	6.06E-06	1.21E-03	5.46E-05	1.21E-03	5.46E-05
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.42E-06	2.03E-05	1.02E-07	2.03E-05	1.02E-07	2.03E-05	9.14E-07	2.03E-05	9.14E-07
Anthracene [3]	120-12-7	Yes	No	Yes	1.87E-06	2.67E-05	1.34E-07	2.67E-05	1.34E-07	2.67E-05	1.20E-06	2.67E-05	1.20E-06
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.68E-06	2.40E-05	1.20E-07	2.40E-05	1.20E-07	2.40E-05	1.08E-06	2.40E-05	1.08E-06
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	4.89E-07	6.99E-06	3.50E-08	6.99E-06	3.50E-08	6.99E-06	3.15E-07	6.99E-06	3.15E-07
Chrysene [2, 3]	218-01-9	Yes	No	Yes	3.53E-07	5.05E-06	2.52E-08	5.05E-06	2.52E-08	5.05E-06	2.27E-07	5.05E-06	2.27E-07
Fluoranthene [3]	206-44-0	Yes	No	Yes	7.61E-06	1.09E-04	5.44E-07	1.09E-04	5.44E-07	1.09E-04	4.90E-06	1.09E-04	4.90E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.92E-05	4.17E-04	2.09E-06	4.17E-04	2.09E-06	4.17E-04	1.88E-05	4.17E-04	1.88E-05
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	3.75E-07	5.36E-06	2.68E-08	5.36E-06	2.68E-08	5.36E-06	2.41E-07	5.36E-06	2.41E-07
Phenanthrene [3]	85-01-8	Yes	No	Yes	2.94E-05	4.20E-04	2.10E-06	4.20E-04	2.10E-06	4.20E-04	1.89E-05	4.20E-04	1.89E-05
Pyrene [3]	129-00-0	Yes	No	Yes	4.78E-06	6.83E-05	3.42E-07	6.83E-05	3.42E-07	6.83E-05	3.08E-06	6.83E-05	3.08E-06
Total PAH	-	Yes	No	Yes	1.68E-04	2.40E-03	1.20E-05	2.40E-03	1.20E-05	2.40E-03	1.08E-04	2.40E-03	1.08E-04
POM	-	Yes	No	Yes	N/A	1.19E-03	5.95E-06	1.19E-03	5.95E-06	1.19E-03	5.36E-05	1.19E-03	5.36E-05
Total HAPs						2.95E-04				2.65E-03			

[1] AP-42 Section 3.3 Diesel Combustion (10/96) Table 3.3-2

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of fifteen pollutants

Table A-29. Emissions from Gases

Oracle Item Number[1]	Product Name	Process Type	Unique REF CAS	Usage Amount	Usage Amount Units	Amount Used [lbs/year] [2]	Constituent and Byproduct Names	CAS #	Max Wt. % [4]	VOC?	HAP?	TAP? Non-Carcinogen (S85)	TAP? Carcinogen (S86)	Emission Factor [lb/lb] [5]	Tool Exhaust Before Control [6] (lbs/year)	Centralized Control Type [7]	Centralized Control Eff. [8]	Air Emissions [9] (lbs/year)	Air Emissions [10] (lbs/hr)	NOTES
9-130-00660	Carbon Dioxide		9-130-00660124-38-9	95	kg	210	Carbon Dioxide	124-38-9	100%	No	No	No	No	1.0	210.00			210.00	3.60E-02	
B99703A009	Octafluoropropane (C3F8)	CVD In-situ	9-130-0001576-19-7	71	kg	157	Octafluorocyclopropane	76-19-7	100%	No	No	No	No	0.4	62.61	Scrubber		62.61	1.07E-02	TEOS CVD etch chamber in-situ chamber clean gas
B99703A009	Octafluoropropane (C3F8)	CVD In-situ	N/A	71	kg	157	Tetrafluoromethane [3]	75-73-0	N/A	No	No	No	No	0.20	31.31	Scrubber		31.31	5.36E-03	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	9-130-0077375-73-0	139	kg	179	Tetrafluoromethane	75-73-0	100%	No	No	No	No	0.81	144.68	Scrubber		144.68	2.48E-02	Etch/Wafer Clean
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Hexafluoroethane [3]	76-16-4	N/A	No	No	No	No	0.079	14.11	Scrubber		14.11	2.42E-03	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Trifluoromethane [3]	75-46-7	N/A	No	No	No	No	0.1	17.86	Scrubber		17.86	3.06E-03	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Octafluorocyclopentene [3]	1400-2-01	N/A	Yes	No	No	No	0.0012	0.21	Scrubber		0.21	3.67E-05	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Hydrogen Fluoride [2]	7664-39-3	N/A	No	Yes	No	No	0.046	8.22	Scrubber	60%	3.29	5.63E-04	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Carbon Monoxide [3]	630-08-0	N/A	No	No	No	No	0.159	28.40	Scrubber		28.40	4.86E-03	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Carbon Dioxide [3]	124-38-9	N/A	No	No	No	No	0.25	44.66	Scrubber		44.66	7.65E-03	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	9-130-00649115-25-3	47	kg	105	Octafluorocyclobutane	115-25-3	100%	No	No	No	No	0.18	18.84	Scrubber		18.84	3.23E-03	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Carbon tetrafluoride [3]	75-73-0	N/A	No	No	No	No	0.11	11.51	Scrubber		11.51	1.97E-03	Etch/Wafer Clean
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Hexafluoroethane [3]	76-16-4	N/A	No	No	No	No	0.037	3.87	Scrubber		3.87	6.63E-04	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Trifluoromethane [3]	75-46-7	N/A	No	No	No	No	0.04	4.19	Scrubber		4.19	7.17E-04	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Hydrogen Fluoride [2]	7664-39-3	N/A	No	Yes	No	No	0.516	54.00	Scrubber	60%	21.60	3.70E-03	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Carbon Monoxide [3]	630-08-0	N/A	No	No	No	No	0.28	29.30	Scrubber		29.30	5.02E-03	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Carbon Dioxide [3]	124-38-9	N/A	No	No	No	No	0.44	46.04	Scrubber		46.04	7.88E-03	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	9-130-000582551-62-4	35	kg	77	Sulfur Hexafluoride	2551-62-4	100%	No	No	No	No	0.55	42.52	Scrubber		42.52	7.28E-03	Etch/Wafer Clean
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Carbon tetrafluoride [3]	75-73-0	N/A	No	No	No	No	0.13	10.05	Scrubber		10.05	1.72E-03	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Hexafluoroethane [3]	76-16-4	N/A	No	No	No	No	0.11	8.50	Scrubber		8.50	1.46E-03	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Trifluoromethane [3]	75-46-7	N/A	No	No	No	No	0.0037	0.29	Scrubber		0.29	4.90E-05	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Hydrogen Fluoride [2]	7664-39-3	N/A	No	Yes	No	No	0.155	11.98	Scrubber	60%	4.79	8.21E-04	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Sulfur Dioxide [3]	7446-09-5	N/A	No	No	No	No	0.439	33.94	Scrubber		33.94	5.81E-03	
9-140-00802	TEOS		9-140-0080278-10-4	9	kg	21	Tetraethyl orthosilicate	78-10-4	100%	No	No	Yes	No	0.0000	0.00	Scrubber		0.00	0.00E+00	
9-140-00802	TEOS		N/A	9	kg	21	Silicon Dioxide [3]	7631-86-9	N/A	No	No	No	No	0.2880	6.01	Scrubber		6.01	1.03E-03	
9-140-00802	TEOS		N/A	9	kg	21	Ethanol [3]	64-17-5	N/A	Yes	No	Yes	No	0.2210	4.61	Scrubber		4.61	7.90E-04	
9-140-00802	TEOS		N/A	9	kg	21	Carbon Monoxide [3]	630-08-0	N/A	No	No	No	No	0.2690	5.62	Scrubber		5.62	9.62E-04	
9-140-00802	TEOS		N/A	9	kg	21	Carbon Dioxide [3]	124-38-9	N/A	No	No	No	No	0.8450	17.64	Scrubber		17.64	3.02E-03	

[1] Oracle numbers are used to identify raw materials.
[2] Usage data is based on an analysis of onsemi's proportions of use of materials in 2020 and 2021.
[3] Indicates a byproduct formed from raw material during or after use in process; if used for both 200 mm and 300 mm utilized most conservative emissions factors from 40 CFR Part 98 Subpart I
[4] Chemical percentage is the weight percent of a given pollutant or precursor within a material identified by its part number.
[5] Emission factor is based on the total ability of the tool to emit the pollutant.
[6] Tool exhaust before control is the quantity of emissions (lb) sent to air emission control system
[7] Centralized control type, if applicable, is listed. "Scrubber" refers to acid removal wet scrubbers.
[8] The control efficiency of the centralized control scrubber for the given compound is listed.
[9] Air emissions are equal to the tool exhaust multiplied by 100% - centralized control % efficiency.
[10] PTE Total based on actual emissions plus a 1.5 multiplier (50% growth in manufacturing emissions over the next 5 years)

Fluorides (as F)	Constituent Name	Compound MW	Fluorine Atoms	F fraction	Compound lb/hr	As F (lb/hr)
C_3F_8	Octafluorocyclopropane	188.0	8	0.81	1.07E-02	8.67E-03
CF_4	Tetrafluoromethane	88.0	4	0.86	3.38E-02	2.92E-02
C_2F_6	Hexafluoroethane	138.0	6	0.83	4.54E-03	3.75E-03
CHF_3	Trifluoromethane	70.0	3	0.81	3.82E-03	3.11E-03
C_5F_8	Octafluorocyclopentene	212.0	8	0.72	3.67E-05	2.63E-05
HF	Hydrogen Fluoride	20.0	1	0.95	5.12E-03	4.87E-03
C_4F_8	Octofluorocyclobutane	200.0	8	0.76	3.23E-03	2.45E-03
SF_6	Sulfur Hexafluoride	146.1	6	0.78	7.28E-03	5.68E-03
$C_4H_5F_9O$	Ethyl Nonafluoroisobutyl Ether	264.09	9	0.65	1.97E-02	1.27E-02
	Fluorides (as F)	7.05E-02 (lb/hr)				

Table A-30. Emissions from Photoresists and Other Organics

Oracle Item Number[1]	Chemical Name	Unique REF CAS	Usage Amount	Usage Amount Units	Amount Used [lbs/year] [2]	Constituent and Byproduct Names [4,5]	CAS #	Max Wt. % [6]	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	Emission Factor [7]	Emissions Before Control [lbs/year] [8]	Centralized Control Type [9]	Centralized Control Eff. [10]	Air Emissions [lbs/year] [11]	Air Emissions (lbs/hr) [12]
9-140-00012	ACETONE 85 % / IPA 15 %	9-140-0001267-64-1	2,703	Gallon	17,866	Acetone	67-64-1	85	No	No	Yes	No	1.00	15,185.8	RCTO VOC	99%	228	3.90E-02
9-140-00012	ACETONE 85 % / IPA 15 %	9-140-0001267-63-0	2,703	Gallon	17,866	Isopropyl Alcohol	67-63-0	15	Yes	No	Yes	No	1.00	2,679.8	RCTO VOC	99%	40	6.88E-03
9-140-00011	ACETONE 85%/15% IPA,1 Gallon	9-140-0001167-64-1	22	Gallon	145	Acetone	67-64-1	85	No	No	Yes	No	1.00	123.6	RCTO VOC	99%	1.9	3.17E-04
9-140-00011	ACETONE 85%/15% IPA,1 Gallon	9-140-0001167-63-0	22	Gallon	145	Isopropyl Alcohol	67-63-0	15	Yes	No	Yes	No	1.00	21.8	RCTO VOC	99%	0.3	5.60E-05
9-140-00349	AICOHOL, ISOPROPYL (IPA) 99.9% 1 Gallon	9-140-0034967-63-0	201	Gallon	1,317	Isopropyl Alcohol	67-63-0	99.9	Yes	No	Yes	No	1.00	1,315.5	RCTO VOC	99%	20	3.38E-03
9-140-00351	ALCOHOL, ISOPROPYL (IPA) 99.95% 55 Gallon	9-140-0035167-63-0	495	Gallon	3,243	Isopropyl Alcohol	67-63-0	99.95	Yes	No	Yes	No	1.00	3,241.2	RCTO VOC	99%	49	8.32E-03
N62854G001	CAUT, 200 PM (1 Quart)	N62854G001108-65-6	13	Quart	27	Propylene Glycol Monomethyl Ether Acetate	108-65-6	99	Yes	No	Yes	No	0.20	5.4	RCTO VOC	98.5%	0.1	1.38E-05
N62854G001	CAUT, 200 PM (1 Quart)	N62854G001Additive	13	Quart	27	Additive (Trade Secret)	Additive	1	Yes	No	No	No	0.20	0.1	RCTO VOC	99%	0.0	1.39E-07
9-160-00619	DEVELOPER, CD2060 RI - 53.5 Gallon DRUM	9-160-00619111-42-2	37,611	Gallon	313,875	Diethanolamine	111-42-2	0.6	Yes	Yes	Yes	No	0.001	1.9	N/A	0%	1.9	3.22E-04
9-160-00619	DEVELOPER, CD2060 RI - 53.5 Gallon DRUM	9-160-0061975-59-2	37,611	Gallon	313,875	Tetramethylammonium hydroxide	75-59-2	0.6	Yes	No	No	No	0.001	1.9	N/A	0%	1.9	3.22E-04
9-160-00730	DEVELOPER, OPD10C X 53.5 Gallon	9-160-0073075-59-2	4,066	Gallon	34,611	Tetramethylammonium hydroxide	75-59-2	25	Yes	No	No	No	0.001	8.7	N/A	0%	8.7	1.48E-03
9-160-00475	DEVELOPER, OPD4130 53.5Gallon DRUM	9-160-0047575-59-2	54	Gallon	446	Tetramethylammonium hydroxide	75-59-2	2.5	Yes	No	No	No	0.001	0.0	N/A	0%	0.0	1.91E-06
N95909F001	DEVELOPER, OPD4262- 1 Drum	N95909F00175-59-2	2,033	Gallon	16,966	Tetramethylammonium hydroxide	75-59-2	2.5	Yes	No	No	No	0.001	0.4	N/A	0%	0.4	7.26E-05
9-160-00569	DEVELOPER, OPD4262- 1 Gallon	9-160-0056975-59-2	59	Gallon	492	Tetramethylammonium hydroxide	75-59-2	2.5	Yes	No	No	No	0.001	0.0	N/A	0%	0.0	2.11E-06
9-140-00099	DI WATER 70 % / IPA 30 % (70/30) BOT	9-140-0009967-63-0	75	Gallon	626	Isopropyl Alcohol	67-63-0	30	Yes	No	Yes	No	1.000	187.8	N/A	0%	188	3.22E-02
9-140-00090	ETHYLENE GLYCOL (C2H6O2), 1Gallon	9-140-0009107-21-1	3	Gallon	28	Ethylene Glycol	107-21-1	5	Yes	Yes	Yes	No	0.200	0.3	N/A	0%	0.3	4.82E-05
N77810G002	FOC-376 (970mL)	N77810G002Crosslinker	41	Liter	90	Crosslinker	Crosslinker	5	Yes	No	No	No	0.200	0.9	RCTO VOC	99%	0.0	2.31E-06
N77810G002	FOC-376 (970mL)	N77810G0029063-87-0	41	Liter	90	Acrylic resin	9063-87-0	16	Yes	No	No	No	0.20	2.9	RCTO VOC	99%	0.0	7.38E-06
N77810G002	FOC-376 (970mL)	N77810G0023852-09-3	41	Liter	90	Methyl 3-methoxy propionate	3852-09-3	99	Yes	No	No	No	0.200	17.8	RCTO VOC	99%	0.3	4.57E-05
9-160-00474	HMDS, CANISTER (MESA) 5Gallon BOT	9-160-00474999-97-3	15	Gallon	97	1,1,1,3,3,3-Hexamethyldisilazane	999-97-3	100	Yes	No	No	No	1.000	96.9	RCTO VOC	99%	1.5	2.49E-04
9-160-00753	LEVEL M10-44 (B94947-22) 4L	9-160-0075397-64-3	236	Liter	520	Ethyl lactate	97-64-3	80	Yes	No	No	No	0.200	83.2	RCTO VOC	99%	1.2	2.14E-04
9-160-00753	LEVEL M10-44 (B94947-22) 4L	9-160-00753Additive	236	Liter	520	Additive (Trade Secret)	Additive	10	Yes	No	No	No	0.20	10.4	RCTO VOC	99%	0.2	2.67E-05
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	9-160-00001123-91-1	168	Quart	351	1,4-Dioxane	123-91-1	1	Yes	Yes	No	Yes	0.200	0.7	RCTO VOC	99%	0.0	1.80E-06
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	9-160-0000919063-87-0	168	Quart	351	Acrylic type resin (Trade Secret)	9063-87-0	40	Yes	No	No	No	0.200	28.0	RCTO VOC	99%	0.4	7.20E-05
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	9-160-00001108-65-6	168	Quart	351	Propylene Glycol Monomethyl Ether Acetate	108-65-6	95	Yes	No	Yes	No	0.200	66.6	RCTO VOC	98.5%	1.0	1.71E-04
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	9-160-00001Additive	168	Quart	351	Photoactive compound (Trade Secret)	Additive	15	Yes	No	No	No	0.200	10.5	RCTO VOC	99%	0.2	2.70E-05
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	9-160-00673123-91-1	37	Quart	77	1,4-Dioxane	123-91-1	1	Yes	Yes	No	Yes	0.200	0.2	RCTO VOC	99%	0.0	3.97E-07
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	9-160-0067739063-87-0	37	Quart	77	Acrylic type resin (Trade Secret)	9063-87-0	40	Yes	No	No	No	0.200	6.2	RCTO VOC	99%	0.1	1.59E-05
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	9-160-00673108-65-6	37	Quart	77	Propylene Glycol Monomethyl Ether Acetate	108-65-6	95	Yes	No	Yes	No	0.200	14.7	RCTO VOC	98.5%	0.2	3.77E-05
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	9-160-00673Additive	37	Quart	77	Photoactive compound (Trade Secret)	Additive	15	Yes	No	No	No	0.200	2.3	RCTO VOC	99%	0.0	5.95E-06
N81876E002	NMP (1 Gallon)	N81876E002Water	107	Gallon	893	Water	Water	1	No	No	No	No	0.200	1.8	RCTO VOC	99%	0.0	4.59E-06
N81876E002	NMP (1 Gallon)	N81876E0028272-50-4	107	Gallon	893	1-Methyl-2-pyrrolidinone	872-50-4	100	Yes	No	No	No	0.200	178.6	RCTO VOC	99%	2.7	4.59E-04
9-140-00001	NOVEC, 7200 ENGINEERED FLUID 3M 33LB/15KG	9-140-00001163702-06-5			479	Ethyl Nonafluoroisobutyl Ether	163702-06-5	70	No	No	No	No	0.200	67.1	N/A	0%	67	1.15E-02
9-140-00001	NOVEC, 7200 ENGINEERED FLUID 3M 33LB/15KG	9-140-00001163702-05-4			479	Ethyl Nonafluorobutyl Ether	163702-05-4	50	No	No	No	No	0.200	47.9	N/A	0%	48	8.20E-03
N97982F001	PGMEA EBR SOLVENT 53.5 DRUM	N97982F001108-65-6	31,940	Gallon	496	2-methoxy-1-methylethyl acetate	108-65-6	100	Yes	No	Yes	No	0.200	99.2	RCTO VOC	98.5%	1.5	2.55E-04
N25329H001	RESIST, FDER-PE (USB) (930mL)	N25329H0019063-87-0	7	Liter	15	Acrylic resin	9063-87-0	25	Yes	No	No	No	0.200	0.7	RCTO VOC	99%	0.0	1.92E-06
N25329H001	RESIST, FDER-PE (USB) (930mL)	N25329H001Sensitizer	7	Liter	15	Sensitizer	Sensitizer	3	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	2.30E-07
N25329H001	RESIST, FDER-PE (USB) (930mL)	N25329H001Crosslinker	7	Liter	15	Crosslinker	Crosslinker	6	Yes	No	No	No	0.200	0.2	RCTO VOC	99%	0.0	4.60E-07
9-160-01027	RESIST, ILA X 1 Gallon	9-160-01027100-66-3	27	Gallon	225	Anisole	100-66-3	35	Yes	No	No	No	0.200	15.8	RCTO VOC	99%	0.2	4.05E-05
9-160-01027	RESIST, ILA X 1 Gallon	9-160-0102796-48-0	27	Gallon	225	gamma-BUTYROLACTONE	96-48-0	69	Yes	No	No	No	0.200	31.1	RCTO VOC	99%	0.5	7.99E-05
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	9-160-00689Coupling agent	11	Liter	24	Coupling agent (Proprietary)	Coupling agent	1	Yes	No	No	No	0.200	0.0	RCTO VOC	99%	0.0	1.25E-07
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	9-160-0068990 63-87-0	11	Liter	24	Epoxy resin (Proprietary)	9063-87-0	2	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	2.49E-07
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	9-160-0068997-64-3	11	Liter	24	Ethyl lactate (El)	97-64-3	45	Yes	No	No	No	0.200	2.2	RCTO VOC	99%	0.0	5.61E-06
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	9-160-0068990 63-87-0	11	Liter	24	Epoxy resin (Proprietary)	9063-87-0	2	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	2.49E-07
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	9-160-0068990 63-87-0	11	Liter	24	Epoxy resin (Proprietary)	9063-87-0	2	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	2.49E-07
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	9-160-00689Sensitizer	11	Liter	24	Photosensitizer (Proprietary)	Sensitizer	10	Yes	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.25E-06
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	9-160-00689Coupling agent	13	Quart	27	Coupling agent (Proprietary)	Coupling agent	1	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	1.39E-07
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	9-160-0068990 63-87-0	13	Quart	27	Epoxy resin (Proprietary)	9063-87-0	2	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	2.79E-07
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	9-160-0068997-64-3	13	Quart	27	Ethyl lactate (El)	97-64-3	45	Yes	No	No	No	0.200	2.4	RCTO VOC	99%	0.0	6.27E-06
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	9-160-0068990 63-87-0	13	Quart	27	Epoxy resin (Proprietary)	9063-87-0	2	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	2.79E-07
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	9-160-0068990 63-87-0	13	Quart	27	Epoxy resin (Proprietary)	9063-87-0	2	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	2.79E-07
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	9-160-00689Sensitizer	13	Quart	27	Photosensitizer (Proprietary)	Sensitizer	10	Yes	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.39E-06
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	9-160-0068998516-30-4	13	Quart	27	Propyleneglycol monoethylether acetate (PGEEA)	98516-30-4	45	Yes	No	No	No	0.200	2.4	RCTO VOC	99%	0.0	6.27E-06
N95906F001	RESIST, MFR-1401LL (1 LIT)	N95906F001108-65-6	11	Liter	24	2-methoxy-1-methylethyl acetate	108-65-6	100	Yes	No	Yes	No	0.200	4.9	RCTO VOC	98.5%	0.1	1.25E-05
N95906F001	RESIST, MFR-1401LL (1 LIT)	N95906F001Coupling agent	11	Liter	24	Coupling agent (Proprietary)	Coupling agent	0.5	Yes	No	No	No	0.200	0.0	RCTO VOC	99%	0.0	6.23E-08
N95906F001	RESIST, MFR-1401LL (1 LIT)	N95906F0019063-87-0	11	Liter	24	Melamine resin (Proprietary)	9063-87-0	3	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	3.74E-07
N95906F001	RESIST, MFR-1401LL (1 LIT)	N95906F0019063-87-0	11	Liter	24	Melamine resin (Proprietary)	9063-87-0	3	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	3.74E-07
N95906F001	RESIST, MFR-1401LL (1 LIT)	N95906F001Additive	11	Liter	24	Naphthoquinonediazide(NQD) Ester (Proprietary)	Additive	10	Yes	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.25E-06
N95906F001	RESIST, MFR-1401LL (1 LIT)	N95906F0019063-87-0	11	Liter	24	Melamine resin (Proprietary)	9063-87-0	3	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	3.74E-07
N95906F001	RESIST, MFR-1401LL (1 LIT)	N95906F0019816-30-4	11	Liter	24	Propyleneglycol monoethylether acetate	98516-30-4	50	Yes	No	No	No	0.200	2.4	RCTO VOC	99%	0.0	6.23E-06
N95906F001	RESIST, MFR-1401LL (1 LIT)	N95906F001687-47-8	11	Liter	24	l-Ethyl lactate	687-47-8	50	Yes	No	No	No	0.200	2.4	RCTO VOC	99%	0.0	6.23E-06
9-160-00468	RESIST, MFR-1401LL (1Gallon)	9-160-00468108-65-6	11	Gallon	92	2-methoxy-1-methylethyl acetate	108-65-6	100	Yes	No	Yes	No	0.200	18.4	RCTO VOC	98.5%	0.3	4.72E-05
9-160-00468	RESIST, MFR-1401LL (1Gallon)	9-160-00468Coupling agent	11	Gallon	92	Coupling agent (Proprietary)	Coupling agent	0.5	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	2.36E-07
9-160-00468	RESIST, MFR-1401LL (1Gallon)	9-160-0046890 63-87-0	11	Gallon	92	Melamine resin (Proprietary)	9063-87-0	3	Yes	No	No	No	0.200	0.6	RCTO VOC	99%	0.0	1.41E-06
9-160-00468	RESIST, MFR-1401LL (1Gallon)	9-160-0046890 63-87-0	11	Gallon	92	Melamine resin (Proprietary)	9063-87-0	3	Yes	No	No	No	0.200	0.6	RCTO VOC	99%	0.0	1.41E-06
9-160-00468	RESIST, MFR-1401LL (1Gallon)	9-160-00468Additive	11	Gallon	92	Naphthoquinonediazide(NQD) Ester (Proprietary)	Additive	10	Yes	No	No	No	0.200	1.8	RCTO VOC	99%	0.0	4.72E-06
9-160-00468	RESIST, MFR-1401LL (1Gallon)	9-160-0046890 63-87-0	11	Gallon	92	Melamine resin (Proprietary)	9063-87-0	3	Yes	No	No	No	0.200	0.6	RCTO VOC	99%	0.0	1.41E-06
9-160-00468	RESIST, MFR-1401LL (1Gallon)	9-160-0046898516-30-4	11	Gallon	92	Propyleneglycol monoethylether acetate	98516-30-4	50	Yes	No	No	No	0.200	9.2	RCTO VOC	99%	0.1	2.36E-05
9-160-00468	RESIST, MFR-1401LL (1Gallon)	9-160-00468687-47-8	11	Gallon	92	l-Ethyl lactate	687-47-8	50	Yes	No	No	No	0.200	9.2	RCTO VOC	99%	0.1	2.36E-05
9-160-00346	RESIST, SB-3000L 760mL BO	9-160-00346108-94-1	14	Liter	30	cyclohexanone	108-94-1	20	Yes	No	Yes	No	0.200	1.2	RCTO VOC	99%	0.0	3.10E-06
9-160-00346	RESIST, SB-3000L 760mL BO	9-160-00346Acrylic monomer	14	Liter	30	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	0.6	RCTO VOC	99%	0.0	1.55E-06
9-160-00346	RESIST, SB-3000L 760mL BO	9-160-00346108-65-6	14	Liter	30	1-Methoxy-2-propanol acetate	108-65-6	60	Yes	No	Yes	No	0.200	3.6	RCTO VOC	98.5%	0.1	9.30E-06
9-160-00346	RESIST, SB-3000L 760mL BO	9-160-00346Pigment	14	Liter	30	Blue Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	0.6	RCTO VOC	99%	0.0	1.55E-06
9-160-00346	RESIST, SB-3000L 760mL BO	9-160-00346763-69-9	14	Liter	30	ethyl 3-ethoxypropionate	763-69-9	15	Yes	No	No	No	0.200	0.9	RCTO VOC	99%	0.0	2.32E-06
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	9-160-00634108-65-6	191	Liter	421	1-Methoxy-2-propanol acetate	108-65-6	55	Yes	No	Yes	No	0.200	46.3	RCTO VOC	98.5%	0.7	1.19E-04
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	9-160-00634Pigment	191	Liter	421	Blue Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	8.4	RCTO VOC	99%	0.1	2.16E-05
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	9-160-00634108-94-1	191	Liter	421	cyclohexanone	108-94-1	20	Yes	No	Yes	No	0.200	16.8	RCTO VOC	99%	0.3	4.32E-05
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	9-160-00634763-69-9	191	Liter	421	ethyl 3-ethoxypropionate	763-69-9	20	Yes	No	No	No	0.200	16.8	RCTO VOC	99%	0.3	4.32E-05
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	9-160-00634100-41-4	191	Liter	421	ethylbenzene	100-41-4	1	Yes	Yes	No	No	0.200	0.8	RCTO VOC	99%	0.0	2.16E-06
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	9-160-00634Acrylic monomer	191	Liter	421	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	8.4	RCTO VOC	99%	0.1	2.16E-05
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	9-160-00634Additive	191	Liter	421	Oxime derivative (Proprietary)	Additive	5	Yes	No	No	No	0.200	4.2	RCTO VOC	99%	0.1	1.08E-05
9-160-00754	RESIST, SB-6510 X 760 mL	9-160-00754Acrylic monomer	106	Liter	233	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	4.7	RCTO VOC	99%	0.1	1.20E-05
9-160-00754	RESIST, SB-6510 X 760 mL	9-160-00754Additive	106	Liter	233	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.20E-06
9-160-00754	RESIST, SB-6510 X 760 mL	9-160-00754Pigment	106	Liter	233	Blue Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	4.7	RCTO VOC	99%	0.1	1.20E-05
9-160-00754	RESIST, SB-6510 X 760 mL	9-160-00754108-94-1	106	Liter	233	cyclohexanone	108-94-1	20	Yes	No	Yes	No	0.200	9.3	RCTO VOC	99%	0.1	2.39E-05
9-160-00754	RESIST, SB-6510 X 760 mL	9-160-00754100-41-4	106	Liter	233	ethylbenzene	100-41-4	1	Yes	Yes	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.20E-06
9-160-00754	RESIST, SB-6510 X 760 mL	9-160-00754108-65-6	106	Liter	233	1-Methoxy-2-propanol acetate	108-65-6	80	Yes	No	Yes	No	0.200	37.3	RCTO VOC	98.5%	0.6	9.57E-05
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	9-160-00755Acrylic monomer	84	Liter	186	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	3.7	RCTO VOC	99%	0.1	9.55E-06
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	9-160-00755108-94-1	84	Liter	186	cyclohexanone	108-94-1	20	Yes	No	Yes	No	0.200	7.4	RCTO VOC	99%	0.1	1.91E-05
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	9-160-00755Additive	84	Liter	186	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	0.4	RCTO VOC	99%	0.0	9.55E-07

Oracle Item Number[1]	Chemical Name	Unique REF CAS	Usage Amount	Usage Amount Units	Amount Used [lbs/year] [2]	Constituent and Byproduct Names [4,5]	CAS #	Max Wt. % [6]	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	Emission Factor [7]	Emissions Before Control [8] [lbs/year]	Centralized Control Type [9]	Centralized Control Eff. [10]	Air Emissions [11] [lbs/year]	Air Emissions [12] (lbs/hr)
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	9-160-00755Pigment	84	Liter	186	Blue Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	3.7	RCTO VOC	99%	0.1	9.55E-06
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	9-160-00755100-41-4	84	Liter	186	ethylbenzene	100-41-4	1	Yes	Yes	Yes	No	0.200	0.4	RCTO VOC	99%	0.0	9.55E-07
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	9-160-00755108-65-6	84	Liter	186	1-Methoxy-2-propanol acetate	108-65-6	80	Yes	No	Yes	No	0.200	29.8	RCTO VOC	98.5%	0.4	7.64E-05
N06514H001	RESIST, SC-7500 (760mL)	N06514H001108-65-6	12	Liter	27	1-Methoxy-2-propanol acetate	108-65-6	90	Yes	No	Yes	No	0.200	4.8	RCTO VOC	98.5%	0.1	1.24E-05
N06514H001	RESIST, SC-7500 (760mL)	N06514H001Pigment	12	Liter	27	Green Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.38E-06
N06514H001	RESIST, SC-7500 (760mL)	N06514H001Additive	12	Liter	27	Oxime derivative (Proprietary)	Additive	5	Yes	No	No	No	0.200	0.3	RCTO VOC	99%	0.0	6.89E-07
9-160-00345	RESIST, SG-3000L 760mL BO	9-160-00345108-65-6	12	Liter	27	1-Methoxy-2-propanol acetate	108-65-6	55	Yes	No	Yes	No	0.200	2.9	RCTO VOC	98.5%	0.0	7.57E-06
9-160-00345	RESIST, SG-3000L 760mL BO	9-160-00345763-69-9	12	Liter	27	ethyl 3-ethoxypropionate	763-69-9	15	Yes	No	No	No	0.200	0.8	RCTO VOC	99%	0.0	2.07E-06
9-160-00345	RESIST, SG-3000L 760mL BO	9-160-00345Pigment	12	Liter	27	Green Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.38E-06
9-160-00345	RESIST, SG-3000L 760mL BO	9-160-00345Acrylic monomer	12	Liter	27	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.38E-06
9-160-00345	RESIST, SG-3000L 760mL BO	9-160-00345108-94-1	12	Liter	27	cyclohexanone	108-94-1	20	Yes	No	Yes	No	0.200	1.1	RCTO VOC	99%	0.0	2.75E-06
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	9-160-00635763-69-9	11	Liter	25	ethyl 3-ethoxypropionate	763-69-9	15	Yes	No	No	No	0.200	0.8	RCTO VOC	99%	0.0	1.94E-06
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	9-160-00635Pigment	11	Liter	25	Green Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.29E-06
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	9-160-00635Additive	11	Liter	25	Oxime derivative (Proprietary)	Additive	5	Yes	No	No	No	0.200	0.3	RCTO VOC	99%	0.0	6.46E-07
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	9-160-00635108-94-1	11	Liter	25	cyclohexanone	108-94-1	30	Yes	No	Yes	No	0.200	1.5	RCTO VOC	99%	0.0	3.87E-06
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	9-160-00635Acrylic monomer	11	Liter	25	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.29E-06
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	9-160-00635108-65-6	11	Liter	25	1-Methoxy-2-propanol acetate	108-65-6	50	Yes	No	Yes	No	0.200	2.5	RCTO VOC	98.5%	0.0	6.46E-06
9-160-00708	RESIST, SG6500 - GREEN (2.89 L)	9-160-00708Additive	448	Liter	988	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	2.0	RCTO VOC	99%	0.0	5.07E-06
9-160-00708	RESIST, SG6500 - GREEN (2.89 L)	9-160-00708108-65-6	448	Liter	988	1-Methoxy-2-propanol acetate	108-65-6	85	Yes	No	Yes	No	0.200	167.9	RCTO VOC	98.5%	2.5	4.31E-04
9-160-00708	RESIST, SG6500 - GREEN (2.89 L)	9-160-00708Acrylic monomer	448	Liter	988	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	19.8	RCTO VOC	99%	0.3	5.07E-05
N97819G001	RESIST, SG-6510 (760mL)	N97819G001Pigment	50	Liter	111	Blue Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	2.2	RCTO VOC	99%	0.0	5.68E-06
N97819G001	RESIST, SG-6510 (760mL)	N97819G001Acrylic monomer	50	Liter	111	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	2.2	RCTO VOC	99%	0.0	5.68E-06
N97819G001	RESIST, SG-6510 (760mL)	N97819G001108-94-1	50	Liter	111	cyclohexanone	108-94-1	20	Yes	No	Yes	No	0.200	4.4	RCTO VOC	99%	0.1	1.14E-05
N97819G001	RESIST, SG-6510 (760mL)	N97819G001100-41-4	50	Liter	111	ethylbenzene	100-41-4	1	Yes	Yes	Yes	No	0.200	0.2	RCTO VOC	99%	0.0	5.68E-07
N97819G001	RESIST, SG-6510 (760mL)	N97819G001108-65-6	50	Liter	111	1-Methoxy-2-propanol acetate	108-65-6	80	Yes	No	Yes	No	0.200	17.7	RCTO VOC	98.5%	0.3	4.54E-05
N97819G001	RESIST, SG-6510 (760mL)	N97819G001Additive	50	Liter	111	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	0.2	RCTO VOC	99%	0.0	5.68E-07
9-160-00756	RESIST, SG-7500 X 760 mL	9-160-00756Acrylic monomer	27	Liter	59	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	1.2	RCTO VOC	99%	0.0	3.01E-06
9-160-00756	RESIST, SG-7500 X 760 mL	9-160-00756Additive	27	Liter	59	Oxime derivative (Proprietary)	Additive	5	Yes	No	No	No	0.200	0.6	RCTO VOC	99%	0.0	1.51E-06
9-160-00756	RESIST, SG-7500 X 760 mL	9-160-00756Pigment	27	Liter	59	Green Pigment (Copper Compound) (Proprietary)	Pigment	15	No	No	No	No	0.200	1.8	RCTO VOC	99%	0.0	4.52E-06
9-160-00756	RESIST, SG-7500 X 760 mL	9-160-00756Pigment	27	Liter	59	Yellow Pigment (Nickel Compound) (Proprietary)	Pigment	5	No	No	No	No	0.200	0.6	RCTO VOC	99%	0.0	1.51E-06
9-160-00756	RESIST, SG-7500 X 760 mL	9-160-00756108-65-6	27	Liter	59	1-Methoxy-2-propanol acetate	108-65-6	85	Yes	No	Yes	No	0.200	10.0	RCTO VOC	98.5%	0.1	2.56E-05
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	9-160-00757Acrylic monomer	24	Liter	52	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	1.0	RCTO VOC	99%	0.0	2.67E-06
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	9-160-00757Pigment	24	Liter	52	Green Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	1.0	RCTO VOC	99%	0.0	2.67E-06
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	9-160-00757Pigment	24	Liter	52	Green Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	1.0	RCTO VOC	99%	0.0	2.67E-06
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	9-160-00757108-94-1	24	Liter	52	cyclohexanone	108-94-1	10	Yes	No	Yes	No	0.200	1.0	RCTO VOC	99%	0.0	2.67E-06
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	9-160-00757108-65-6	24	Liter	52	1-Methoxy-2-propanol acetate	108-65-6	80	Yes	No	Yes	No	0.200	8.3	RCTO VOC	98.5%	0.1	2.13E-05
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	9-160-00757107-98-2	24	Liter	52	1-Methoxy-2-propanol	107-98-2	5	Yes	No	Yes	No	0.200	0.5	RCTO VOC	99%	0.0	1.33E-06
N28794G001	RESIST, SG-8510 (Quart)	N28794G001Acrylic monomer	11	Quart	23	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.18E-06
N28794G001	RESIST, SG-8510 (Quart)	N28794G001Additive	11	Quart	23	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	0.0	RCTO VOC	99%	0.0	1.18E-07
N28794G001	RESIST, SG-8510 (Quart)	N28794G001108-65-6	11	Quart	23	1-Methoxy-2-propanol acetate	108-65-6	90	Yes	No	Yes	No	0.200	4.1	RCTO VOC	98.5%	0.1	1.06E-05
9-160-00002	RESIST, SI-5500 760 mL BOT	9-160-00002Pigment	11	Liter	23	Blue Pigment (Copper Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.20E-06
9-160-00002	RESIST, SI-5500 760 mL BOT	9-160-00002108-94-1	11	Liter	23	cyclohexanone	108-94-1	10	Yes	No	Yes	No	0.200	0.5	RCTO VOC	99%	0.0	1.20E-06
9-160-00002	RESIST, SI-5500 760 mL BOT	9-160-00002Additive	11	Liter	23	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	0.0	RCTO VOC	99%	0.0	1.20E-07
9-160-00002	RESIST, SI-5500 760 mL BOT	9-160-00002100-41-4	11	Liter	23	ethylbenzene	100-41-4	1	Yes	Yes	Yes	No	0.200	0.0	RCTO VOC	99%	0.0	1.20E-07
[3] 9-160-00002	RESIST, SI-5500 760 mL BOT	9-160-00002108-65-6	11	Liter	23	1-Methoxy-2-propanol acetate	108-65-6	80	Yes	No	Yes	No	0.200	3.8	RCTO VOC	98.5%	0.1	9.64E-06
[2] 9-160-00557	RESIST, SK-5000Liter (0.76L BOT)	9-160-00557Acrylic monomer	43	Liter	96	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	1.9	RCTO VOC	99%	0.0	4.91E-06
[3] 9-160-00557	RESIST, SK-5000Liter (0.76L BOT)	9-160-00557Additive	43	Liter	96	Oxime derivative (Proprietary)	Additive	5	Yes	No	No	No	0.200	1.0	RCTO VOC	99%	0.0	2.45E-06
[4] 9-160-00557	RESIST, SK-5000Liter (0.76L BOT)	9-160-00557108-94-1	43	Liter	96	cyclohexanone	108-94-1	15	Yes	No	Yes	No	0.200	2.9	RCTO VOC	99%	0.0	7.36E-06
[5] 9-160-00557	RESIST, SK-5000Liter (0.76L BOT)	9-160-005571333-86-4	43	Liter	96	Carbon black	1333-86-4	15	No	No	Yes	No	0.200	2.9	RCTO VOC	99%	0.0	7.36E-06
[6] 9-160-00557	RESIST, SK-5000Liter (0.76L BOT)	9-160-00557763-69-9	43	Liter	96	Ethyl 3-Ethoxypropionate	763-69-9	25	Yes	No	No	No	0.200	4.8	RCTO VOC	99%	0.1	1.23E-05
[7] 9-160-00557	RESIST, SK-5000Liter (0.76L BOT)	9-160-00557108-65-6	43	Liter	96	1-Methoxy-2-propanol acetate	108-65-6	50	Yes	No	Yes	No	0.200	9.6	RCTO VOC	98.5%	0.1	2.45E-05
[8] 9-160-00557	RESIST, SK-5000Liter (0.76L BOT)	9-160-00557108-65-6	43	Liter	96	1-Methoxy-2-propanol acetate	108-65-6	50	Yes	No	Yes	No	0.200	9.6	RCTO VOC	98.5%	0.1	2.45E-05
9-160-00556	RESIST, SK-5000Liter (2.89 L)	9-160-00556107-98-2	749	Liter	1,650	1-Methoxy-2-propanol	107-98-2	5	Yes	No	Yes	No	0.200	16.5	RCTO VOC	99%	0.2	4.24E-05

	Oracle Item Number[1]	Chemical Name	Unique REF CAS	Usage Amount	Usage Amount Units	Amount Used [lbs/year] [2]	Constituent and Byproduct Names [4,5]	CAS #	Max Wt. % [6]	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	Emission Factor [7]	Emissions Before Control [lbs/year] [8]	Centralized Control Type [9]	Centralized Control Eff. [10]	Air Emissions [lbs/year] [11]	Air Emissions (lbs/hr) [12]
9	9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	9-160-00900123-91-1	22	Gallon	184	1,4-Dioxane	123-91-1	0.2	Yes	Yes	No	Yes	0.200	0.1	RCTO VOC	99%	0.0	1.89E-07
10	9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	9-160-0090097-64-3	22	Gallon	184	Ethyl lactate	97-64-3	35	Yes	No	No	No	0.200	12.9	RCTO VOC	99%	0.2	3.30E-05
11	9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	9-160-009001319-77-3	22	Gallon	184	Cresol	1319-77-3	1	Yes	Yes	Yes	No	0.200	0.4	RCTO VOC	99%	0.0	9.43E-07
12	9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	9-160-00900Additive	22	Gallon	184	Diazo Photoactive Compound (Trade secret)	Additive	10	Yes	No	No	No	0.200	3.7	RCTO VOC	99%	0.1	9.43E-06
	9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	9-160-00900624-41-9	22	Gallon	184	2-Methyl Butyl Acetate	624-41-9	10	Yes	No	No	No	0.200	3.7	RCTO VOC	99%	0.1	9.43E-06
	9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	9-160-00900Additive	22	Gallon	184	Diazo Photoactive Compound (Trade secret)	Additive	10	Yes	No	No	No	0.200	3.7	RCTO VOC	99%	0.1	9.43E-06
	9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	9-160-00900100-66-3	22	Gallon	184	Anisole	100-66-3	20	Yes	No	No	No	0.200	7.3	RCTO VOC	99%	0.1	1.89E-05
	9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	9-160-00900Additive	22	Gallon	184	Diazo Photoactive Compound (Trade secret)	Additive	10	Yes	No	No	No	0.200	3.7	RCTO VOC	99%	0.1	9.43E-06
	9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	9-160-00900628-63-7	22	Gallon	184	n-AMYl ACETATE	628-63-7	10	Yes	No	Yes	No	0.200	3.7	RCTO VOC	99%	0.06	9.43E-06
	9-160-00344	RESIST, SR-3000L 760mL BOT	9-160-00344Acrylic monomer	13	Liter	28	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	0.6	RCTO VOC	99%	0.0	1.46E-06
	9-160-00344	RESIST, SR-3000L 760mL BOT	9-160-00344108-65-6	13	Liter	28	1-Methoxy-2-propanol acetate	108-65-6	60	Yes	No	Yes	No	0.200	3.4	RCTO VOC	98.5%	0.1	8.78E-06
	9-160-00344	RESIST, SR-3000L 760mL BOT	9-160-00344108-94-1	13	Liter	28	cyclohexanone	108-94-1	20	Yes	No	Yes	No	0.200	1.1	RCTO VOC	99%	0.0	2.93E-06
	9-160-00344	RESIST, SR-3000L 760mL BOT	9-160-00344763-69-9	13	Liter	28	Ethyl 3-Ethoxypropionate	763-69-9	20	Yes	No	No	No	0.200	1.1	RCTO VOC	99%	0.0	2.93E-06
	9-160-00633	RESIST, SR5500L - RED (2.89 L)	9-160-00633Additive	335	Liter	739	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	1.5	RCTO VOC	99%	0.0	3.80E-06
	9-160-00633	RESIST, SR5500L - RED (2.89 L)	9-160-00633Acrylic monomer	335	Liter	739	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	14.8	RCTO VOC	99%	0.2	3.80E-05
	9-160-00633	RESIST, SR5500L - RED (2.89 L)	9-160-00633763-69-9	335	Liter	739	Ethyl 3-Ethoxypropionate	763-69-9	25	Yes	No	No	No	0.200	37.0	RCTO VOC	99%	0.6	9.49E-05
	9-160-00633	RESIST, SR5500L - RED (2.89 L)	9-160-00633108-65-6	335	Liter	739	1-Methoxy-2-propanol acetate	108-65-6	70	Yes	No	Yes	No	0.200	103.5	RCTO VOC	98.5%	1.6	2.66E-04
	9-160-00633	RESIST, SR5500L - RED (2.89 L)	9-160-00633107-98-2	335	Liter	739	1-Methoxy-2-propanol	107-98-2	5	Yes	No	Yes	No	0.200	7.4	RCTO VOC	99%	0.1	1.90E-05
	9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	9-160-00636Acrylic monomer	92	Liter	203	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	4.1	RCTO VOC	99%	0.1	1.04E-05
	9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	9-160-00636Additive	92	Liter	203	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	0.4	RCTO VOC	99%	0.0	1.04E-06
	9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	9-160-00636763-69-9	92	Liter	203	Ethyl 3-Ethoxypropionate	763-69-9	25	Yes	No	No	No	0.200	10.1	RCTO VOC	99%	0.2	2.60E-05
	9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	9-160-00636108-65-6	92	Liter	203	1-Methoxy-2-propanol acetate	108-65-6	70	Yes	No	Yes	No	0.200	28.4	RCTO VOC	98.5%	0.4	7.29E-05
	9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	9-160-00636107-98-2	92	Liter	203	1-Methoxy-2-propanol	107-98-2	5	Yes	No	Yes	No	0.200	2.0	RCTO VOC	99%	0.0	5.21E-06
	N00993H001	RESIST, SR-8500 (0.76 L)	N00993H001108-65-6	11	Liter	25	1-Methoxy-2-propanol acetate	108-65-6	90	Yes	No	Yes	No	0.200	4.5	RCTO VOC	98.5%	0.1	1.16E-05
	N00993H001	RESIST, SR-8500 (0.76 L)	N00993H001Additive	11	Liter	25	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	1.29E-07
	N94906F001	RESIST, SW-8000 (2.89 L)	N94906F001108-94-1	194	Liter	427	cyclohexanone	108-94-1	15	Yes	No	Yes	No	0.200	12.8	RCTO VOC	99%	0.2	3.29E-05
	N94906F001	RESIST, SW-8000 (2.89 L)	N94906F001Acrylic monomer	194	Liter	427	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	15	Yes	No	No	No	0.200	12.8	RCTO VOC	99%	0.2	3.29E-05
	N94906F001	RESIST, SW-8000 (2.89 L)	N94906F001Additive	194	Liter	427	Oxime derivative (Proprietary)	Additive	5	Yes	No	No	No	0.200	4.3	RCTO VOC	99%	0.1	1.10E-05
	N94906F001	RESIST, SW-8000 (2.89 L)	N94906F001108-65-6	194	Liter	427	1-Methoxy-2-propanol acetate	108-65-6	70	Yes	No	Yes	No	0.200	59.8	RCTO VOC	98.5%	0.9	1.54E-04
	9-160-00810	RESIST, SW-8000 X 760 mL	9-160-00810108-94-1	22	Liter	49	cyclohexanone	108-94-1	15	Yes	No	Yes	No	0.200	1.5	RCTO VOC	99%	0.0	3.74E-06
	9-160-00810	RESIST, SW-8000 X 760 mL	9-160-00810Acrylic monomer	22	Liter	49	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	15	Yes	No	No	No	0.200	1.5	RCTO VOC	99%	0.0	3.74E-06
	9-160-00810	RESIST, SW-8000 X 760 mL	9-160-00810Additive	22	Liter	49	Oxime derivative (Proprietary)	Additive	5	Yes	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.25E-06
	9-160-00810	RESIST, SW-8000 X 760 mL	9-160-00810108-65-6	22	Liter	49	1-Methoxy-2-propanol acetate	108-65-6	70	Yes	No	Yes	No	0.200	6.8	RCTO VOC	98.5%	0.1	1.75E-05
	N90997G001	RESIST, SY-7500 (7.60 mL)	N90997G001108-65-6	12	Liter	27	1-Methoxy-2-propanol acetate	108-65-6	90	Yes	No	Yes	No	0.200	4.8	RCTO VOC	98.5%	0.1	1.24E-05
	N90997G001	RESIST, SY-7500 (7.60 mL)	N90997G001108-94-1	12	Liter	27	cyclohexanone	108-94-1	10	Yes	No	Yes	No	0.200	0.5	RCTO VOC	99%	0.0	1.38E-06
	N90997G001	RESIST, SY-7500 (7.60 mL)	N90997G001Acrylic monomer	12	Liter	27	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	10	Yes	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.38E-06
	N90997G001	RESIST, SY-7500 (7.60 mL)	N90997G001Pigment	12	Liter	27	Yellow Pigment (Nickel Compound) (Proprietary)	Pigment	10	No	No	No	No	0.200	0.5	RCTO VOC	99%	0.0	1.38E-06
	N90997G001	RESIST, SY-7500 (7.60 mL)	N90997G001Additive	12	Liter	27	Oxime derivative (Proprietary)	Additive	1	Yes	No	No	No	0.200	0.1	RCTO VOC	99%	0.0	1.38E-07
	9-160-00671	RESIST, TMR-1.55 (1 Quart)	9-160-00671108-65-6	20	Quart	42	Propylene Glycol Monomethyl Ether Acetate	108-65-6	95	Yes	No	Yes	No	0.200	7.9	RCTO VOC	98.5%	0.1	2.04E-05
	9-160-00671	RESIST, TMR-1.55 (1 Quart)	9-160-00671123-91-1	20	Quart	42	1,4-Dioxane	123-91-1	1	Yes	Yes	No	Yes	0.200	0.1	RCTO VOC	99%	0.0	2.14E-07
	9-160-00671	RESIST, TMR-1.55 (1 Quart)	9-160-006719063-87-0	20	Quart	42	Acrylic type resin (Trade Secret)	9063-87-0	40	Yes	No	No	No	0.200	3.3	RCTO VOC	99%	0.1	8.57E-06
	9-160-00671	RESIST, TMR-1.55 (1 Quart)	9-160-00671Additive	20	Quart	42	Photoactive compound (Trade secret)	Additive	10	Yes	No	No	No	0.200	0.8	RCTO VOC	99%	0.0	2.14E-06
	9-160-00672	RESIST, TMR-1.9 (1 Quart)	9-160-00672123-91-1	108	Quart	225	1,4-Dioxane	123-91-1	1	Yes	Yes	No	Yes	0.200	0.5	RCTO VOC	99%	0.0	1.16E-06
	9-160-00672	RESIST, TMR-1.9 (1 Quart)	9-160-006729063-87-0	108	Quart	225	Acrylic type resin (Trade Secret)	9063-87-0	40	Yes	No	No	No	0.200	18.0	RCTO VOC	99%	0.3	4.63E-05
	9-160-00672	RESIST, TMR-1.9 (1 Quart)	9-160-00672108-65-6	108	Quart	225	Propylene Glycol Monomethyl Ether Acetate	108-65-6	95	Yes	No	Yes	No	0.200	42.8	RCTO VOC	98.5%	0.6	1.10E-04
	9-160-00672	RESIST, TMR-1.9 (1 Quart)	9-160-00672Additive	108	Quart	225	Photoactive compound (Trade secret)	Additive	15	Yes	No	No	No	0.200	6.8	RCTO VOC	99%	0.1	1.74E-05
	9-160-00670	RESIST, TMR-10.5 (1Gallon)	9-160-00670123-91-1	111	Gallon	926	1,4-Dioxane	123-91-1	1	Yes	Yes	No	Yes	0.200	1.9	RCTO VOC	99%	0.0	4.76E-06
	9-160-00670	RESIST, TMR-10.5 (1Gallon)	9-160-006709063-87-0	111	Gallon	926	Acrylic type resin (Trade Secret)	9063-87-0	40	Yes	No	No	No	0.200	74.1	RCTO VOC	99%	1.1	1.90E-04
	9-160-00670	RESIST, TMR-10.5 (1Gallon)	9-160-00670108-65-6	111	Gallon	926	Propylene Glycol Monomethyl Ether Acetate	108-65-6	95	Yes	No	Yes	No	0.200	176.0	RCTO VOC	98.5%	2.6	4.52E-04
	9-160-00670	RESIST, TMR-10.5 (1Gallon)	9-160-00670Additive	111	Gallon	926	Photoactive compound (Trade Secret)	Additive	15	Yes	No	No	No	0.200	27.8	RCTO VOC	99%	0.4	7.14E-05
	9-160-00643	RESIST, TMR-2.7 (1Gallon)	9-160-00643123-91-1	85	Gallon	709	1,4-Dioxane	123-91-1	1	Yes	Yes	No	Yes	0.200	1.4	RCTO VOC	99%	0.0	3.64E-06
	9-160-00643	RESIST, TMR-2.7 (1Gallon)	9-160-006439063-87-0	85	Gallon	709	Acrylic type resin (Trade Secret)	9063-87-0	40	Yes	No	No	No	0.200	56.7	RCTO VOC	99%	0.9	1.46E-04
	9-160-00643	RESIST, TMR-2.7 (1Gallon)	9-160-00643108-65-6	85	Gallon	709	Propylene Glycol Monomethyl Ether Acetate	108-65-6	95	Yes	No	Yes	No	0.200	134.8	RCTO VOC	98.5%	2.0	3.46E-04
	9-160-00643	RESIST, TMR-2.7 (1Gallon)	9-160-00643Additive	85	Gallon	709	Photoactive compound (Trade Secret)	Additive	15	Yes	No	No	No	0.200	21.3	RCTO VOC	99%	0.3	5.47E-05
	N97964F001	RESIST, TMR-3.8 (1 Quart)	N97964F001123-91-1	69	Quart	144	1,4-Dioxane	123-91-1	1	Yes	Yes	No	Yes	0.200	0.3	RCTO VOC	99%	0.0	7.40E-07
	N97964F001	RESIST, TMR-3.8 (1 Quart)	N97964F0019063-87-0	69	Quart	144	Acrylic type resin (Trade Secret)	9063-87-0	40	Yes	No	No	No	0.200	11.5	RCTO VOC	99%	0.2	2.96E-05
	N97964F001	RESIST, TMR-3.8 (1 Quart)	N97964F001Additive	69	Quart	144	Photoactive compound (Trade Secret)	Additive	15	Yes	No	No	No	0.200	4.3	RCTO VOC	99%	0.1	1.11E-05
	N97964F001	RESIST, TMR-3.8 (1 Quart)	N97964F001108-65-6	69	Quart	144	Propylene Glycol Monomethyl Ether Acetate	108-65-6	95	Yes	No	Yes	No	0.200	27.4	RCTO VOC	98.5%	0.4	7.03E-05
	9-160-00647	RESIST, TMR-3.8 (1Gallon)	9-160-00647123-91-1	152	Gallon	1,269	1,4-Dioxane	123-91-1	1	Yes	Yes	No	Yes	0.200	2.5	RCTO VOC	99%	0.0	6.52E-06
	9-160-00647	RESIST, TMR-3.8 (1Gallon)	9-160-006479063-87-0	152	Gallon	1,269	Acrylic type resin (Trade Secret)	9063-87-0	40	Yes	No	No	No	0.200	101	RCTO VOC	99%	1.5	2.61E-04
	9-160-00647	RESIST, TMR-3.8 (1Gallon)	9-160-00647Additive	152	Gallon	1,269	Photoactive compound (Trade Secret)	Additive	15	Yes	No	No	No	0.200	38	RCTO VOC	99%	0.6	9.77E-05
	9-160-00647	RESIST, TMR-3.8 (1Gallon)	9-160-00647108-65-6	152	Gallon	1,269	Propylene Glycol Monomethyl Ether Acetate	108-65-6	95	Yes	No	Yes	No	0.200	241	RCTO VOC	98.5%	3.6	6.19E-04
	N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	N24500H00167-64-1	15	Quart	31	Acetone	67-64-1	1	No	No	Yes	No	0.200	0.1	RCTO VOC	99%	0.0	1.61E-07
	N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	N24500H001108-65-6	15	Quart	31	Propylene Glycol Monomethyl Ether Acetate	108-65-6	60	Yes	No	Yes	No	0.200	3.8	RCTO VOC	98.5%	0.1	9.65E-06
	N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	N24500H001Additive	15	Quart	31	Photoactive compound (Trade secret)	Additive	15	Yes	No	No	No	0.200	0.9	RCTO VOC	99%	0.0	2.41E-06
	N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	N24500H001110-43-0	15	Quart	31	2-HEPTANONE	110-43-0	40	Yes	No	Yes	No	0.200	2.5	RCTO VOC	99%	0.0	6.43E-06
	N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	N24500H0019063-87-0	15	Quart	31	Novalak resin (Trade secret)	9063-87-0	30	Yes	No	No	No	0.200	1.9	RCTO VOC	99%	0.0	4.82E-06
	N21357H001	RESIST, TMR-TS01E PM 50cP (1 Quart)	N21357H001108-65-6	18	Quart	38	Propylene Glycol Monomethyl Ether Acetate	108-65-6	95	Yes	No	Yes	No	0.200	7.1	RCTO VOC	98.5%	0.1	1.83E-05
	N21357H001	RESIST, TMR-TS01E PM 50cP (1 Quart)	N21357H0019063-87-0	18	Quart	38	Acrylic type resin (Trade Secret)	9063-87-0	40	Yes	No	No	No	0.200	3.0	RCTO VOC	99%	0.0	7.72E-06
	N21357H001	RESIST, TMR-TS01E PM 50cP (1 Quart)	N21357H001Additive	18	Quart	38	Photoactive compound (Trade Secret)	Additive	15	Yes	No	No	No	0.200	1.1	RCTO VOC	99%	0.0	2.89E-06

Oracle Item Number[1]	Chemical Name	Unique REF CAS	Usage Amount	Usage Amount Units	Amount Used [lbs/year] [2]	Constituent and Byproduct Names [4,5]	CAS #	Max Wt. % [6]	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	Emission Factor [7]	Emissions Before Control [8] [lbs/year]	Centralized Control Type [9]	Centralized Control Eff. [10]	Air Emissions [lbs/year] [11]	Air Emissions [12] (lbs/hr)
N24499H001	RESIST, TMR-V005 PM 56cP (1 Quart)	N24499H001108-65-6	12	Quart	25	Propylene Glycol Monomethyl Ether Acetate	108-65-6	80	Yes	No	Yes	No	0.200	4.0	RCTO VOC	98.5%	0.1	1.03E-05
N24499H001	RESIST, TMR-V005 PM 56cP (1 Quart)	N24499H0019063-87-0	12	Quart	25	Acrylic type resin (Trade Secret)	9063-87-0	30	Yes	No	No	No	0.200	1.5	RCTO VOC	99%	0.0	3.86E-06
9-140-00389	SOLVENT, ORGANIC CLEANER (SOC) 85% ACETO	9-140-0038967-56-1	108	Gallon	714	Methanol	67-56-1	100	Yes	Yes	Yes	No	1.000	714	N/A	0%	714	1.22E-01
9-140-00389	SOLVENT, ORGANIC CLEANER (SOC) 85% ACETO	9-140-00389123-42-2	108	Gallon	714	DIACETONE AICOHOI	123-42-2	20	No	No	Yes	No	1.000	143	N/A	0%	143	2.44E-02
9-160-00308	SOLVENT, PGMEA 1Gallon BOT	9-160-00308108-65-6	132	Gallon	1,067	2-methoxy-1-methylethyl acetate	108-65-6	100	Yes	No	Yes	No	0.200	213	N/A	0.0%	213	3.66E-02
9-140-13217	WPPS WET PAD PROTECTION SOL, KG 211 DRUM	9-140-1321775-59-2	34,182,000	Gram	75,358	Tetramethylammonium hydroxide	75-59-2	10	Yes	No	No	No	0.001	8	N/A	0%	8	1.29E-03
9-140-13217	WPPS WET PAD PROTECTION SOL, KG 211 DRUM	9-140-132177727-54-0	34,182,000	Gram	75,358	Diammonium peroxodisulphate	7727-54-0	5	No	No	No	No	0.001	4	N/A	0%	4	6.45E-04

Insert New Chemicals Above This Line

[1] Oracle numbers are used to identify raw materials.

[2] Usage data is based on an analysis of onsemi's proportions of use of materials in 2020 and 2021, scaled based on projected growth given new techniques for use of existing tools.

[3] Indicates a byproduct formed from raw material during or after use in process

[4] PGME is propylene glycol monomethyl ether (1-methoxy-2-propanol)

[5] PGMEA is propylene glycol monomethyl ether acetate (1-methoxy-2-propanol acetate).

[6] Weight percent is of a given pollutant or precursor within a material identified by its part number.

[7] Emission factor is based on the total ability of the tool to emit the pollutant, taking into account the quantity of the pollutant or precursor within the used material.

Note: CO_2 emission factors are back-calculated by dividing total CO2 formation from VOC combustion by amount of material used. Ultimately, the value is based on the carbon balance of the raw material.

[8] Tool exhaust before control is the quantity of emissions (lb) sent to air emission control system

[9] Centralized control type, if applicable, is listed. RCTO is the rotor-concentrator thermal oxidizer.

[10] The control efficiency of the RTCO is estimated to be: 98.5%

[11] Air emissions are equal to the tool exhaust multiplied by 100% - centralized control % efficiency.

[12] PTE Total based on actual emissions plus a 1.5 multiplier (50% growth in manufacturing emissions over the next 5 years)

Total Uncontrolled VOC (tpy)	**5.51**
Total Uncontrolled HAP (tpy)	**0.36**
Total Uncontrolled Single HAP (tpy)	**0.36**

Table A-31. Emissions from Acids and Bases

Oracle Item Number[1]	Product Name	Unique REF CAS	Usage Amount	Usage Amount Units	Amount Used [lbs/year] [2]	Constituent and Byproduct Names	CAS #	Max Wt. % [4]	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	Pre-POU Emission Factor [lb/lb] [5]	POU Removal	Tool Exhaust Before Control (lbs/year) [6]	Centralized Control Type [7]	Centralized Control Eff. [8]	Air Emissions (lbs/year) [9]	Air Emissions (lbs/hr) [10]
9-140-00025	ACID, HYDROCHLORIC (HCl) PPB 1Gallon BOT	9-140-000257647-01-0	1	Gallon	10	Hydrochloric Acid	7647-01-0	36	No	Yes	Yes	No	0.05	0%	0.18	Scrubber	60%	0.07	1.22E-05
9-140-00850	ACID, PHOSPHORIC 86% (H3PO4) 197L DRUM	9-140-008507664-38-2	2,167	Liter	7,931	Phosphoric acid	7664-38-2	86	No	No	Yes	No	0.001	0%	6.82	Scrubber	40%	4.09	7.01E-04
9-140-01151	AMMONIUM HYDROXIDE,(NH4OH	9-140-011517664-41-7	6,751	Gallon	50,706	Ammonia	7664-41-7	29	No	No	Yes	No	0.500	0%	7352	Scrubber	0%	7,352	1.26E+00
9-140-00306	HYDROFLUORIC ACID PPB (HF) 1Gallon BOT	9-140-003067664-39-3	3	Gallon	24	Hydrogen fluoride	7664-39-3	49	No	Yes	No	No	0.05	0%	0.59	Scrubber	60%	0.24	4.08E-05
9-140-01702	NITRIC ACID, (HNO3), 70 2.5L - EUR	9-140-017027697-37-2	8	Liter	18	Nitric Acid	7697-37-2	69.9	No	No	Yes	No	0.1	0%	1.29	Scrubber	40%	0.77	1.32E-04
9-140-00849	PEROXIDE, HYDROGEN (H2O2) 53Gallon DRUM	9-140-008497722-84-1	1,537	Gallon	17,958	Hydrogen peroxide	7722-84-1	35	No	No	Yes	No	0.001	0%	6.29	Scrubber	40%	3.77	6.46E-04
9-950-01676	SULFURIC ACID, 66-DEG BE, 750 LB DRUM	9-950-016767664-93-9	2,250	Pounds	2,250	Sulfuric Acid	7664-93-9	93	No	No	Yes	No	0.001	0%	2.09	Scrubber	40%	1.26	2.15E-04
9-140-13217	WPPS WET PAD PROTECTION SOL, KG 211 DRUM		34,182,000	Gram	80,475	Ammonia [3]	7664-41-7	0.37	No	No	Yes	No	0.500	0%	150.15	Scrubber	0%	150.15	2.57E-02

[1] Oracle numbers are used to identify raw materials.

[2] Usage data is based on an analysis of onsemi's proportions of use of materials in 2020 and 2021, scaled based on projected growth given new techniques for use of existing tools.

[3] Indicates a byproduct formed from raw material during or after use in process

[4] Chemical percentage is the weight percent of a given pollutant or precursor within a material identified by its part number.

[5] Emission factor is based on the total ability of the tool to emit the pollutant, taking into account the quantity of the pollutant or precursor within the used material, and the exhaust conditioning effect of Point-Of-Use abatement devices.

[6] Tool exhaust before control is the quantity of emissions (lb) sent to air emission control system

[7] Centralized control type, if applicable, is listed. "Scrubber" refers to acid removal wet scrubbers.

[8] The control efficiency of the centralized control scrubber for the given compound is listed.

[9] Air emissions are equal to the tool exhaust multiplied by 100% - centralized control % efficiency.

[10] PTE Total based on actual emissions plus a 1.5 multiplier (50% growth in manufacturing emissions over the next 5 years)

Table A-32. Emissions from Cooling Towers

Wet Cooling Towers	Towers 1-3	Towers 4-5
Water Flow Rate (gal/min)	1,150	1,694
Flow of cooling water (lbs/hr)	575,460	847,678
TDS of blowdown (mg/l or ppmw) - Maximum ppm at blowdown [1]	750	750
Flow of dissolved solids (lbs/hr)	432	636
Fraction of flow producing PM_{10} drift [2]	0.86	0.86
Fraction of flow producing $PM_{2.5}$ drift [2]	0.0039	0.0039
Control efficiency of drift eliminators (gal drift/gal flow) [3]	0.0002	0.0002
PM emissions from tower (lb/hr)	0.08632	0.127
PM_{10} emissions from tower (lb/hr)	0.07420	0.109
$PM_{2.5}$ emissions from tower (lb/hr)	0.00034	0.0005
Baseline Actual Operating time (hr/yr)	500	6,500
PM emissions from tower (tpy)	0.022	0.413
PM_{10} emissions from tower (tpy)	0.019	0.355
$PM_{2.5}$ emissions from tower (tpy)	0.000	0.002
Operational Variability Operating time (hr/yr)	8,260	2,260
PM emissions from tower (tpy)	0.356	0.144
PM_{10} emissions from tower (tpy)	0.306	0.124
$PM_{2.5}$ emissions from tower (tpy)	0.001	0.001
Other Parameters	**Towers 1-3**	**Towers 4-5**
Number of cells per tower (outlet fans)	6	2
Height at cell release (ft):	16.0	22.0
Height at cell release (m):	4.88	6.71
Discharge flow per cooling tower (ACFM):	239,500	418,800
Discharge flow per cell (ACFM):	39,917	209,400
Diameter of each cell (ft):	5.5	11.1
Diameter of each cell (m):	1.68	3.38
Area of cell discharge (ft^2):	24	96
Average Temperature of cell discharge (degF):	75	72
Average Temperature of cell discharge (K):	297.05	295.38
Exit Velocity (ft/s):	28.0	36.2
Exit Velocity (m/s):	8.53	11.03

Notes:

[1] Cooling Tower TDS design data based on historic data from the Micron Tier II Operating Permit Application dated December 2010.

[2] From "Calculating Realistic PM Emissions From Cooling Towers" (J. Reisman, G. Frisbie).

[3] Based on AP-42, Table 13.4-1 by converting drift emission factor into percentage.

Table A-33. Manufacturing Gases Composition

Oracle Item Number	Product Name	Chemical Description	Density [kg/L]	Density[1] [lb/ft^3]	Constituent Name	CAS #	REF CAS	Min Wt.%	Max Wt. %	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	NOTES
9-130-00050	ARGON-GR 6.0 (AR), 265FT3	Argon	0.0018	0.36	Argon	7440-37-1	9-130-000507440-37-1		100%	No	No	No	No	
9-130-00660	CARBON DIOXIDE (CO2) 60LB	Carbon Dioxide	0.0020	0.11	Carbon Dioxide	124-38-9	9-130-00660124-38-9		100%	No	No	No	No	
9-130-00048	HELIUM-GR 6.0 (He), 231FT3	Helium	0.0002	0.01	Helium	7440-59-7	9-130-000487440-59-7		100%	No	No	No	No	
9-130-00067	HYDROGEN/NITROGEN (3.8%H2/N2), 240 SCF	3.8%HYDROGEN/NITROGEN	0.0013	0.07	Hydrogen	1333-74-0	9-130-000671333-74-0		4%	No	No	No	No	
9-130-00534	HYDROGEN-GR 5.9 (H2), 261FT3	Hydrogen	0.0001	0.01	Hydrogen	1333-74-0	9-130-005341333-74-0		100%	No	No	No	No	
9-130-00046	NITROGEN-GR 6.0 (N2), 239scf	Nitrogen	0.0013	0.08	Nitrogen	7727-37-9	9-130-000467727-37-9		100%	No	No	No	No	
9-130-00649	OCTOFLUOROCYCLOBUTANE (C4F8) (RC318)	Octofluorocyclobutane	0.01	0.54	Octofluorocyclobutane	115-25-3	9-130-00649115-25-3		100%	No	No	No	No	
9-130-00015	OCTOFLUOROCYCLOPROPANE (C3F8) 105 LB CYL	Octofluorocyclopropane	0.01	0.50	Octofluorocyclopropane	76-19-7	9-130-0001576-19-7		100%	No	No	No	No	
9-130-00803	OXYGEN GR 5.0 (O2), 6PACK 2022FT3	Oxygen	0.00	0.09	Oxygen	7782-44-7	9-130-008037782-44-7		100%	No	No	No	No	
9-130-00058	SULFUR HEXAFLUORIDE (SF6), 50 LBS	Sulfur Hexafluoride	0.01	0.39	Sulfur Hexafluoride	2551-62-4	9-130-000582551-62-4		100%	No	No	No	No	
9-140-00802	TEOS, 5 GALLON CANISTER	Tetraethyl orthosilicate	0.01	0.54	Tetraethyl orthosilicate	78-10-4	9-140-0080278-10-4		100%	No	No	Yes	No	
9-130-00773	TETRAFLUOROMETHANE (CF4), 35LBS	Tetrafluoromethane	--	0.23	Tetrafluoromethane	75-73-0	9-130-0077375-73-0		100%	No	No	No	No	
9-130-00774	TRIFLUOROMETHANE (CHF3) 30 LBS	Trifluoromethane	--	0.18	Trifluoromethane	75-46-7	9-130-0077475-46-7		100%	No	No	No	No	
Insert New Chemicals Above This Line														

Density figures are taken from either PubChem, the SDS on file at onsemi, or Wikipedia.
Temperature is assumed to be 25 C if not indicated from source.
kg/L to lb/ft^3 conversion is: 62.428
Did not calculate mixtures components <1% (F/Kr/Ne)

Table A-34. Manufacturing Chemicals Composition

Oracle Item Number	Product Name	Area Used Per onsemi	Area Used Calculations	Waste Stream	UOM	UOM Amt	UOM Dscr	Denstiy [g/mL]	Density1 [lb/Gallon]	Constituent Name	CAS #	REF CAS	Min Wt.%	Max Wt. %	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)
9-140-00012	ACETONE 85 % / IPA 15 %	Bowl cleans (non-process)	Photoresist and Organics	Solvent waste	DR	53	Gallon	0.792	6.61	Acetone	67-64-1	9-140-0001267-64-1		85	No	No	Yes	No
9-140-00012	ACETONE 85 % / IPA 15 %	Bowl cleans (non-process)	Photoresist and Organics	Solvent waste	DR	53	Gallon	0.792	6.61	Isopropyl Alcohol	67-63-0	9-140-0001267-63-0		15	Yes	No	Yes	No
9-140-00011	ACETONE 85%/15% IPA,1 Gallon	Photo CFA Coat tool, Line cleans (non-process)	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.792	6.61	Acetone	67-64-1	9-140-0001167-64-1		85	No	No	Yes	No
9-140-00011	ACETONE 85%/15% IPA,1 Gallon	Photo CFA Coat tool, Line cleans (non-process)	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.792	6.61	Isopropyl Alcohol	67-63-0	9-140-0001167-63-0		15	Yes	No	Yes	No
9-140-00025	ACID, HYDROCHLORIC (HCl) PPB 1Gallon BOT	Followed-up with Juan for usage	Acid and Bases		BTL	1	Gallon	1.19	9.93	Hydrochloric Acid	7647-01-0	9-140-000257647-01-0		36	No	Yes	Yes	No
9-140-00850	ACID, PHOSPHORIC 86% (H3PO4) 197L DRUM	Tool WSTG1D0100	Acid and Bases		DR	197	Liter	1.66	13.85	Phosphoric acid	7664-38-2	9-140-008507664-38-2	80	86	No	No	Yes	No
9-140-00349	ALCOHOL, ISOPROPYL (IPA) 99.9% 1 Gallon	CFA, Probe, aLL around fab	Photoresist and Organics		BTL	1	Gallon	0.785	6.55	Isopropyl Alcohol	67-63-0	9-140-0034967-63-0		99.9	Yes	No	Yes	No
9-140-00351	ALCOHOL, ISOPRPYL (IPA) 99.95% 55 Gallon	Tool WSTG1D0100 and WDNS1D0100	Photoresist and Organics		DR	55	Gallon	0.785	6.55	Isopropyl Alcohol	67-63-0	9-140-0035167-63-0		99.95	Yes	No	Yes	No
9-140-01151	AMMONIUM HYDROXIDE,(NH4OH	Tool WSTG1D0100	Acid and Bases	IW	DR	50	Gallon	0.9	7.51	Ammonia	7664-41-7	9-140-011517664-41-7		29	No	No	Yes	No
N62854G001	CAUT, 200 PM (1 Quart)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N62854G001108-65-6		99	Yes	No	Yes	No
N62854G001	CAUT, 200 PM (1 Quart)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Additive (Trade Secret)	Additive	N62854G001Additive		1	Yes	No	No	No
9-160-00619	DEVELOPER, CD2060 RI - 53.5 Gallon DRUM	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1	8.35	Diethanolamine	111-42-2	9-160-00619111-42-2	0.1	0.6	Yes	Yes	Yes	No
9-160-00619	DEVELOPER, CD2060 RI - 53.5 Gallon DRUM	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1	8.35	Tetramethylammonium hydroxide	75-59-2	9-160-0061975-59-2	0	0.6	Yes	No	No	No
9-160-00730	DEVELOPER, OPD10C X 53.5 Gallon	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1.02	8.51	Tetramethylammonium hydroxide	75-59-2	9-160-0073075-59-2	10	25	Yes	No	No	No
9-160-00475	DEVELOPER, OPD4130 53.5Gallon DRUM	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1	8.35	Tetramethylammonium hydroxide	75-59-2	9-160-0047575-59-2	1	2.5	Yes	No	No	No
N95909F001	DEVELOPER, OPD4262- 1 Drum	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1	8.35	Tetramethylammonium hydroxide	75-59-2	N95909F00175-59-2	1	2.5	Yes	No	No	No
9-160-00569	DEVELOPER, OPD4262- 1 Gallon	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	BTL	53.5	Gallon	1	8.35	Tetramethylammonium hydroxide	75-59-2	9-160-0056975-59-2	1	2.5	Yes	No	No	No
9-140-00099	DI WATER 70 % / IPA 30 % (70/30) BOT	CFA, Probe all around fab	Photoresist and Organics	IW	BTL	1	Gallon	1	8.35	Isopropyl Alcohol	67-63-0	9-140-0009967-63-0		30	Yes	No	Yes	No
9-140-00090	ETHYLENE GLYCOL (C2H6O2), 1Gallon	5/95 and 15/85 mix for track chillers and may be d	Photoresist and Organics		BTL	1	Gallon	1.125	9.39	Ethylene Glycol	107-21-1	9-140-00090107-21-1		5	Yes	Yes	Yes	No
N77810G002	FOC-376 (970mL)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	0.97	Liter	1	8.35	Crosslinker	Crosslinker	N77810G002Crosslinker	0.5	5	Yes	No	No	No
N77810G002	FOC-376 (970mL)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	0.97	Liter	1	8.35	Acrylic resin	9063-87-0	N77810G0029063-87-0	1	16	Yes	No	No	No
N77810G002	FOC-376 (970mL)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	0.97	Liter	1	8.35	Methyl 3-methoxy propionate	3852-09-3	N77810G0023852-09-3	79	99	Yes	No	No	No
9-160-00474	HMDS, CANISTER (MESA) 5Gallon BOT	Photo CFA Coat tool, Bulk supply	Photoresist and Organics	Solvent waste	CN	5	Gallon	0.774	6.46	1,1,1,3,3,3-Hexamethyldisilazane	999-97-3	9-160-00474999-97-3	99	100	Yes	No	No	No
9-140-00306	HYDROFLUORIC ACID PPB (HF) 1Gallon BOT	Quartz cleaning	Acid and Bases	IW	BTL	1	Gallon	0.97	8.10	Hydrogen fluoride	7664-39-3	9-140-003067664-39-3	0.1	49	No	Yes	No	No
9-160-00753	LEVEL M10-44 (B94947-22) 4L	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	4	Liter	1	8.35	Additive (Trade Secret)	Additive	9-160-00753Additive	0	10	Yes	No	No	No
9-160-00753	LEVEL M10-44 (B94947-22) 4L	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	4	Liter	1	8.35	Ethyl lactate	97-64-3	9-160-0075397-64-3	5	80	Yes	No	No	No
9-160-00753	LEVEL M10-44 (B94947-22) 4L	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	4	Liter	1	8.35	Polymer Solids (Proprietary)	Polymer Solids	9-160-00753Polymer Solids	20	95	Yes	No	No	No
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	9-160-00001123-91-1	0	1	Yes	Yes	No	Yes
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-000019063-87-0	5	40	Yes	No	No	No
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00001108-65-6	45	95	Yes	No	Yes	No
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00001Additive	1	15	Yes	No	No	No
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	9-160-00673123-91-1	0	1	Yes	Yes	No	Yes
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-000739063-87-0	5	40	Yes	No	No	No
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00673108-65-6	45	95	Yes	No	Yes	No
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00673Additive	1	15	Yes	No	No	No
9-140-01702	NITRIC ACID, (HNO3), 70 2.5L - EUR	Quartz cleaning	Acid and Bases	IW	BTL	2.5	Liter	1.115	9.31	Nitric Acid	7697-37-2	9-140-017027697-37-2	64	69.9	No	No	Yes	No
N81876E002	NMP (1 Gallon)	Photo CFA Coat tools, line clean, Bench	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Water	Water	N81876E002Water	0	1	No	No	No	No
N81876E002	NMP (1 Gallon)	Photo CFA Coat tools, line clean, Bench	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1-Methyl-2-pyrrolidinone	872-50-4	N81876E002872-50-4	99	100	Yes	No	No	No
9-140-00001	NOVEC, 7200 ENGINEERED FLUID 3M 33LB/15KG	Probe chillers	Photoresist and Organics	Containerized waste	BTL			1	8.35	Ethyl Nonafluoroisobutyl Ether	163702-06-5	9-140-00001163702-06-5	50	70	No	No	No	No
9-140-00001	NOVEC, 7200 ENGINEERED FLUID 3M 33LB/15KG	Probe chillers	Photoresist and Organics	Containerized waste	BTL			1	8.35	Ethyl Nonafluorobutyl Ether	163702-05-4	9-140-00001163702-05-4	30	50	No	No	No	No
9-140-00849	PEROXIDE, HYDROGEN (H2O2) 53Gallon DRUM	Tool WSTG1D0100			DR	53	Gallon	1.4	11.68	Hydrogen peroxide	7722-84-1	9-140-008497722-84-1	20	35	No	No	Yes	No
N97982F001	PGMEA EBR SOLVENT 53.5 DRUM	Photo CFA Coat tools, bulk supply	Photoresist and Organics	Solvent waste	DR	53	Gallon	0.965	8.05	2-methoxy-1-methylethyl acetate	108-65-6	N97982F001108-65-6	90	100	Yes	No	Yes	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Acrylic resin	9063-87-0	N25329H0019063-87-0	10	25	Yes	No	No	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Sensitizer	Sensitizer	N25329H001Sensitizer	0.5	3	Yes	No	No	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Crosslinker	Crosslinker	N25329H001Crosslinker	2	6	Yes	No	No	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Acrylic monomer	Acrylic monomer	N25329H001Acrylic monomer	2	10	Yes	No	No	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	1-methoxy-2-propanol	107-98-2	N25329H001107-98-2	10	20	Yes	No	Yes	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Methyl 3-methoxy propionate	3852-09-3	N25329H0013852-09-3	50	60	Yes	No	No	No
9-160-01027	RESIST, ILA X 1 Gallon	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Anisole	100-66-3	9-160-01027100-66-3	31	35	Yes	No	No	No
9-160-01027	RESIST, ILA X 1 Gallon	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	gamma-BUTYROIACTONE	96-48-0	9-160-0102796-48-0	65	69	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Coupling agent (Proprietary)	Coupling agent	9-160-00689Coupling agent	0.1	1	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Epoxy resin (Proprietary)	9063-87-0	9-160-006899063-87-0	0.1	2	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Ethyl lactate (El)	97-64-3	9-160-0068997-64-3	35	45	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Melamine resin (Proprietary)	9063-87-0	9-160-006899063-87-0	1	5	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Phenolic resin (Proprietary)	9063-87-0	9-160-006899063-87-0	10	20	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Photosensitizer (Proprietary)	Sensitizer	9-160-00689Sensitizer	1	10	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propyleneglycol monoethylether acetate (PGEEA)	98516-30-4	9-160-0068998516-30-4	35	45	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Coupling agent (Proprietary)	Coupling agent	9-160-00689Coupling agent	0.1	1	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Epoxy resin (Proprietary)	9063-87-0	9-160-006899063-87-0	0.1	2	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Ethyl lactate (El)	97-64-3	9-160-0068997-64-3	35	45	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Melamine resin (Proprietary)	9063-87-0	9-160-006899063-87-0	1	5	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Phenolic resin (Proprietary)	9063-87-0	9-160-006899063-87-0	10	20	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photosensitizer (Proprietary)	Sensitizer	9-160-00689Sensitizer	1	10	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propyleneglycol monoethylether acetate (PGEEA)	98516-30-4	9-160-0068998516-30-4	35	45	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	2-methoxy-1-methylethyl acetate	108-65-6	N95906F001108-65-6	90	100	Yes	No	Yes	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Coupling agent (Proprietary)	Coupling agent	N95906F001Coupling agent	0.1	0.5	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Melamine resin (Proprietary)	9063-87-0	N95906F0019063-87-0	0.1	3	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Phenolic resin (Proprietary)	9063-87-0	N95906F0019063-87-0	5	15	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Naphthoquinonediazide(NQD) Ester (Proprietary)	Additive	N95906F001Additive	1	10	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Epoxy Resin (Proprietary)	9063-87-0	N95906F0019063-87-0	0.1	3	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Propyleneglycol monoethylether acetate	98516-30-4	N95906F00198516-30-4	40	50	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	l-Ethyl lactate	687-47-8	N95906F001687-47-8	40	50	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	2-methoxy-1-methylethyl acetate	108-65-6	9-160-00468108-65-6	90	100	Yes	No	Yes	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Coupling agent (Proprietary)	Coupling agent	9-160-00468Coupling agent	0.1	0.5	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Melamine resin (Proprietary)	9063-87-0	9-160-004689063-87-0	0.1	3	Yes	No	No	No

Oracle Item Number	Product Name	Area Used Per onsemi	Area Used Calculations	Waste Stream	UOM	UOM Amt	UOM Dscr	Denstiy [g/mL]	Density1 [lb/Gallon]	Constituent Name	CAS #	REF CAS	Min Wt.%	Max Wt. %	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Phenolic resin (Proprietary)	9063-87-0	9-160-004689063-87-0	5	15	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Naphthoquinonediazide(NQD) Ester (Proprietary)	Additive	9-160-00468Additive	1	10	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Epoxy Resin (Proprietary)	9063-87-0	9-160-004689063-87-0	0.1	3	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Propyleneglycol monoethylether acetate	98516-30-4	9-160-0046898516-30-4	40	50	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	l-Ethyl lactate	687-47-8	9-160-00468687-47-8	40	50	Yes	No	No	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00346108-94-1	10	20	Yes	No	Yes	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00346Acrylic monomer	1	10	Yes	No	No	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00346108-65-6	40	60	Yes	No	Yes	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00346Pigment	1	10	No	No	No	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethyl 3-ethoxypropionate	763-69-9	9-160-00346763-69-9	5	15	Yes	No	No	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00634108-65-6	40	55	Yes	No	Yes	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00634Pigment	1	10	No	No	No	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00634108-94-1	10	20	Yes	No	Yes	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	ethyl 3-ethoxypropionate	763-69-9	9-160-00634763-69-9	10	20	Yes	No	No	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	ethylbenzene	100-41-4	9-160-00634100-41-4	0.1	1	Yes	Yes	Yes	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00634Acrylic monomer	1	10	Yes	No	No	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00634Additive	1	5	Yes	No	No	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00754Acrylic monomer	1	10	Yes	No	No	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00754Additive	0.1	1	Yes	No	No	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00754Pigment	1	10	No	No	No	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00754108-94-1	10	20	Yes	No	Yes	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethylbenzene	100-41-4	9-160-00754100-41-4	0.1	1	Yes	Yes	Yes	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00754108-65-6	60	80	Yes	No	Yes	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00755Acrylic monomer	1	10	Yes	No	No	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00755108-94-1	10	20	Yes	No	Yes	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00755Additive	0.1	1	Yes	No	No	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00755Pigment	1	10	No	No	No	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethylbenzene	100-41-4	9-160-00755100-41-4	0.1	1	Yes	Yes	Yes	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00755108-65-6	60	80	Yes	No	Yes	No
N06514H001	RESIST, SC-7500 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N06514H001108-65-6	80	90	Yes	No	Yes	No
N06514H001	RESIST, SC-7500 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	N06514H001Pigment	1	10	No	No	No	No
N06514H001	RESIST, SC-7500 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N06514H001Additive	1	5	Yes	No	No	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00345108-65-6	45	55	Yes	No	Yes	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethyl 3-ethoxypropionate	763-69-9	9-160-00345763-69-9	5	15	Yes	No	No	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00345Pigment	1	10	No	No	No	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00345Acrylic monomer	1	10	Yes	No	No	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00345108-94-1	10	20	Yes	No	Yes	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethyl 3-ethoxypropionate	763-69-9	9-160-00635763-69-9	5	15	Yes	No	No	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00635Pigment	1	10	No	No	No	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00635Additive	1	5	Yes	No	No	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00635108-94-1	20	30	Yes	No	Yes	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00635Acrylic monomer	1	10	Yes	No	No	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00635108-65-6	30	50	Yes	No	Yes	No
9-160-00708	RESIST, SG6500 - GREEN (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00708Additive	0.1	1	Yes	No	No	No
9-160-00708	RESIST, SG6500 - GREEN (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00708108-65-6	65	85	Yes	No	Yes	No
9-160-00708	RESIST, SG6500 - GREEN (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00708Acrylic monomer	1	10	Yes	No	No	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	N97819G001Pigment	1	10	No	No	No	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	N97819G001Acrylic monomer	1	10	Yes	No	No	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	N97819G001108-94-1	10	20	Yes	No	Yes	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethylbenzene	100-41-4	N97819G001100-41-4	0.1	1	Yes	Yes	Yes	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N97819G001108-65-6	60	80	Yes	No	Yes	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N97819G001Additive	0.1	1	Yes	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00756Acrylic monomer	1	10	Yes	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00756Additive	1	5	Yes	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00756Pigment	5	15	No	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	YeLLow Pigment (Nickel Compound) (Proprietary)	Pigment	9-160-00756Pigment	1	5	No	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00756108-65-6	65	85	Yes	No	Yes	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00757Acrylic monomer	1	10	Yes	No	No	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00757Pigment	1	10	No	No	No	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	YeLLow Pigment (Nickel Compound) (Proprietary)	Pigment	9-160-00757Pigment	1	10	Yes	No	No	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00757108-94-1	1	10	Yes	No	Yes	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00757108-65-6	60	80	Yes	No	Yes	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol	107-98-2	9-160-00757107-98-2	1	5	Yes	No	Yes	No
N28794G001	RESIST, SG-8510 (Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	N28794G001Acrylic monomer	1	10	Yes	No	No	No
N28794G001	RESIST, SG-8510 (Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Oxime derivative (Proprietary)	Additive	N28794G001Additive	0.1	1	Yes	No	No	No
N28794G001	RESIST, SG-8510 (Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N28794G001108-65-6	70	90	Yes	No	Yes	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00002Pigment	1	10	No	No	No	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00002108-94-1	1	10	Yes	No	Yes	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00002Additive	0.1	1	Yes	No	No	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethylbenzene	100-41-4	9-160-00002100-41-4	0.1	1	Yes	Yes	Yes	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00002108-65-6	60	80	Yes	No	Yes	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00557Acrylic monomer	1	10	Yes	No	No	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00557Additive	1	5	Yes	No	No	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00557108-94-1	5	15	Yes	No	Yes	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Carbon black	1333-86-4	9-160-00557133-86-4	5	15	No	No	Yes	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Ethyl 3-Ethoxypropionate	763-69-9	9-160-00557763-69-9	15	25	Yes	No	No	No

Oracle Item Number	Product Name	Area Used Per onsemi	Area Used Calculations	Waste Stream	UOM	UOM Amt	UOM Dscr	Denstiy [g/mL]	Density1 [lb/Gallon]	Constituent Name	CAS #	REF CAS	Min Wt.%	Max Wt. %	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00557108-65-6	30	50	Yes	No	Yes	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00557108-65-6	30	50	Yes	No	Yes	No
9-160-00556	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol	107-98-2	9-160-00556107-98-2	1	5	Yes	No	Yes	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1,4-Dioxane	123-91-1	9-160-00900123-91-1	0	0.2	Yes	Yes	No	Yes
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Ethyl lactate	97-64-3	9-160-0090097-64-3	25	35	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Cresol	1319-77-3	9-160-009001319-77-3	0	1	Yes	Yes	Yes	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Diazo Photoactive Compound (Trade secret)	Additive	9-160-00900Additive	1	10	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	2-Methyl Butyl Acetate	624-41-9	9-160-00900624-41-9	1	10	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Organic Siloxane Surfactant (Trade secret)	Additive	9-160-00900Additive	0	1	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Anisole	100-66-3	9-160-00900100-66-3	10	20	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Cresol novolak resin	Additive	9-160-00900Additive	25	35	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	n-AMYl ACETATE	628-63-7	9-160-00900628-63-7	1	10	Yes	No	Yes	No
9-160-00344	RESIST, SR-3000L 760mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00344Acrylic monomer	1	10	Yes	No	No	No
9-160-00344	RESIST, SR-3000L 760mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00344108-65-6	40	60	Yes	No	Yes	No
9-160-00344	RESIST, SR-3000L 760mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00344108-94-1	10	20	Yes	No	Yes	No
9-160-00344	RESIST, SR-3000L 760mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Ethyl 3-Ethoxypropionate	763-69-9	9-160-00344763-69-9	10	20	Yes	No	No	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00633Additive	0.1	1	Yes	No	No	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00633Acrylic monomer	1	10	Yes	No	No	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Ethyl 3-Ethoxypropionate	763-69-9	9-160-00633763-69-9	15	25	Yes	No	No	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00633108-65-6	50	70	Yes	No	Yes	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol	107-98-2	9-160-00633107-98-2	1	5	Yes	No	Yes	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00636Acrylic monomer	1	10	Yes	No	No	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00636Additive	0.1	1	Yes	No	No	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Ethyl 3-Ethoxypropionate	763-69-9	9-160-00636763-69-9	15	25	Yes	No	No	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00636108-65-6	50	70	Yes	No	Yes	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol	107-98-2	9-160-00636107-98-2	0.1	5	Yes	No	Yes	No
N00993H001	RESIST, SR-8500 (0.76 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N00993H001108-65-6	80	90	Yes	No	Yes	No
N00993H001	RESIST, SR-8500 (0.76 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N00993H001Additive	0.1	1	Yes	No	No	No
N94906F001	RESIST, SW-8000 (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	cyclohexanone	108-94-1	N94906F001108-94-1	5	15	Yes	No	Yes	No
N94906F001	RESIST, SW-8000 (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	N94906F001Acrylic monomer	5	15	Yes	No	No	No
N94906F001	RESIST, SW-8000 (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N94906F001Additive	1	5	Yes	No	No	No
N94906F001	RESIST, SW-8000 (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N94906F001108-65-6	60	70	Yes	No	Yes	No
9-160-00810	RESIST, SW-8000 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00810108-94-1	5	15	Yes	No	Yes	No
9-160-00810	RESIST, SW-8000 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00810Acrylic monomer	5	15	Yes	No	No	No
9-160-00810	RESIST, SW-8000 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00810Additive	1	5	Yes	No	No	No
9-160-00810	RESIST, SW-8000 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00810108-65-6	60	70	Yes	No	Yes	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N90997G001108-65-6	70	90	Yes	No	Yes	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	N90997G001108-94-1	1	10	Yes	No	Yes	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	N90997G001Acrylic monomer	1	10	Yes	No	No	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	YeLLow Pigment (Nickel Compound) (Proprietary)	Pigment	N90997G001Pigment	1	10	Yes	No	No	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N90997G001Additive	0.1	1	Yes	No	No	No
9-160-00671	RESIST, TMR-1.55 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00671108-65-6	45	95	Yes	No	Yes	No
9-160-00671	RESIST, TMR-1.55 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	9-160-00671123-91-1	0	1	Yes	Yes	No	Yes
9-160-00671	RESIST, TMR-1.55 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-00671Acrylic monomer	1	40	Yes	No	No	No
9-160-00671	RESIST, TMR-1.55 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade secret)	Additive	9-160-00671Additive	0	10	Yes	No	No	No
9-160-00672	RESIST, TMR-1.9 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	9-160-00672123-91-1	0	1	Yes	Yes	No	Yes
9-160-00672	RESIST, TMR-1.9 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-00672Acrylic monomer	5	40	Yes	No	No	No
9-160-00672	RESIST, TMR-1.9 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00672108-65-6	45	95	Yes	No	Yes	No
9-160-00672	RESIST, TMR-1.9 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade secret)	Additive	9-160-00672Additive	1	15	Yes	No	No	No
9-160-00670	RESIST, TMR-10.5 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1,4-Dioxane	123-91-1	9-160-00670123-91-1	0	1	Yes	Yes	No	Yes
9-160-00670	RESIST, TMR-10.5 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-00670Acrylic monomer	5	40	Yes	No	No	No
9-160-00670	RESIST, TMR-10.5 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00670108-65-6	45	95	Yes	No	Yes	No
9-160-00670	RESIST, TMR-10.5 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00670Additive	1	15	Yes	No	No	No
9-160-00643	RESIST, TMR-2.7 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1,4-Dioxane	123-91-1	9-160-00643123-91-1	0	1	Yes	Yes	No	Yes
9-160-00643	RESIST, TMR-2.7 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-00643Acrylic monomer	5	40	Yes	No	No	No
9-160-00643	RESIST, TMR-2.7 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00643108-65-6	45	95	Yes	No	Yes	No
9-160-00643	RESIST, TMR-2.7 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00643Additive	1	15	Yes	No	No	No
N97964F001	RESIST, TMR-3.8 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	N97964F001123-91-1	0	1	Yes	Yes	No	Yes
N97964F001	RESIST, TMR-3.8 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	N97964F0019063-87-0	5	40	Yes	No	No	No
N97964F001	RESIST, TMR-3.8 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade Secret)	Additive	N97964F001Additive	1	15	Yes	No	No	No
N97964F001	RESIST, TMR-3.8 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N97964F001108-65-6	45	95	Yes	No	Yes	No
9-160-00647	RESIST, TMR-3.8 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1,4-Dioxane	123-91-1	9-160-00647123-91-1	0	1	Yes	Yes	No	Yes
9-160-00647	RESIST, TMR-3.8 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-00647Acrylic monomer	5	40	Yes	No	No	No
9-160-00647	RESIST, TMR-3.8 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00647Additive	1	15	Yes	No	No	No
9-160-00647	RESIST, TMR-3.8 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00647108-65-6	45	95	Yes	No	Yes	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acetone	67-64-1	N24500H00167-64-1	0	1	No	No	Yes	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N24500H001108-65-6	35	60	Yes	No	Yes	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade secret)	Additive	N24500H001Additive	1	15	Yes	No	No	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	2-HEPTANONE	110-43-0	N24500H001110-43-0	20	40	Yes	No	Yes	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Novalak resin (Trade secret)	9063-87-0	N24500H0019063-87-0	1	30	Yes	No	No	No
N21357H001	RESIST, TMR-TS01E PM 50cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N21357H001108-65-6	45	95	Yes	No	Yes	No
N21357H001	RESIST, TMR-TS01E PM 50cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	N21357H0019063-87-0	5	40	Yes	No	No	No
N21357H001	RESIST, TMR-TS01E PM 50cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade Secret)	Additive	N21357H001Additive	1	15	Yes	No	No	No
N24499H001	RESIST, TMR-V005 PM 56cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N24499H001108-65-6	70	80	Yes	No	Yes	No
N24499H001	RESIST, TMR-V005 PM 56cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	N24499H0019063-87-0	20	30	Yes	No	No	No
9-140-00389	SOLVENT, ORGANIC CLEANER (SOC) 85% ACETO	Photo CFA Coat tools, nozzle clean	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.792	6.61	Methanol	67-56-1	9-140-0038967-56-1	99	100	Yes	Yes	Yes	No

Oracle Item Number	Product Name	Area Used Per onsemi	Area Used Calculations	Waste Stream	UOM	UOM Amt	UOM Dscr	Denstiy [g/mL]	Density1 [lb/Gallon]	Constituent Name	CAS #	REF CAS	Min Wt.%	Max Wt. %	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)
9-140-00389	SOLVENT, ORGANIC CLEANER (SOC) 85% ACETO	Photo CFA Coat tools, nozzle clean	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.792	6.61	DIACETONE AlCOHOl	123-42-2	9-140-00389123-42-2	10	20	No	No	Yes	No
9-160-00308	SOLVENT, PGMEA 1Gallon BOT	Photo CFA Coat tools, line clean, Bench	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.969	8.09	2-methoxy-1-methylethyl acetate	108-65-6	9-160-00308108-65-6	90	100	Yes	No	Yes	No
9-950-01676	SULFURIC ACID, 66-DEG BE, 750 LB DRUM		Acid and Bases	IW	DR	750	Pound			Sulfuric Acid	7664-93-9	9-950-016767664-93-9		93	No	No	Yes	No
9-140-13217	WPPS WET PAD PROTECTION SOL, KG 211 DRUM	Tool WSTG1D0100 and WDNS1D0100	Photoresist and Organics		DR	211	KG	1.055	8.80	Tetramethylammonium hydroxide	75-59-2	9-140-1321775-59-2	5	10	Yes	No	No	No
9-140-13217	WPPS WET PAD PROTECTION SOL, KG 211 DRUM	Tool WSTG1D0100 and WDNS1D0100	Photoresist and Organics		DR	211	KG	1.055	8.80	Diammonium peroxodisulphate	7727-54-0	9-140-132177727-54-0	1	5	No	No	No	No
Insert New Chemical Above This Line																		

Note:

[1] Specfic Gravity conversion is 1 g/cm^3 = 8.345 lb/gallon

[2] Proprietary constituents without a CAS# (additives, crosslinker, polymer, acrylic resin, sensitizer, etc.) conservatively assumed to be a VOC but not a HAP or TAP

Color filter array (CFA) is a mosaic of tiny color filters placed over the pixel sensors of an image sensor to capture color information.

Table A-35. Modeled Point Sources Release Parameters

Source ID	Description	Release Orientation	UTM X (m)	UTM Y (m)	Elevation (m)	Height (m)	Temp (K)	Velocity (m/s)	Diameter (m)
BOI01	Kewanee Boiler Low NOx burners rated at 9 PPM	POINTCAP	537536.00	4827153.00	778.30	13.40	477.6	5.67	0.55
BOI02	Kewanee Boiler Low NOx burners rated at 9 PPM	POINTCAP	537538.00	4827151.00	778.30	13.40	477.6	5.67	0.55
BOI03	Cleaver Brooks Boiler	POINTCAP	537541.00	4827148.00	778.29	13.40	393.7	7.96	0.41
BOI04	Kewanee Boiler Low NOx burners rated at 9 PPM	POINTCAP	537543.00	4827147.00	778.30	13.40	477.6	5.67	0.55
HEAT	Natural Gas Water Heater	POINTCAP	537543.00	4827140.00	778.27	14.17	294.3	1.37	0.10
VOC02UN	VOC Abatement Uncontrolled	POINTCAP	537494.00	4827180.00	778.00	11.28	304.3	12.62	0.61
GEN02_S1	Cummins 111 2kW Emergency Generator, Stack 1	POINT	537559.40	4827110.00	777.96	3.66	753.7	50.00	0.15
GEN02_S2	Cummins 111 2kW Emergency Generator, Stack 2	POINT	537559.80	4827110.00	777.97	3.66	753.7	50.00	0.15
GEN03_S1	Cummins 1655 kW Emergency Generator, Stack 1	POINT	537554.40	4827105.00	777.82	3.66	735.9	50.00	0.15
GEN03_S2	Cummins 1655 kW Emergency Generator, Stack 2	POINT	537554.90	4827105.00	777.83	3.66	735.9	50.00	0.15
COOL01A	Wet Cooling Tower	POINT	537539.50	4827134.00	778.21	4.88	297.0	8.53	1.68
COOL01B	Wet Cooling Tower	POINT	537537.30	4827132.00	778.17	4.88	297.0	8.53	1.68
COOL01C	Wet Cooling Tower	POINT	537535.20	4827130.00	778.11	4.88	297.0	8.53	1.68
COOL01D	Wet Cooling Tower	POINT	537540.80	4827133.00	778.20	4.88	297.0	8.53	1.68
COOL01E	Wet Cooling Tower	POINT	537538.60	4827131.00	778.16	4.88	297.0	8.53	1.68
COOL01F	Wet Cooling Tower	POINT	537536.40	4827128.00	778.10	4.88	297.0	8.53	1.68
COOL02A	Wet Cooling Tower	POINT	537535.10	4827138.00	778.22	4.88	297.0	8.53	1.68
COOL02B	Wet Cooling Tower	POINT	537532.90	4827136.00	778.19	4.88	297.0	8.53	1.68
COOL02C	Wet Cooling Tower	POINT	537530.80	4827134.00	778.13	4.88	297.0	8.53	1.68
COOL02D	Wet Cooling Tower	POINT	537536.40	4827137.00	778.23	4.88	297.0	8.53	1.68
COOL02E	Wet Cooling Tower	POINT	537534.20	4827135.00	778.19	4.88	297.0	8.53	1.68
COOL02F	Wet Cooling Tower	POINT	537532.00	4827133.00	778.13	4.88	297.0	8.53	1.68
COOL03A	Wet Cooling Tower	POINT	537530.70	4827143.00	778.21	4.88	297.0	8.53	1.68
COOL03B	Wet Cooling Tower	POINT	537528.50	4827141.00	778.18	4.88	297.0	8.53	1.68
COOL03C	Wet Cooling Tower	POINT	537526.30	4827139.00	778.13	4.88	297.0	8.53	1.68
COOL03D	Wet Cooling Tower	POINT	537531.90	4827142.00	778.21	4.88	297.0	8.53	1.68
COOL03E	Wet Cooling Tower	POINT	537529.80	4827139.00	778.18	4.88	297.0	8.53	1.68
COOL04A	Wet Cooling Tower	POINT	537517.00	4827131.00	777.89	6.71	295.4	11.03	3.38
COOL04B	Wet Cooling Tower	POINT	537521.90	4827128.00	777.91	6.71	295.4	11.03	3.38
COOL05A	Wet Cooling Tower	POINT	537526.00	4827122.00	777.89	6.71	295.4	11.03	3.38
COOL05B	Wet Cooling Tower	POINT	537529.50	4827121.00	777.92	6.71	295.4	11.03	3.38
FS_01	Manufacturing Emissions	POINT	537547.20	4827160.00	778.43	14.94	293.2	11.40	1.26
FS_02	Manufacturing Emissions	POINT	537550.10	4827157.00	778.43	14.94	293.2	11.40	1.26
FS_03	Manufacturing Emissions	POINT	537553.70	4827153.00	778.42	14.94	293.2	11.40	1.26
VOC01	VOC Abatement	POINT	537595.10	4827115.00	778.04	3.66	304.3	28.40	0.4064
VOC02	VOC Abatement	POINT	537487.00	4827181.00	777.87	3.66	304.3	28.40	0.4064
VOC01UN	VOC Abatement Uncontrolled	POINT	537586.80	4827113.00	778.03	13.72	304.3	5.61	0.910
MAU5BPT	Makeup air unit stack	POINT	537510.10	4827199.00	778.22	11.18	0.0	14.08	0.559

Table A-36. Modeled Volume Sources Release Parameters

Source ID	Description	Release Orientation	UTM Coordinates		Elevation	Associated Door Height	Associated Door Width	Release Height	Init. Lat. Dim	Init. Vert. Dim
			X (m)	Y (m)	(m)	(m)	(m)	(m)	(m)	(m)
MAU5B_01	Makeup air unit emissions through door	Volume	537519.274	4827196.763	778.31	8.31	6.106	4.155	1.42	3.865
MAU5B_02	Makeup air unit emissions through door	Volume	537495.304	4827180.563	778.03	8.31	6.106	4.155	1.42	3.865
MAU5B_03	Makeup air unit emissions through door	Volume	537505.634	4827171.363	778.17	8.31	6.106	4.155	1.42	3.865

Table A-37. Controlled Modeled Sources Emission Rates

Source ID	Description	Release Orientation	Modeled Emission Rate[1]					
			1-hr NO_2 (g/s)	Annual NO_2 (g/s)	1-hr/8-hr CO (g/s)	24-hr PM_{10} (g/s)	24-hr $PM_{2.5}$ (g/s)	Annual $PM_{2.5}$ (g/s)
BOI01	Kewanee Boiler Low NOx burners rated at 9 PPM	POINTCAP	1.15E-02	1.15E-02	7.79E-02	8.01E-03	6.01E-03	6.01E-03
BOI02	Kewanee Boiler Low NOx burners rated at 9 PPM	POINTCAP	1.15E-02	1.15E-02	7.79E-02	8.01E-03	6.01E-03	6.01E-03
BOI03	Cleaver Brooks Boiler	POINTCAP	1.01E-01	1.01E-01	8.47E-02	7.67E-03	7.67E-03	7.67E-03
BOI04	Kewanee Boiler Low NOx burners rated at 9 PPM	POINTCAP	1.15E-02	1.15E-02	7.79E-02	8.01E-03	6.01E-03	6.01E-03
HEAT	Natural Gas Water Heater	POINTCAP	9.28E-04	9.28E-04	7.79E-04	7.05E-05	7.05E-05	7.05E-05
VOC02UN	VOC Abatement Uncontrolled	POINTCAP	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GEN02_S1	Cummins 111 2kW Emergency Generator, Stack 1	POINT	0.00E+00	1.58E-02	3.10E-01	6.90E-03	6.90E-03	2.36E-04
GEN02_S2	Cummins 111 2kW Emergency Generator, Stack 2	POINT	0.00E+00	1.58E-02	3.10E-01	6.90E-03	6.90E-03	2.36E-04
GEN03_S1	Cummins 1655 kW Emergency Generator, Stack 1	POINT	0.00E+00	2.99E-02	4.01E-01	1.13E-02	1.13E-02	3.87E-04
GEN03_S2	Cummins 1655 kW Emergency Generator, Stack 2	POINT	0.00E+00	2.99E-02	4.01E-01	1.13E-02	1.13E-02	3.87E-04
COOL01A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01C	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01D	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01E	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01F	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02C	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02D	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02E	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02F	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL03A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL03B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL03C	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL03D	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL03E	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL04A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	6.89E-03	3.15E-05	3.15E-05
COOL04B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	6.89E-03	3.15E-05	3.15E-05
COOL05A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	6.89E-03	3.15E-05	3.15E-05
COOL05B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	6.89E-03	3.15E-05	3.15E-05
FS_01	Manufacturing Emissions	POINT	0.00E+00	0.00E+00	0.00E+00	4.17E-04	4.17E-04	3.21E-04
FS_02	Manufacturing Emissions	POINT	0.00E+00	0.00E+00	0.00E+00	4.17E-04	4.17E-04	3.21E-04
FS_03	Manufacturing Emissions	POINT	0.00E+00	0.00E+00	0.00E+00	4.17E-04	4.17E-04	3.21E-04
VOC01	VOC Abatement	POINT	2.52E-02	2.52E-02	2.12E-02	1.92E-03	1.92E-03	1.92E-03
VOC02	VOC Abatement	POINT	2.52E-02	2.52E-02	2.12E-02	1.92E-03	1.92E-03	1.92E-03
VOC01UN	VOC Abatement Uncontrolled	POINT	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MAU5BPT[2]	Process Fugitive - 75%	POINT	4.45E-02	4.45E-02	3.74E-02	3.38E-03	3.38E-03	3.38E-03
MAU5B_01[2]	Process Fugitive - 8.33%	Volume	4.94E-03	4.94E-03	4.15E-03	3.76E-04	3.76E-04	3.76E-04
MAU5B_02[2]	Process Fugitive - 8.33%	Volume	4.94E-03	4.94E-03	4.15E-03	3.76E-04	3.76E-04	3.76E-04
MAU5B_03[2]	Process Fugitive - 8.33%	Volume	4.94E-03	4.94E-03	4.15E-03	3.76E-04	3.76E-04	3.76E-04

[1] Modeling of 24-hr standards for emergency generators incorporates non-emergency operation only happening within an eight hour period each day. Daily total emissions for eight hours of operation are divided by 24 to obtain a 24-hr averaged emission rate for modeling.

[2] 75% of the MAU 5B emissions will be emitted through the exhaust pipe. The remaining 25% will be divided evenly between the three door volume sources.

Table A-38. Uncontrolled Modeled Sources Emission Rates

Source ID	Description	Release Orientation	Modeled Emission Rate[1]					
			1-hr NO_2 (g/s)	Annual NO_2 (g/s)	1-hr/8-hr CO (g/s)	24-hr PM_{10} (g/s)	24-hr $PM_{2.5}$ (g/s)	Annual $PM_{2.5}$ (g/s)
BOI01	Kewanee Boiler Low NOx burners rated at 9 PPM	POINTCAP	1.15E-02	1.15E-02	7.79E-02	8.01E-03	6.01E-03	6.01E-03
BOI02	Kewanee Boiler Low NOx burners rated at 9 PPM	POINTCAP	1.15E-02	1.15E-02	7.79E-02	8.01E-03	6.01E-03	6.01E-03
BOI03	Cleaver Brooks Boiler	POINTCAP	1.01E-01	1.01E-01	8.47E-02	7.67E-03	7.67E-03	7.67E-03
BOI04	Kewanee Boiler Low NOx burners rated at 9 PPM	POINTCAP	1.15E-02	1.15E-02	7.79E-02	8.01E-03	6.01E-03	6.01E-03
HEAT	Natural Gas Water Heater	POINTCAP	9.28E-04	9.28E-04	7.79E-04	7.05E-05	7.05E-05	7.05E-05
VOC02UN	VOC Abatement Uncontrolled	POINTCAP	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GEN02_S1	Cummins 111 2kW Emergency Generator, Stack 1	POINT	0.00E+00	1.58E-02	3.10E-01	6.90E-03	6.90E-03	2.36E-04
GEN02_S2	Cummins 111 2kW Emergency Generator, Stack 2	POINT	0.00E+00	1.58E-02	3.10E-01	6.90E-03	6.90E-03	2.36E-04
GEN03_S1	Cummins 1655 kW Emergency Generator, Stack 1	POINT	0.00E+00	2.99E-02	4.01E-01	1.13E-02	1.13E-02	3.87E-04
GEN03_S2	Cummins 1655 kW Emergency Generator, Stack 2	POINT	0.00E+00	2.99E-02	4.01E-01	1.13E-02	1.13E-02	3.87E-04
COOL01A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01C	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01D	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01E	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL01F	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02C	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02D	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02E	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL02F	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.56E-03	7.12E-06	7.12E-06
COOL03A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL03B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL03C	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL03D	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL03E	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	1.87E-03	8.54E-06	8.54E-06
COOL04A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	6.89E-03	3.15E-05	3.15E-05
COOL04B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	6.89E-03	3.15E-05	3.15E-05
COOL05A	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	6.89E-03	3.15E-05	3.15E-05
COOL05B	Wet Cooling Tower	POINT	0.00E+00	0.00E+00	0.00E+00	6.89E-03	3.15E-05	3.15E-05
FS_01[3]	Manufacturing Emissions	POINT	3.34E-04	3.34E-04	2.80E-04	4.43E-04	4.43E-04	3.46E-04
FS_02[3]	Manufacturing Emissions	POINT	3.34E-04	3.34E-04	2.80E-04	4.43E-04	4.43E-04	3.46E-04
FS_03[3]	Manufacturing Emissions	POINT	3.34E-04	3.34E-04	2.80E-04	4.43E-04	4.43E-04	3.46E-04
VOC01	VOC Abatement	POINT	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOC02	VOC Abatement	POINT	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOC01UN	VOC Abatement Uncontrolled	POINT	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MAU5BPT[2]	Process Fugitive - 75%	POINT	4.45E-02	4.45E-02	3.74E-02	3.38E-03	3.38E-03	3.38E-03
MAU5B_01[2]	Process Fugitive - 8.33%	Volume	4.94E-03	4.94E-03	4.15E-03	3.76E-04	3.76E-04	3.76E-04
MAU5B_02[2]	Process Fugitive - 8.33%	Volume	4.94E-03	4.94E-03	4.15E-03	3.76E-04	3.76E-04	3.76E-04
MAU5B_03[2]	Process Fugitive - 8.33%	Volume	4.94E-03	4.94E-03	4.15E-03	3.76E-04	3.76E-04	3.76E-04

[1] Modeling of 24-hr standards for emergency generators incorporates non-emergency operation only happening within an eight hour period each day. Daily total emissions for eight hours of operation are divided by 24 to obtain a 24-hr averaged emission rate for modeling.

[2] 75% of the MAU 5B emissions will be emitted through the exhaust pipe. The remaining 25% will be divided evenly between the door volume sources.

[3] In an uncontrolled scenario, TPUs will emit through the scrubbers rather than thorugh the VOC abatement units.

Table A-39. NAAQS Background Concentrations

Modeled Pollutant	Background[1,2] (µg/m^3)
NO_2 1-hr	83.40
NO_2 Annual	23.51
CO 1-hr	2,824
CO 8-hr	1,646
PM_{10} 24-hr	79.39
$PM_{2.5}$ 24-hr	26.01
$PM_{2.5}$ Annual	8.05

[1] Background pollutant concentration obtained from NWAIRQUEST for the closest point to the facility.

[2] NO_2 and CO background concentrations given in ppb and ppm, respectively. Both were converted to µg/m^3.

Table A-40. NAAQS Model Results - Controlled Scenario

Modeled Pollutant	Facility-Wide Modeled Impacts (µg/m^3)	Background[1,2] (µg/m^3)	Impacts + Background (µg/m^3)	NAAQS (µg/m^3)	Impacts Below NAAQS?
NO_2 1-hr	101.72	83.4	185.12	188	Yes
NO_2 Annual	11.00	23.5	34.51	100	Yes
CO 1-hr	1186.80	2824.0	4,011	40,000	Yes
CO 8-hr	437.27	1646.0	2,083	10,000	Yes
PM_{10} 24-hr	10.80	79.4	90.19	150	Yes
$PM_{2.5}$ 24-hr	5.73	26.0	31.74	35	Yes
$PM_{2.5}$ Annual	1.17	8.1	9.22	12	Yes

[1] Background pollutant concentration obtained from NWAIRQUEST for the closest point to the facility.

[2] NO_2 and CO background concentrations given in ppb and ppm, respectively. Both were converted to µg/m^3.

Table A-41. NAAQS Model Results - Uncontrolled Scenario

Modeled Pollutant	Facility-Wide Modeled Impacts (µg/m^3)	Background[1,2] (µg/m^3)	Impacts + Background (µg/m^3)	NAAQS (µg/m^3)	Impacts Below NAAQS?
NO_2 1-hr	90.21	83.4	173.61	188	Yes
NO_2 Annual	9.60	23.5	33.11	100	Yes
CO 1-hr	1171.94	2824.0	3,996	40,000	Yes
CO 8-hr	431.06	1646.0	2,077	10,000	Yes
PM_{10} 24-hr	10.47	79.4	89.86	150	Yes
$PM_{2.5}$ 24-hr	5.47	26.0	31.48	35	Yes
$PM_{2.5}$ Annual	1.06	8.1	9.11	12	Yes

[1] Background pollutant concentration obtained from NWAIRQUEST for the closest point to the facility.

[2] NO_2 and CO background concentrations given in ppb and ppm, respectively. Both were converted to µg/m^3.

Table A-42. Individual Source Modeled Chi/Q Dispersion Factors

Source	Modeled Dispersion Factor (µg/m³)/(lb/hr)		Source Category
	Annual Average	24-hr Average	
BOI01	2.84	17.18	Boilers
BOI02	2.95	17.43	Boilers
BOI03	3.65	21.08	Boilers
BOI04	3.17	17.53	Boilers
HEAT	5.01	29.19	Heater
VOC02UN	3.72	21.62	VOC abatement
GEN02_S1	3.68	17.44	Generators
GEN02_S2	3.68	17.50	Generators
GEN03_S1	3.44	22.73	Generators
GEN03_S2	3.44	22.59	Generators
COOL01A	3.65	18.93	Cooling tower
COOL01B	3.64	18.63	Cooling tower
COOL01C	3.07	22.36	Cooling tower
COOL01D	3.66	18.66	Cooling tower
COOL01E	3.64	18.37	Cooling tower
COOL01F	3.03	21.91	Cooling tower
COOL02A	3.62	19.56	Cooling tower
COOL02B	3.59	19.39	Cooling tower
COOL02C	3.05	23.06	Cooling tower
COOL02D	3.64	19.42	Cooling tower
COOL02E	3.59	19.26	Cooling tower
COOL02F	3.09	22.86	Cooling tower
COOL03A	3.59	20.18	Cooling tower
COOL03B	3.51	20.11	Cooling tower
COOL03C	2.88	23.95	Cooling tower
COOL03D	3.61	20.01	Cooling tower
COOL03E	3.61	19.91	Cooling tower
COOL04A	1.14	25.97	Cooling tower
COOL04B	1.16	25.11	Cooling tower
COOL05A	1.15	23.81	Cooling tower
COOL05B	1.13	23.37	Cooling tower
FS_01	2.77	13.43	Scrubbers
FS_02	2.86	13.95	Scrubbers
FS_03	2.91	14.31	Scrubbers
VOC01	5.38	18.78	VOC abatement
VOC02	5.09	25.17	VOC abatement
VOC01UN	3.42	11.92	VOC abatement
MAU5BPT	3.33	25.86	MAU
MAU5B_01	41.57	162.63	MAU
MAU5B_02	48.08	186.93	MAU
MAU5B_03	37.15	147.90	MAU

Table A-43. Source Category Maxium Modeled Chi/Q Dispersion Factors

Source Category	Modeled Dispersion Factor	
	Annual Average	24-hr Average
Boilers	3.65	21.08
Heater	5.01	29.19
VOC abatement[1]	5.38	25.17
Generators	3.68	22.73
Scrubbers[1]	2.91	14.31
MAU	48.08	186.93
Maximum from manufacturing emissions[2]	*5.38*	*25.17*

1 Represents maximum from controlled or uncontrolled operating scenario

2 The maximum of VOC abatement and scrubbers will be used for ongoing TAPs Chi/Q compliance demonstrations for manufacturing process emissions.

Table A-44. Demonstration of Compliance with TAPs AACs/AACCs

Pollutant	Ammonia
TAP type	§585 non-carcinogenic
Averaging Period	24-hr
PTE Emission Rate (lb/hr)	1.67
Chi/Q Dispersion Factor (µg/m³)/(lb/hr)	25.17
Screening Impact (µg/m³)	42.03
AAC (µg/m³)	900
Impact Below AAC?	Yes
Impact % of AAC	4.67%

Table A-45. onsemi Particle Size Distribution Wet Cooling Towers

TDS= **750** ppmw

EPRI Droplet Diameter (µm) [1]	Droplet Volume (µm3)	Droplet Mass (µg)	Particle Mass (Solids) (µg)	Solid Particle Volume (µm3)	Solid Particle Diameter (µm)	EPRI % Mass Smaller [1]	TSP % Mass Smaller	PM10 % Mass Smaller	PM2.5 % Mass Smaller
10	524	5.24E-04	3.93E-07	0.18	0.70	0			
20	4189	4.19E-03	3.14E-06	1.43	1.40	0.196			
30	14137	1.41E-02	1.06E-05	4.82	2.10	0.226			0.393
40	33510	3.35E-02	2.51E-05	11.42	2.79	0.514			
50	65450	6.54E-02	4.91E-05	22.31	3.49	1.816			
60	113097	1.13E-01	8.48E-05	38.56	4.19	5.702			
70	179594	1.80E-01	1.35E-04	61.23	4.89	21.348			
90	381704	3.82E-01	2.86E-04	130.13	6.29	49.812			
110	696910	6.97E-01	5.23E-04	237.58	7.68	70.509			
130	1150347	1.15E+00	8.63E-04	392.16	9.08	82.023		85.960	
150	1767146	1.77E+00	1.33E-03	602.44	10.48	88.012			
180	3053628	3.05E+00	2.29E-03	1041.01	12.57	91.032			
210	4849048	4.85E+00	3.64E-03	1653.08	14.67	92.468			
240	7238229	7.24E+00	5.43E-03	2467.58	16.77	94.091			
270	10305995	1.03E+01	7.73E-03	3513.41	18.86	94.689			
300	14137167	1.41E+01	1.06E-02	4819.49	20.96	96.288			
350	22449298	2.24E+01	1.68E-02	7653.17	24.45	97.011			
400	33510322	3.35E+01	2.51E-02	11423.97	27.94	98.34	94.585		
450	47712938	4.77E+01	3.58E-02	16265.77	31.44	99.071			
500	65449847	6.54E+01	4.91E-02	22312.45	34.93	99.071			
600	113097336	1.13E+02	8.48E-02	38555.91	41.91	100			

Data from "Calculating Realistic PM10 Emissions from Cooling Towers"

AML_Index	SUMMARY TITLE	GROUP ID	HEADING NAME	AVERAGE CONC	YY	MM	DD	HH	XR	YR	ZELEV	ZHILL	ZFLAG	RECEPTOR TYPE
150316.6086 ms	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	ALL	1ST HIGHEST VALUE	217.21924					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	BOI01	1ST HIGHEST VALUE	2.83545					537465.7	4827237.1	777.6	777.6	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	BOI02	1ST HIGHEST VALUE	2.953					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	BOI03	1ST HIGHEST VALUE	3.65464					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	BOI04	1ST HIGHEST VALUE	3.17368					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	HEAT	1ST HIGHEST VALUE	5.00778					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	VOC02UN	1ST HIGHEST VALUE	3.72454					537415.7	4827237.1	776.98	776.98	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	GEN02_S1	1ST HIGHEST VALUE	3.67786					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	GEN02_S2	1ST HIGHEST VALUE	3.67654					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	GEN03_S1	1ST HIGHEST VALUE	3.44055					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	GEN03_S2	1ST HIGHEST VALUE	3.43927					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL01A	1ST HIGHEST VALUE	3.64646					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL01B	1ST HIGHEST VALUE	3.64151					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL01C	1ST HIGHEST VALUE	3.07433					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL01D	1ST HIGHEST VALUE	3.65753					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL01E	1ST HIGHEST VALUE	3.6378					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL01F	1ST HIGHEST VALUE	3.0274					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL02A	1ST HIGHEST VALUE	3.61662					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL02B	1ST HIGHEST VALUE	3.58611					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL02C	1ST HIGHEST VALUE	3.04635					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL02D	1ST HIGHEST VALUE	3.63575					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL02E	1ST HIGHEST VALUE	3.58798					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL02F	1ST HIGHEST VALUE	3.08872					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL03A	1ST HIGHEST VALUE	3.5868					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL03B	1ST HIGHEST VALUE	3.51417					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL03C	1ST HIGHEST VALUE	2.87858					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL03D	1ST HIGHEST VALUE	3.61479					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL03E	1ST HIGHEST VALUE	3.61266					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL04A	1ST HIGHEST VALUE	1.1447					537440.7	4827212.1	777.2	777.2	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL04B	1ST HIGHEST VALUE	1.15725					537440.7	4827212.1	777.2	777.2	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL05A	1ST HIGHEST VALUE	1.15479					537434.3	4827200.7	776.98	776.98	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	COOL05B	1ST HIGHEST VALUE	1.12519					537434.3	4827200.7	776.98	776.98	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	FS_01	1ST HIGHEST VALUE	2.76749					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	FS_02	1ST HIGHEST VALUE	2.85752					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	FS_03	1ST HIGHEST VALUE	2.91069					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	VOC01	1ST HIGHEST VALUE	5.3787					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	VOC02	1ST HIGHEST VALUE	5.08867					537415.7	4827237.1	776.98	776.98	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	VOC01UN	1ST HIGHEST VALUE	3.42083					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5BPT	1ST HIGHEST VALUE	3.32817					537415.7	4827287.1	777.37	777.37	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	1ST HIGHEST VALUE	41.57167					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	2ND HIGHEST VALUE	38.58252					537465.7	4827237.1	777.6	777.6	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	3RD HIGHEST VALUE	30.03896					537486.4	4827254.7	777.92	777.92	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	4TH HIGHEST VALUE	28.29164					537465.7	4827262.1	777.86	777.86	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	5TH HIGHEST VALUE	24.09585					537490.7	4827262.1	778.04	778.04	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	6TH HIGHEST VALUE	23.65399					537440.7	4827262.1	777.53	777.53	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	7TH HIGHEST VALUE	19.14997					537440.7	4827237.1	777.32	777.32	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	8TH HIGHEST VALUE	18.35537					537440.7	4827287.1	777.78	777.78	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	9TH HIGHEST VALUE	17.46255					537465.7	4827287.1	778.12	778.12	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_01	10TH HIGHEST VALUE	16.99154					537503.8	4827272.6	778.24	778.24	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	1ST HIGHEST VALUE	48.07932					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	2ND HIGHEST VALUE	33.42206					537440.7	4827212.1	777.2	777.2	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	3RD HIGHEST VALUE	32.82778					537440.7	4827237.1	777.32	777.32	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	4TH HIGHEST VALUE	30.02961					537465.7	4827237.1	777.6	777.6	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	5TH HIGHEST VALUE	29.23046					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	6TH HIGHEST VALUE	22.94988					537415.7	4827237.1	776.98	776.98	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	7TH HIGHEST VALUE	20.38773					537440.7	4827262.1	777.53	777.53	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	8TH HIGHEST VALUE	20.22889					537415.7	4827262.1	777.12	777.12	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	9TH HIGHEST VALUE	17.42687					537465.7	4827262.1	777.86	777.86	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_02	10TH HIGHEST VALUE	17.31802					537434.3	4827200.7	776.98	776.98	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	1ST HIGHEST VALUE	37.15482					537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	2ND HIGHEST VALUE	28.3319					537440.7	4827212.1	777.2	777.2	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	3RD HIGHEST VALUE	26.76764					537440.7	4827237.1	777.32	777.32	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	4TH HIGHEST VALUE	25.99332					537465.7	4827237.1	777.6	777.6	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	5TH HIGHEST VALUE	25.5409					537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	6TH HIGHEST VALUE	19.52544					537415.7	4827237.1	776.98	776.98	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	7TH HIGHEST VALUE	17.82492					537440.7	4827262.1	777.53	777.53	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	8TH HIGHEST VALUE	17.32315					537434.3	4827200.7	776.98	776.98	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	9TH HIGHEST VALUE	17.29055					537415.7	4827262.1	777.12	777.12	0	DC
	SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS	MAU5B_03	10TH HIGHEST VALUE	15.8415					537465.7	4827262.1	777.86	777.86	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	ALL	1ST HIGH VALUE	729.98327	20	12	10	24	537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	BOI01	1ST HIGH VALUE	17.18125	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	BOI02	1ST HIGH VALUE	17.43309	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	BOI03	1ST HIGH VALUE	21.0809	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	BOI04	1ST HIGH VALUE	17.52698	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	HEAT	1ST HIGH VALUE	29.18792	21	1	21	24	537677.7	4827174.3	778.64	778.64	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	VOC02UN	1ST HIGH VALUE	21.61659	21	7	19	24	537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	GEN02_S1	1ST HIGH VALUE	17.43889	20	12	10	24	537486.4	4827254.7	777.92	777.92	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	GEN02_S2	1ST HIGH VALUE	17.50322	20	12	10	24	537486.4	4827254.7	777.92	777.92	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	GEN03_S1	1ST HIGH VALUE	22.72643	17	2	23	24	537640.3	4827035.4	776.9	776.9	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	GEN03_S2	1ST HIGH VALUE	22.58899	17	2	23	24	537640.3	4827035.4	776.9	776.9	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL01A	1ST HIGH VALUE	18.92668	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL01B	1ST HIGH VALUE	18.63219	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL01C	1ST HIGH VALUE	22.35692	17	9	12	24	537440.7	4827212.1	777.2	777.2	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL01D	1ST HIGH VALUE	18.65762	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL01E	1ST HIGH VALUE	18.37243	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL01F	1ST HIGH VALUE	21.9137	17	9	12	24	537440.7	4827212.1	777.2	777.2	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL02A	1ST HIGH VALUE	19.56088	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL02B	1ST HIGH VALUE	19.39096	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL02C	1ST HIGH VALUE	23.05675	17	9	12	24	537440.7	4827212.1	777.2	777.2	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL02D	1ST HIGH VALUE	19.42364	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL02E	1ST HIGH VALUE	19.26382	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL02F	1ST HIGH VALUE	22.86141	17	9	12	24	537440.7	4827212.1	777.2	777.2	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL03A	1ST HIGH VALUE	20.17937	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL03B	1ST HIGH VALUE	20.11459	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL03C	1ST HIGH VALUE	23.95037	17	9	12	24	537440.7	4827212.1	777.2	777.2	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL03D	1ST HIGH VALUE	20.00537	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL03E	1ST HIGH VALUE	19.90972	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL04A	1ST HIGH VALUE	25.97341	18	7	31	24	537431.7	4827198	776.9	776.9	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL04B	1ST HIGH VALUE	25.10853	18	7	31	24	537431.7	4827198	776.9	776.9	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL05A	1ST HIGH VALUE	23.80911	18	7	31	24	537431.7	4827198	776.9	776.9	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	COOL05B	1ST HIGH VALUE	23.36945	18	7	31	24	537431.7	4827198	776.9	776.9	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	FS_01	1ST HIGH VALUE	13.42597	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	FS_02	1ST HIGH VALUE	13.94822	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	FS_03	1ST HIGH VALUE	14.31388	20	8	10	24	537677.5	4827149.3	778.26	778.26	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	VOC01	1ST HIGH VALUE	18.77511	18	12	29	24	537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	VOC02	1ST HIGH VALUE	25.16719	21	12	13	24	537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	VOC01UN	1ST HIGH VALUE	11.91607	21	11	21	24	537469	4827236.7	777.61	777.61	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	MAU5BPT	1ST HIGH VALUE	25.86445	21	2	12	24	537677.7	4827174.3	778.64	778.64	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	MAU5B_01	1ST HIGH VALUE	162.63352	19	11	3	24	537486.4	4827254.7	777.92	777.92	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	MAU5B_02	1ST HIGH VALUE	186.93204	21	12	28	24	537451.7	4827218.7	777.4	777.4	0	DC
	SUMMARY OF HIGHEST 24-HR RESULTS	MAU5B_03	1ST HIGH VALUE	147.90468	21	12	28	24	537451.7	4827218.7	777.4	777.4	0	DC

Secondary Ozone Contribution

Precursor	Emissions (tpy)	8-hr Ozone MERP[1]	8-hr Ozone Secondary Contribution (ppb)
NO_x	26.00	364	0.071
VOC	53.00	2054	0.026
		Total:	**0.097**
		8-hr Ozone Significant Impact Level (ppb):	**1.0**
		Total less than SIL?	**Yes**

Secondary contribution based on methodology in EPA July 29, 2022 *Guidance for Ozone and Fine Particulate Matter Permit Modeling*, including Significant Impact Limits (SILs)

Modeled Emission Rate for Precursor (MERP) based on Canyon Co. MERP for most conservative of any stack height or emission rate. Obtained from EPA MERPS ViewQlik website on January 24, 2023 (https://www.epa.gov/scram/merps-view-qlik)

Calculation: Secondary Contribution ($\mu g/m^3$) = SIL (µg/m3) × PTE (tpy) ÷ MERP (tpy)

Table A-20. Natural Gas - Gas Abatement Unit (GAU) Emissions Input Parameters

Fuel	Natural Gas	
Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate (existing GAU)	0.060	(MMBtu/hr)
Maximum Rate (new GAU)	0.021	(MMBtu/hr)
Maximum Rate (existing GAU)	0.00006	(MMscf/hr)
Maximum Rate (new GAU)	0.00002	(MMscf/hr)
	0.70	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Non-boiler Rate	38.7	(MMBtu/hr)
Non-boiler actual fuel usage	18.1	(MMscf/yr)
Actual Fuel Usage [1]	0.03	(MMscf/yr)
Operational Variability Fuel Usage [2, 3]	0.67	(MMscf/yr)

Both Gas Abatement Units operating (PTE)

PM_{10}	**6.04E-04**	lb/hr
$PM_{2.5}$	**6.04E-04**	lb/hr
CO	**6.67E-03**	lb/hr
NO_X	**7.94E-03**	lb/hr
SO_2	**4.76E-05**	lb/hr

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021

[2] Two unit, 60,000 Btu/hr (existing) and 21,000 Btu/hr (new)

[3] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage; Includes operation of two TPU units

Table A-21. Natural Gas - Gas Abatement Unit Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (lb/MMScf)
PM_{10}	7.6
$PM_{2.5}$	7.6
CO	84
NO_X	100
SO_2	0.6
VOC	5.5
Lead	0.0005
CH_4	2.3
N_2O	2.20
CO_2	120,000
CO_2e^2	NA

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-22. Gas Abatement Unit Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)
Benzene	71-43-2	Yes	No	Yes	2.10E-03
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02
Toluene	108-88-3	Yes	Yes	No	3.40E-03
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03
Hexane	110-54-3	Yes	Yes	No	1.80E+00
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05
Pentane	109-66-0	No	Yes	No	2.60E+00
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04
Barium	7440-39-3	No	Yes	No	4.40E-03
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05
Copper	7440-50-8	No	Yes	No	8.50E-04
Lead	-	Yes	No	No	5.00E-04
Manganese	7439-96-5	Yes	Yes	No	3.80E-04
Mercury	7439-97-6	Yes	No	No	2.60E-04
Molybdenum	7439-98-7	No	Yes	No	1.10E-03
Nickel	7440-02-0	Yes	No	Yes	2.10E-03
Selenium	7782-49-2	Yes	Yes	No	2.40E-05
Vanadium	7440-62-2	No	Yes	No	2.30E-03
7-PAH	-	Yes	No	Yes	N/A
POM	-	Yes	No	Yes	N/A
Total HAPs					

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-3. VOC-HAP-PM Emissions Summary

Name	CAS #	PM10?	VOC?	HAP?	Scrubber Gases and Acid/Bases [lb/yr]	VOC ABUs Photoresist and Other Organics [lb/yr]	Baseline Actual Emissions [lb/yr]
Ammonia	7664-41-7	No	No	No	7502.50	0.00	7502.50
Hydrogen Chloride	7647-01-0	Yes	No	Yes	0.07	0.00	0.07
Hydrogen Fluoride	7664-39-3	Yes	No	Yes	29.92	0.00	29.92
Carbon Dioxide	124-38-9	No	No	No	318.35	0.00	318.35
Carbon Monoxide	630-08-0	No	No	No	63.32	0.00	63.32
Silicon Dioxide	7631-86-9	Yes	No	No	6.01	0.00	6.01
Hexafluoroethane	76-16-4	No	No	No	26.49	0.00	26.49
Carbon tetrafluoride	75-73-0	No	No	No	197.55	0.00	197.55
Trifluoromethane	75-46-7	No	No	No	22.33	0.00	22.33
Octafluorocyclopentene	1400-2-01	No	Yes	No	0.21	0.00	0.21
Octafluorocyclobutane	115-25-3	No	No	No	18.84	0.00	18.84
Ethanol	64-17-5	No	Yes	No	4.61	0.00	4.61
Sulfur Hexafluoride	2551-62-4	No	No	No	42.52	0.00	42.52
Sulfur Dioxide	7446-09-5	No	No	No	33.94	0.00	33.94
Fluorine	7782-41-4	No	No	No	0.00	0.00	0.00
Acetic Acid	64-19-7	Yes	Yes	No	0.00	0.00	0.00
Ammonium Hydroxide	1336-21-6	No	Yes	No	0.00	0.00	0.00
Tetramethylammonium hydroxide	75-59-2	No	Yes	No	0.00	18.52	18.52
Ethylene glycol	107-21-1	No	Yes	Yes	0.00	0.28	0.28
Hydrogen Peroxide	7722-84-1	Yes	No	No	3.77	0.00	3.77
Isopropyl Alcohol	67-63-0	No	Yes	No	0.00	296.65	296.65
Sulfuric Acid	7664-93-9	No	No	No	1.26	0.00	1.26
Nitric Acid	7697-37-2	Yes	No	No	0.77	0.00	0.77
n-Methylpyrrolidinone	872-50-4	No	Yes	No	0.00	2.68	2.68
Phosphoric acid	7664-38-2	Yes	No	No	4.09	0.00	4.09
Proprietary Additive	Additive	No	Yes	No	0.00	2.31	2.31
Acetone	67-64-1	No	No	No	0.00	229.64	229.64
PGME	107-98-2	No	Yes	No	0.00	0.40	0.40
Acrylic monomer	Acrylic monomer	No	Yes	No	0.00	1.19	1.19
PGMEA	108-65-6	No	Yes	No	0.00	234.83	234.83
Cyclohexanone	108-94-1	No	Yes	No	0.00	0.93	0.93
Crosslinker	Crosslinker	No	Yes	No	0.00	0.02	0.02
Ethyl-S-Lactate	97-64-3	No	Yes	No	0.00	1.51	1.51
Methanol	67-56-1	No	Yes	Yes	0.00	713.83	713.83
n-Butyl acetate	123-86-4	No	Yes	No	0.00	0.00	0.00
Coupling agent	Coupling agent	No	Yes	No	0.00	0.00	0.00
Gamma-butyrolactone	96-48-0	No	Yes	No	0.00	0.47	0.47
Hexamethyldisilazane	999-97-3	No	Yes	No	0.00	1.45	1.45
Anisole	100-66-3	No	Yes	No	0.00	0.35	0.35
2-Methyl butyl acetate	624-41-9	No	Yes	No	0.00	0.06	0.06
2-heptanone	110-43-0	No	Yes	No	0.00	0.04	0.04
Sensitizer	Sensitizer	No	Yes	No	0.00	0.02	0.02
Acrylic resin	9063-87-0	No	Yes	No	0.00	4.68	4.68
Ethyl silicate	78-10-4	No	No	No	0.00	0.00	0.00
Diethanolamine	111-42-2	No	Yes	Yes	0.00	1.88	1.88
Methyl 3-methoxy propionate	3852-09-3	No	Yes	No	0.00	0.27	0.27
Ethyl Lactate	97-64-3	No	Yes	No	0.00	1.51	1.51
1.4-Dioxane	123-91-1	No	Yes	Yes	0.00	0.11	0.11
Propyleneglycol monoethylether acetate (PGMEEA)	98516-30-4	No	Yes	No	0.00	0.21	0.21
ethyl 3-ethoxypropionate	763-69-9	No	Yes	No	0.00	1.08	1.08
ethylbenzene	100-41-4	No	Yes	Yes	0.00	0.03	0.03
Cresol	1319-77-3	No	Yes	Yes	0.00	0.01	0.01
n-AMYl ACETATE	628-63-7	No	Yes	No	0.00	0.06	0.06
				Total PM_{10} [lb/yr]	**45**	**0.0**	**45**
				Total PM_{10} [tpy]	**0.02**	**0.00**	**0.02**
				Total VOC [lb/yr]	**4.8**	**1,285**	**1,290**
				Total VOC [tpy]	**0.002**	**0.64**	**0.65**
				Total HAP [lb/yr]	**30.0**	**716.1**	**746.13**
				Total HAP [tpy]	**0.01**	**0.36**	**0.37**
				Max Single HAP [tpy]	**0.01**	**0.36**	**0.36**

New Method of Proposed calculations: Process-based emission factors
usage (lb/yr)*Emission Factor (from supporting documents) =Emitted to control device
Emitted to control device * control eff= emitted to air (lb/yr)

	usage(lb/yr)	100% acetone Usage	emission factor	emitted to control device	control eff	emitted to air
Acetone (85%)	17,866	15185.79533	1.00	15185.79533	99%	228
Acetone (85%)	145	123.5987781	1	123.5987781	99%	1
Acetone (100%)	31	31.2952667	0.2	6.259053339	99%	0.062590533
Total Acteone						229

Table A-4. TAP Emissions Summary

Name	CAS #	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	Scrubber Gases and Acid/Bases [lb/hr]	VOC ABUs Photoresist and Other Organics [lb/hr]	Baseline Actual Emissions + Operational Variability[1] [lb/hr]	IDAPA 585/586 EL [lb/hr]	Exceeds EL [lb/hr]
Ammonia	7664-41-7	Yes	No	1.28E+00	0.00E+00	1.67E+00	1.20E+00	Yes
Hydrogen Chloride	7647-01-0	Yes	No	1.22E-05	0.00E+00	1.59E-05	5.00E-02	No
Fluorides (as F)	7664-39-3	Yes	No	7.05E-02	0.00E+00	9.17E-02	1.67E-01	No
Ethanol	64-17-5	Yes	No	7.90E-04	0.00E+00	1.03E-03	1.25E+02	No
Hydrogen Peroxide	7722-84-1	Yes	No	6.46E-04	0.00E+00	8.39E-04	1.00E-01	No
Isopropyl Alcohol	67-63-0	Yes	No	0.00E+00	5.08E-02	6.60E-02	6.53E+01	No
Ethylene Glycol	107-21-1	Yes	No	0.00E+00	4.82E-05	6.27E-05	8.46E-01	No
Carbon black	1333-86-4	Yes	No	0.00E+00	7.36E-06	9.57E-06	2.30E-01	No
Diacetone Alcohol	123-42-2	Yes	No	0.00E+00	2.44E-02	3.18E-02	1.60E+01	No
Nitric Acid	7697-37-2	Yes	No	1.32E-04	0.00E+00	1.72E-04	3.33E-01	No
Phosphoric acid	7664-38-2	Yes	No	7.01E-04	0.00E+00	9.11E-04	6.70E-02	No
Acetone	67-64-1	Yes	No	0.00E+00	3.93E-02	5.11E-02	1.19E+02	No
PGME	107-98-2	Yes	No	0.00E+00	6.79E-05	8.83E-05	2.40E+01	No
PGMEA	108-65-6	Yes	No	0.00E+00	4.02E-02	5.23E-02	2.40E+01	No
Cyclohexanone	108-94-1	Yes	No	0.00E+00	1.59E-04	2.07E-04	6.67E+00	No
Methanol	67-56-1	Yes	No	0.00E+00	1.22E-01	1.59E-01	1.73E+01	No
2-heptanone	110-43-0	Yes	No	0.00E+00	6.43E-06	8.36E-06	1.57E+01	No
Ethyl silicate	78-10-4	Yes	No	0.00E+00	0.00E+00	0.00E+00	5.67E+00	No
Sulfuric Acid	7664-93-9	Yes	No	2.15E-04	0.00E+00	2.79E-04	6.70E-02	No
Diethanolamine	111-42-2	Yes	No	0.00E+00	3.22E-04	4.19E-04	1.00E+00	No
1.4-Dioxane	123-91-1	No	Yes	0.00E+00	1.94E-05	1.94E-05	4.80E-03	No
ethylbenzene	100-41-4	Yes	No	0.00E+00	5.00E-06	6.50E-06	2.90E+01	No
Cresol	1319-77-3	Yes	No	0.00E+00	9.43E-07	1.23E-06	1.47E+00	No
n-AMYl ACETATE	628-63-7	Yes	No	0.00E+00	9.43E-06	1.23E-05	3.53E+01	No

1. Calculated as TAPs PTE divided by 8,760 hours per year. Additional 30% safety factor added for §585 TAPs to account for daily fluctuation in material usage, because §585 TAPs utilize a 24-hr averaging period for Acceptible Ambient Concentrations (AACs).

New Method of Proposed calculations: Process-based emission factors

usage (lb/yr)*Emission Factor (from supporting documents) =Emitted to control device

Emitted to control device * control eff= emitted to air (lb/yr)

	usage(lb/yr)	100% wt ammonia	Pre-POU Emission Factor [lb/lb]	emitted to control device (lb/yr)	control eff	emitted to air (lb/yr)	emitted to air in (lb/hr)
Ammonia(0.37%wt)	80,475	297.7587564	0.50	148.87938	0%	149	0.02549
Ammonia(29 wt%)	50,706	14704.69444	0.5	7352.3472	0%	7,352	1.25896
Total Ammonia							1.28446

Table A-5. Natural Gas Boiler 1,2,4 (Each) Emissions Input Parameters

Fuel	Natural Gas	
Boiler Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate	8.37	(MMBtu/hr)
	0.0082	(MMscf/hr)
	71.88	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Total Boilers Rate	33.3	(MMBtu/hr)
Boilers actual fuel usage	4.64	(MMscf/yr)
Baseline Actual Fuel Usage [1]	1.17	(MMscf/yr)
Baseline Actual Fuel Usage	1,190	(MMBtu/yr)
Operational Variability Fuel Usage [2]	70.72	(MMscf/yr)
Operational Variability Fuel Usage	72,131	(MMBtu/yr)

[1] Based on ratio of facility wide BTU and total NG usage over consecutive 24-month period 1/1/2020-12/31/2021; Boiler 3 fuel usage (scf) estimated based on MMBtu/hr rating and separated out from other boilers since it does not have low-NOx burners

[2] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage

Table A-6. Natural Gas Boiler 1,2,4 (Each) Total Criteria and GHG Baseline Actual and Operational Flexibility Emissions

Pollutant	Emission Factor[1] (lb/MMBtu)/ (lb/MMscf)
PM_{10} [4]	0.0076
$PM_{2.5}$ [5]	0.0057
CO [3]	0.0739
NO_X [3]	0.0109
SO_2 [3]	0.0017
VOC [3]	0.0055
Lead [2]	4.90E-07
CH_4 [7]	2.3
N_2O [7]	2.20
CO_2 [7]	120,000
CO_2e [6]	NA

[1] Based on ratio of facility wide BTU and total NG usage over consecutive 24-month period 1/1/2020-12/31/2021; Three identical boilers, therefore emissions calculations are presented for only one boiler.

[2] Lead emission factor, small uncontrolled boilers (EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-1 and 1.4-2), converted to lb/MMBtu dated 07/98.

[3] Manufacturer emission factors Cleaver Brooks 11/12/15; NOx based on 9 ppm Low NOx burners.

[4] PM_{10} based on Cleaver Brooks manufacturer data sheet dated 11/12/15

[5] $PM_{2.5}$ based on Cleaver Brooks manufacturer data sheet dated 11/25/15.

[6] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

[7] CH_4, N_2O, and CO_2 emissions factors lb/MMscf EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-2

Table A-7. Boiler 1,2,4 (Each) Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)
Benzene	71-43-2	Yes	No	Yes	2.10E-03
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02
Toluene	108-88-3	Yes	Yes	No	3.40E-03
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03
Hexane	110-54-3	Yes	Yes	No	1.80E+00
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05
Pentane	109-66-0	No	Yes	No	2.60E+00
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04
Barium	7440-39-3	No	Yes	No	4.40E-03
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05
Copper	7440-50-8	No	Yes	No	8.50E-04
Lead	-	Yes	No	No	5.00E-04
Manganese	7439-96-5	Yes	Yes	No	3.80E-04
Mercury	7439-97-6	Yes	No	No	2.60E-04
Molybdenum	7439-98-7	No	Yes	No	1.10E-03
Nickel	7440-02-0	Yes	No	Yes	2.10E-03
Selenium	7782-49-2	Yes	Yes	No	2.40E-05
Vanadium	7440-62-2	No	Yes	No	2.30E-03
7-PAH	-	Yes	No	Yes	N/A
POM	-	Yes	No	Yes	N/A
Total HAPs					

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-8. Natural Gas Boiler 3 Emissions Input Parameters

Fuel	Natural Gas	
Boiler Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate	8.165	(MMBtu/hr)
	0.0080	(MMscf/hr)
	70.12	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Total Boilers Rate	33.3	(MMBtu/hr)
Boiler actual fuel usage	1.51	(MMscf/yr)
Baseline Actual Fuel Usage [1]	1.51	(MMscf/yr)
Operational Variability Fuel Usage [2]	68.61	(MMscf/yr)

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021; Boiler 3 fuel usage (scf) estimated based on MMBtu/hr rating and separated out from other boilers since it does not have low-NOx burners

[2] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage

Table A-9. Natural Gas Boiler 3 Total Criteria and GHG Baseline Actual and Operational Flexibility Emissions

Pollutant	Emission Factor[1] (lb/MMScf)
PM_{10}	7.6
$PM_{2.5}$	7.6
CO	84
NO_X	100
SO_2	0.6
VOC	5.5
Lead	0.0005
CH_4	2.3
N_2O	2.20
CO_2	120,000
CO_2e^2	NA

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-10. Boiler 3 Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)
Benzene	71-43-2	Yes	No	Yes	2.10E-03
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02
Toluene	108-88-3	Yes	Yes	No	3.40E-03
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03
Hexane	110-54-3	Yes	Yes	No	1.80E+00
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05
Pentane	109-66-0	No	Yes	No	2.60E+00
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04
Barium	7440-39-3	No	Yes	No	4.40E-03
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05
Copper	7440-50-8	No	Yes	No	8.50E-04
Lead	-	Yes	No	No	5.00E-04
Manganese	7439-96-5	Yes	Yes	No	3.80E-04
Mercury	7439-97-6	Yes	No	No	2.60E-04
Molybdenum	7439-98-7	No	Yes	No	1.10E-03
Nickel	7440-02-0	Yes	No	Yes	2.10E-03
Selenium	7782-49-2	Yes	Yes	No	2.40E-05
Vanadium	7440-62-2	No	Yes	No	2.30E-03
7-PAH	-	Yes	No	Yes	N/A
POM	-	Yes	No	Yes	N/A
Total HAPs					

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-11. Natural Gas Fired MAU5B Emissions Input Parameters

Fuel	Natural Gas	
Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate	4.8	(MMBtu/hr)
	0.0047	(MMscf/hr)
	41.2	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Non-boiler Rate	38.7	(MMBtu/hr)
Non-boiler actual fuel usage	18.1	(MMscf/yr)
Actual Fuel Usage [1]	2.2	(MMscf/yr)
Operational Variability Fuel Usage [2]	38.98	(MMscf/yr)

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021

[2] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage

Table A-12. MAU5B Total Criteria and GHG Baseline Actual and Operational Flexibility Emissions

Pollutant	Emission Factor[1] (lb/MMScf)
PM_{10}	7.6
$PM_{2.5}$	7.6
CO	84
NO_X	100
SO_2	0.6
VOC	5.5
Lead	0.0005
CH_4	2.3
N_2O	2.20
CO_2	120,000
CO_2e^2	NA

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-13. MAU5B Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)
Benzene	71-43-2	Yes	No	Yes	2.10E-03
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02
Toluene	108-88-3	Yes	Yes	No	3.40E-03
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03
Hexane	110-54-3	Yes	Yes	No	1.80E+00
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05
Pentane	109-66-0	No	Yes	No	2.60E+00
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04
Barium	7440-39-3	No	Yes	No	4.40E-03
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05
Copper	7440-50-8	No	Yes	No	8.50E-04
Lead	-	Yes	No	No	5.00E-04
Manganese	7439-96-5	Yes	Yes	No	3.80E-04
Mercury	7439-97-6	Yes	No	No	2.60E-04
Molybdenum	7439-98-7	No	Yes	No	1.10E-03
Nickel	7440-02-0	Yes	No	Yes	2.10E-03
Selenium	7782-49-2	Yes	Yes	No	2.40E-05
Vanadium	7440-62-2	No	Yes	No	2.30E-03
7-PAH	-	Yes	No	Yes	N/A
POM	-	Yes	No	Yes	N/A
Total HAPs					

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-14. Natural Gas Water Heater Emissions Input Parameters

Fuel	Natural Gas	
Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate	0.0751	(MMBtu/hr)
	0.0001	(MMscf/hr)
	0.64	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Non-boiler Rate	38.7	(MMBtu/hr)
Non-boiler actual fuel usage	18.1	(MMscf/yr)
Actual Fuel Usage [1]	0.04	(MMscf/yr)
Operational Variability Fuel Usage [2]	0.61	(MMscf/yr)

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021

[2] Operational variability rate calculated as the difference between maximum potential fuel usage and baseline actual fuel usage

Table A-15. Natural Gas Water Heater Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (lb/MMScf)
PM_{10}	7.6
$PM_{2.5}$	7.6
CO	84
NO_X	100
SO_2	0.6
VOC	5.5
Lead	0.0005
CH_4	2.3
N_2O	2.20
CO_2	120,000
CO_2e^2	NA

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-16. Water Heater Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)
Benzene	71-43-2	Yes	No	Yes	2.10E-03
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02
Toluene	108-88-3	Yes	Yes	No	3.40E-03
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03
Hexane	110-54-3	Yes	Yes	No	1.80E+00
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05
Pentane	109-66-0	No	Yes	No	2.60E+00
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04
Barium	7440-39-3	No	Yes	No	4.40E-03
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05
Copper	7440-50-8	No	Yes	No	8.50E-04
Lead	-	Yes	No	No	5.00E-04
Manganese	7439-96-5	Yes	Yes	No	3.80E-04
Mercury	7439-97-6	Yes	No	No	2.60E-04
Molybdenum	7439-98-7	No	Yes	No	1.10E-03
Nickel	7440-02-0	Yes	No	Yes	2.10E-03
Selenium	7782-49-2	Yes	Yes	No	2.40E-05
Vanadium	7440-62-2	No	Yes	No	2.30E-03
7-PAH	-	Yes	No	Yes	N/A
POM	-	Yes	No	Yes	N/A
Total HAPs					

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-17. Natural Gas VOC Abatement Units Emissions Input Parameters

Fuel	Natural Gas	
Fuel Heat Value	1020	(Btu/scf)
Maximum Operation	8760	(hr/yr)
Maximum Rate [2]	2.00	(MMBtu/hr)
	0.0020	(MMscf/hr)
	17.18	(MMscf/yr)
Facility-wide actual fuel usage	24.2	(MMscf/yr)
Non-boiler Rate	38.7	(MMBtu/hr)
Non-boiler actual fuel usage	18.1	(MMscf/yr)
Actual Fuel Usage [1]	0.93	(MMscf/yr)
Operational Variability Fuel Usage [3]	33.42	(MMscf/yr)

[1] Based on ratio of facility wide BTU and total NG usage over a consecutive 24-month period 1/1/2020-12/31/2021

[2] Two identical unit, 2 MMBtu/hr each

[3] Operational variability rate calculated as the difference between maximum potential fuel usage (assuming 2 units operating) and baseline actual fuel usage (1 unit operating)

Table A-18. Natural Gas VOC Abatement Units Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (lb/MMScf)
PM_{10}	7.6
$PM_{2.5}$	7.6
CO	84
NO_X	100
SO_2	0.6
VOC	5.5
Lead	0.0005
CH_4	2.3
N_2O	2.20
CO_2	120,000
CO_2e^2	NA

[1] Emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 and 1.4-2. Assumes PM10 and PM2.5 equal to total PM and no use of low-NOx burners.

[2] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-19. VOC Abatement Units Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Natural Gas Combustion Emission Factor[1] (lb/MMscf)
Benzene	71-43-2	Yes	No	Yes	2.10E-03
Formaldehyde	50-00-0	Yes	No	Yes	7.50E-02
Toluene	108-88-3	Yes	Yes	No	3.40E-03
2-Methylnaphthalene [3]	91-57-6	Yes	No	Yes	2.40E-05
3-Methylchloranthrene [3]	56-49-5	Yes	No	Yes	1.80E-06
7,12-Dimethylbenz(a)anthracene [3]	-	Yes	No	Yes	1.60E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	1.80E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.20E-06
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	1.80E-06
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.80E-06
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	1.20E-06
Dichlorobenzene	25321-22-6	Yes	Yes	No	1.20E-03
Hexane	110-54-3	Yes	Yes	No	1.80E+00
Naphthalene	91-20-3	Yes	Yes	No	6.10E-04
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.80E-06
Anthracene [3]	120-12-7	Yes	No	Yes	2.40E-06
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.80E-06
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	1.20E-06
Chrysene [2, 3]	218-01-9	Yes	No	Yes	1.80E-06
Fluoranthene [3]	206-44-0	Yes	No	Yes	3.00E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.80E-06
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	1.80E-06
Phenanthrene [3]	85-01-8	Yes	No	Yes	1.70E-05
Pentane	109-66-0	No	Yes	No	2.60E+00
Pyrene [3]	129-00-0	Yes	No	Yes	5.00E-06
Arsenic	7440-38-2	Yes	No	Yes	2.00E-04
Barium	7440-39-3	No	Yes	No	4.40E-03
Beryllium	7440-41-7	Yes	No	Yes	1.20E-05
Cadmium	7440-43-9	Yes	No	Yes	1.10E-03
Chromium	7440-47-3	Yes	Yes	Yes	1.40E-03
Cobalt	7440-48-4	Yes	Yes	No	8.40E-05
Copper	7440-50-8	No	Yes	No	8.50E-04
Lead	-	Yes	No	No	5.00E-04
Manganese	7439-96-5	Yes	Yes	No	3.80E-04
Mercury	7439-97-6	Yes	No	No	2.60E-04
Molybdenum	7439-98-7	No	Yes	No	1.10E-03
Nickel	7440-02-0	Yes	No	Yes	2.10E-03
Selenium	7782-49-2	Yes	Yes	No	2.40E-05
Vanadium	7440-62-2	No	Yes	No	2.30E-03
7-PAH	-	Yes	No	Yes	N/A
POM	-	Yes	No	Yes	N/A
Total HAPs					

[1] AP-42 Section 1.4 Natural Gas Combustion, Tables 1.4-3 and 1.4-4 (7/98).

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of eighteen pollutants

Table A-23. Diesel Generator 02 Emissions Input Parameters

Fuel	Diesel	
Fuel Heat Value	0.138	(MMBtu/gal)
Size (QST30-G4)	1490	(BHP)
Fuel usage [1]	60.20	(gal/hr)
Maximum Operation [2]	100	(hr/yr)
Annual Operation	10	(hr/yr)
Operational Variability [3]	90	(hr/yr)

[1] Cummins Power manufacturer specification sheet

[2] Currently permitted to operate no more than 100 hr/yr for maintenance and testing

[3] Operational variability rate calculated as the difference between maximum hours of operation and baseline actual hours of operation

Table A-24. Diesel Generator 02 Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (g/BHP-hr)
PM_{10} [1, 2]	0.10
$PM_{2.5}$ [1, 2]	0.10
CO [1]	1.50
NO_X [1]	6.70
SO_2 [1]	0.13
VOC [1, 3]	0.30
CH_4 [4]	3.00E-03
N_2O [4]	6.00E-04
CO_2 [4]	73.96
CO_2e[5]	

[1] PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, and HC emission factors are provided by engine manufacturer

[2] PM emission factor is assumed to equal PM_{10} and $PM_{2.5}$

[3] HC emission factor is used to estimate VOCs.

[4] CH_4, N_2O, and CO_2 emissions factors kg/MMBtu; per 40 CFR Part 98, Subpart C, Table C-1 and C-2

[5] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-25. Diesel Generator 02 Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Diesel Combustion Emission Factor[1] (lb/MMBtu)
Benzene	71-43-2	Yes	No	Yes	9.33E-04
Formaldehyde	50-00-0	Yes	No	Yes	1.18E-03
Toluene	108-88-3	Yes	Yes	No	4.09E-04
Xylene	1330-20-7	Yes	Yes	No	2.85E-04
1,3-Butadiene	106-99-0	Yes	No	Yes	3.91E-05
Acetaldehyde	75-07-0	Yes	No	Yes	7.67E-04
Acrolein	107-02-8	Yes	Yes	No	9.25E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	5.06E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.88E-07
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	9.91E-08
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.55E-07
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	5.83E-07
Naphthalene	91-20-3	Yes	Yes	No	8.48E-05
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.42E-06
Anthracene [3]	120-12-7	Yes	No	Yes	1.87E-06
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	#REF!	1.68E-06
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	4.89E-07
Chrysene [2, 3]	218-01-9	Yes	No	Yes	3.53E-07
Fluoranthene [3]	206-44-0	Yes	No	Yes	7.61E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.92E-05
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	3.75E-07
Phenanthrene [3]	85-01-8	Yes	No	Yes	2.94E-05
Pyrene [3]	129-00-0	Yes	No	Yes	4.78E-06
Total PAH	-	Yes	No	Yes	1.68E-04
POM	-	Yes	No	Yes	N/A
Total HAPs					

[1] AP-42 Section 3.3 Diesel Combustion (10/96) Table 3.3-2

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of fifteen pollutants

Table A-26. Diesel Generator 03 Emissions Input Parameters

Fuel	Diesel	
Fuel Heat Value	0.138	(MMBtu/gal)
Size (KTA50-G9)	2220	(BHP)
Fuel usage [1]	103.60	(gal/hr)
Maximum Operation [2]	100	(hr/yr)
Annual Operation	10	(hr/yr)
Operational Variability [3]	90	(hr/yr)

[1] Cummins Power manufacturer specification sheet

[2] Currently permitted to operate no more than 100 hr/yr for maintenance and testing

[3] Operational variability rate calculated as the difference between maximum hours of operation and baseline actual hours of operation

Table A-27. Diesel Generator 03 Total Criteria and GHG Potential Emissions

Pollutant	Emission Factor[1] (g/BHP-hr)
PM_{10} [1, 2]	0.11
$PM_{2.5}$ [1, 2]	0.11
CO [1]	1.30
NO_X [1]	8.50
SO_2 [4]	5.50E-03
VOC [1, 3]	0.17
CH_4 [4]	3.00E-03
N_2O [4]	6.00E-04
CO_2 [5]	73.96
CO_2e [6]	

[1] PM_{10}, $PM_{2.5}$, NO_x, CO, and HC emission factors are provided by engine manufacturer

[2] PM emission factor is assumed to equal PM_{10} and $PM_{2.5}$

[3] HC emission factor is used to estimate VOCs.

[4] SO_2 emission factor lb/hp-hr; multiplied by percent sulfur content of fuel (EPA AP-42 Table 3.4-1) EF = 8.09E-03 x 0.0015 = 1.21E-05, then converted to g/hp-hr.

[5] CH_4, N_2O, and CO_2 emissions factors kg/MMBtu; per 40 CFR Part 98, Subpart C, Table C-1 and C-2

[6] CO_2e assumes a Global Warming Potential per Table A-1 to Subpart A of 40 CFR Part 98: CO_2 = 1, CH_4 = 25, N_2O = 298

Table A-28. Diesel Generator 03 Total HAP/TAP Potential Emissions

Pollutant	CAS #	HAP?	Non-Carcinogenic TAP?	Carcinogenic TAP?	Diesel Combustion Emission Factor[1] (lb/MMBtu)
Benzene	71-43-2	Yes	No	Yes	9.33E-04
Formaldehyde	50-00-0	Yes	No	Yes	1.18E-03
Toluene	108-88-3	Yes	Yes	No	4.09E-04
Xylene	1330-20-7	Yes	Yes	No	2.85E-04
1,3-Butadiene	106-99-0	Yes	No	Yes	3.91E-05
Acetaldehyde	75-07-0	Yes	No	Yes	7.67E-04
Acrolein	107-02-8	Yes	Yes	No	9.25E-05
Acenaphthylene [3]	208-96-8	Yes	No	Yes	5.06E-06
Benzo(a)pyrene [2, 3]	50-32-8	Yes	No	Yes	1.88E-07
Benzo(b)fluoranthene [2, 3]	205-99-2	Yes	No	Yes	9.91E-08
Benzo(k)fluoranthene [2, 3]	207-08-9	Yes	No	Yes	1.55E-07
Dibenzo(a,h)anthracene [2, 3]	53-70-3	Yes	No	Yes	5.83E-07
Naphthalene	91-20-3	Yes	Yes	No	8.48E-05
Acenaphthene [3]	83-32-9	Yes	No	Yes	1.42E-06
Anthracene [3]	120-12-7	Yes	No	Yes	1.87E-06
Benzo(a)anthracene [2, 3]	56-55-3	Yes	No	Yes	1.68E-06
Benzo(g,h,i)perylene [3]	191-24-2	Yes	No	Yes	4.89E-07
Chrysene [2, 3]	218-01-9	Yes	No	Yes	3.53E-07
Fluoranthene [3]	206-44-0	Yes	No	Yes	7.61E-06
Fluorene [3]	86-73-7	Yes	No	Yes	2.92E-05
Indeno(1,2,3-cd)pyrene [2, 3]	193-39-5	Yes	No	Yes	3.75E-07
Phenanthrene [3]	85-01-8	Yes	No	Yes	2.94E-05
Pyrene [3]	129-00-0	Yes	No	Yes	4.78E-06
Total PAH	-	Yes	No	Yes	1.68E-04
POM	-	Yes	No	Yes	N/A
Total HAPs					

[1] AP-42 Section 3.3 Diesel Combustion (10/96) Table 3.3-2

[2] PAH is considered as one TAP comprised of seven pollutants

[3] Polycyclic Organic Matter (POM) is considered as one TAP comprised of fifteen pollutants

Table A-29. Emissions from Gases

Oracle Item Number[1]	Product Name	Process Type	Unique REF CAS	Usage Amount	Usage Amount Units	Amount Used [lbs/year] [2]	Constituent and Byproduct Names	CAS #	Max Wt. % [4]	VOC?	HAP?	TAP? Non-Carcinogen (S85)	TAP? Carcinogen (S86)	Emission Factor [lb/lb] [5]	Tool Exhaust Before Control [6] (lbs/year)	Centralized Control Type [7]	Centralized Control Eff. [8]	Air Emissions [9] (lbs/year)	Air Emissions [10] (lbs/hr)	NOTES
9-130-00660	Carbon Dioxide		9-130-00660124-38-9	95	kg	210	Carbon Dioxide	124-38-9	100%	No	No	No	No	1.0	210.00			210.00	3.60E-02	
B99703A009	Octafluoropropane (C3F8)	CVD In-situ	9-130-0001576-19-7	71	kg	157	Octafluorocyclopropane	76-19-7	100%	No	No	No	No	0.4	62.61	Scrubber		62.61	1.07E-02	TEOS CVD etch chamber in-situ chamber clean gas
B99703A009	Octafluoropropane (C3F8)	CVD In-situ	N/A	71	kg	157	Tetrafluoromethane [3]	75-73-0	N/A	No	No	No	No	0.20	31.31	Scrubber		31.31	5.36E-03	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	9-130-0077375-73-0	139	kg	179	Tetrafluoromethane	75-73-0	100%	No	No	No	No	0.81	144.68	Scrubber		144.68	2.48E-02	Etch/Wafer Clean
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Hexafluoroethane [3]	76-16-4	N/A	No	No	No	No	0.079	14.11	Scrubber		14.11	2.42E-03	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Trifluoromethane [3]	75-46-7	N/A	No	No	No	No	0.1	17.86	Scrubber		17.86	3.06E-03	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Octafluorocyclopentene [3]	1400-2-01	N/A	Yes	No	No	No	0.0012	0.21	Scrubber		0.21	3.67E-05	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Hydrogen Fluoride [3]	7664-39-3	N/A	No	Yes	No	No	0.046	8.22	Scrubber	60%	3.29	5.63E-04	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Carbon Monoxide [3]	630-08-0	N/A	No	No	No	No	0.159	28.40	Scrubber		28.40	4.86E-03	
9-130-00773	Tetrafluoromethane (HC14) (CF4)	Etch/Wafer Clean	N/A	139	kg	179	Carbon Dioxide [3]	124-38-9	N/A	No	No	No	No	0.25	44.66	Scrubber		44.66	7.65E-03	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	9-130-00649115-25-3	47	kg	105	Octafluorocyclobutane	115-25-3	100%	No	No	No	No	0.18	18.84	Scrubber		18.84	3.23E-03	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Carbon tetrafluoride [3]	75-73-0	N/A	No	No	No	No	0.11	11.51	Scrubber		11.51	1.97E-03	Etch/Wafer Clean
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Hexafluoroethane [3]	76-16-4	N/A	No	No	No	No	0.037	3.87	Scrubber		3.87	6.63E-04	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Trifluoromethane [3]	75-46-7	N/A	No	No	No	No	0.04	4.19	Scrubber		4.19	7.17E-04	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Hydrogen Fluoride [3]	7664-39-3	N/A	No	Yes	No	No	0.516	54.00	Scrubber	60%	21.60	3.70E-03	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Carbon Monoxide [3]	630-08-0	N/A	No	No	No	No	0.28	29.30	Scrubber		29.30	5.02E-03	
9-130-00649	Halocarbon C318 (C4F8)	Etch/Wafer Clean	N/A	47	kg	105	Carbon Dioxide [3]	124-38-9	N/A	No	No	No	No	0.44	46.04	Scrubber		46.04	7.88E-03	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	9-130-000582551-62-4	35	kg	77	Sulfur Hexafluoride [3]	2551-62-4	100%	No	No	No	No	0.55	42.52	Scrubber		42.52	7.28E-03	Etch/Wafer Clean
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Carbon tetrafluoride [3]	75-73-0	N/A	No	No	No	No	0.13	10.05	Scrubber		10.05	1.72E-03	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Hexafluoroethane [3]	76-16-4	N/A	No	No	No	No	0.11	8.50	Scrubber		8.50	1.46E-03	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Trifluoromethane [3]	75-46-7	N/A	No	No	No	No	0.0037	0.29	Scrubber		0.29	4.90E-05	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Hydrogen Fluoride [3]	7664-39-3	N/A	No	Yes	No	No	0.155	11.98	Scrubber	60%	4.79	8.21E-04	
9-130-00058	Sulfur Hexafluoride	Etch/Wafer Clean	N/A	35	kg	77	Sulfur Dioxide [3]	7446-09-5	N/A	No	No	No	No	0.439	33.94	Scrubber		33.94	5.81E-03	
9-140-00802	TEOS		9-140-0080278-10-4	9	kg	21	Tetraethyl orthosilicate	78-10-4	100%	No	No	Yes	No	0.0000	0.00	Scrubber		0.00	0.00E+00	
9-140-00802	TEOS		N/A	9	kg	21	Silicon Dioxide [3]	7631-86-9	N/A	No	No	No	No	0.2880	6.01	Scrubber		6.01	1.03E-03	
9-140-00802	TEOS		N/A	9	kg	21	Ethanol [3]	64-17-5	N/A	Yes	No	Yes	No	0.2210	4.61	Scrubber		4.61	7.90E-04	
9-140-00802	TEOS		N/A	9	kg	21	Carbon Monoxide [3]	630-08-0	N/A	No	No	No	No	0.2690	5.62	Scrubber		5.62	9.62E-04	
9-140-00802	TEOS		N/A	9	kg	21	Carbon Dioxide [3]	124-38-9	N/A	No	No	No	No	0.8450	17.64	Scrubber		17.64	3.02E-03	

[1] Oracle numbers are used to identify raw materials.
[2] Usage data is based on an analysis of onsemi's proportions of use of materials in 2020 and 2021.
[3] Indicates a byproduct formed from raw material during or after use in process; if used for both 200 mm and 300 mm utilized most conservative emissions factors from 40 CFR Part 98 Subpart I
[4] Chemical percentage is the weight percent of a given pollutant or precursor within a material identified by its part number.
[5] Emission factor is based on the total ability of the tool to emit the pollutant.
[6] Tool exhaust before control is the quantity of emissions (lb) sent to air emission control system
[7] Centralized control type, if applicable, is listed. "Scrubber" refers to acid removal wet scrubbers.
[8] The control efficiency of the centralized control scrubber for the given compound is listed.
[9] Air emissions are equal to the tool exhaust multiplied by 100% - centralized control % efficiency.
[10] PTE Total based on actual emissions plus a 1.5 multiplier (50% growth in manufacturing emissions over the next 5 years)

Fluorides (as F)	Constituent Name	Compound MW	Fluorine Atoms	F fraction	Compound lb/hr	As F (lb/hr)
C_3F_8	Octofluorocyclopropane	188.0	8	0.81	1.07E-02	8.67E-03
CF_4	Tetrafluoromethane	88.0	4	0.86	3.38E-02	2.92E-02
C_2F_6	Hexafluoroethane	138.0	6	0.83	4.54E-03	3.75E-03
CHF_3	Trifluoromethane	70.0	3	0.81	3.82E-03	3.11E-03
C_5F_8	Octafluorocyclopentene	212.0	8	0.72	3.67E-05	2.63E-05
HF	Hydrogen Fluoride	20.0	1	0.95	5.12E-03	4.87E-03
C_4F_8	Octofluorocyclobutane	200.0	8	0.76	3.23E-03	2.45E-03
SF_6	Sulfur Hexafluoride	146.1	6	0.78	7.28E-03	5.68E-03
$C_4H_5F_9O$	Ethyl Nonafluoroisobutyl Ether	264.09	9	0.65	1.97E-02	1.27E-02
	Fluorides (as F)	7.05E-02 (lb/hr)				

Table A-30. Emissions from Photoresists and Other Organics

Oracle Item Number[1]	Chemical Name	Unique REF CAS	Usage Amount	Usage Amount Units	Amount Used [lbs/year] [2]	Constituent and Byproduct Names [4,5]	CAS #	Max Wt. % [6]	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	Emission Factor [7]	Emissions Before Control [lbs/year] [8]	Centralized Control Type [9]	Centralized Control Eff. [10]	Air Emissions [lbs/year] [11]	Air Emissions (lbs/hr) [12]
9-140-00012	ACETONE 85 % / IPA 15 %	9-140-0001267-64-1	2,703	Gallon	17,866	Acetone	67-64-1	85	No	No	Yes	No	1.00	15,185.8	RCTO VOC	99%	228	3.90E-02
9-140-00011	ACETONE 85%/15% IPA,1 Gallon	9-140-0001167-64-1	22	Gallon	145	Acetone	67-64-1	85	No	No	Yes	No	1.00	123.6	RCTO VOC	99%	1.9	3.17E-04
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	N24500H00167-64-1	15	Quart	31	Acetone	67-64-1	1	No	No	Yes	No	0.200	0.1	RCTO VOC	99%	0.0	1.61E-07

Table A-31. Emissions from Acids and Bases

Oracle Item Number[1]	Product Name	Unique REF CAS	Usage Amount	Usage Amount Units	Amount Used [lbs/year] [2]	Constituent and Byproduct Names	CAS #	Max Wt. % [4]	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	Pre-POU Emission Factor [lb/lb] [5]	POU Removal	Tool Exhaust Before Control (lbs/year) [6]	Centralized Control Type [7]	Centralized Control Eff. [8]	Air Emissions (lbs/year) [9]	Air Emissions (lbs/hr) [10]
9-140-01151	AMMONIUM HYDROXIDE,(NH4OH	9-140-01151664-41-7	6,751	Gallon	50,706	Ammonia	7664-41-7	29	No	No	Yes	No	0.500	0%	7352	Scrubber	0%	7,352	1.26E+00
9-140-13217	WPPS WET PAD PROTECTION SOL, KG 211 DRUM		34,182,000	Gram	80,475	Ammonia [3]	7664-41-7	0.37	No	No	Yes	No	0.500	0%	150.15	Scrubber	0%	150.15	2.57E-02

Table A-32. Emissions from Cooling Towers

Wet Cooling Towers	Towers 1-3	Towers 4-5
Water Flow Rate (gal/min)	1,150	1,694
Flow of cooling water (lbs/hr)	575,460	847,678
TDS of blowdown (mg/l or ppmw) - Maximum ppm at blowdown [1]	750	750
Flow of dissolved solids (lbs/hr)	432	636
Fraction of flow producing PM_{10} drift [2]	0.86	0.86
Fraction of flow producing $PM_{2.5}$ drift [2]	0.0039	0.0039
Control efficiency of drift eliminators (gal drift/gal flow) [3]	0.0002	0.0002
PM emissions from tower (lb/hr)	0.08632	0.127
PM_{10} emissions from tower (lb/hr)	0.07420	0.109
$PM_{2.5}$ emissions from tower (lb/hr)	0.00034	0.0005
Baseline Actual Operating time (hr/yr)	500	6,500
PM emissions from tower (tpy)	0.022	0.413
PM_{10} emissions from tower (tpy)	0.019	0.355
$PM_{2.5}$ emissions from tower (tpy)	0.000	0.002
Operational Variability Operating time (hr/yr)	8,260	2,260
PM emissions from tower (tpy)	0.356	0.144
PM_{10} emissions from tower (tpy)	0.306	0.124
$PM_{2.5}$ emissions from tower (tpy)	0.001	0.001
Other Parameters	**Towers 1-3**	**Towers 4-5**
Number of cells per tower (outlet fans)	6	2
Height at cell release (ft):	16.0	22.0
Height at cell release (m):	4.88	6.71
Discharge flow per cooling tower (ACFM):	239,500	418,800
Discharge flow per cell (ACFM):	39,917	209,400
Diameter of each cell (ft):	5.5	11.1
Diameter of each cell (m):	1.68	3.38
Area of cell discharge (ft^2):	24	96
Average Temperature of cell discharge (degF):	75	72
Average Temperature of cell discharge (K):	297.05	295.38
Exit Velocity (ft/s):	28.0	36.2
Exit Velocity (m/s):	8.53	11.03

Notes:

[1] Cooling Tower TDS design data based on historic data from the Micron Tier II Operating Permit Application dated December 2010.

[2] From "Calculating Realistic PM Emissions From Cooling Towers" (J. Reisman, G. Frisbie).

[3] Based on AP-42, Table 13.4-1 by converting drift emission factor into percentage.

Table A-33. Manufacturing Gases Composition

Oracle Item Number	Product Name	Chemical Description	Density [kg/L]	Density[1] [lb/ft^3]	Constituent Name	CAS #	REF CAS	Min Wt.%	Max Wt. %	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)	NOTES
9-130-00050	ARGON-GR 6.0 (AR), 265FT3	Argon	0.0018	0.36	Argon	7440-37-1	9-130-000507440-37-1		100%	No	No	No	No	
9-130-00660	CARBON DIOXIDE (CO2) 60LB	Carbon Dioxide	0.0020	0.11	Carbon Dioxide	124-38-9	9-130-00660124-38-9		100%	No	No	No	No	
9-130-00048	HELIUM-GR 6.0 (He), 231FT3	Helium	0.0002	0.01	Helium	7440-59-7	9-130-000487440-59-7		100%	No	No	No	No	
9-130-00067	HYDROGEN/NITROGEN (3.8%H2/N2), 240 SCF	3.8%HYDROGEN/NITROGEN	0.0013	0.07	Hydrogen	1333-74-0	9-130-000671333-74-0		4%	No	No	No	No	
9-130-00534	HYDROGEN-GR 5.9 (H2), 261FT3	Hydrogen	0.0001	0.01	Hydrogen	1333-74-0	9-130-005341333-74-0		100%	No	No	No	No	
9-130-00046	NITROGEN-GR 6.0 (N2), 239scf	Nitrogen	0.0013	0.08	Nitrogen	7727-37-9	9-130-000467727-37-9		100%	No	No	No	No	
9-130-00649	OCTOFLUOROCYCLOBUTANE (C4F8) (RC318)	Octofluorocyclobutane	0.01	0.54	Octofluorocyclobutane	115-25-3	9-130-00649115-25-3		100%	No	No	No	No	
9-130-00015	OCTOFLUOROCYCLOPROPANE (C3F8) 105 LB CYL	Octofluorocyclopropane	0.01	0.50	Octofluorocyclopropane	76-19-7	9-130-0001576-19-7		100%	No	No	No	No	
9-130-00803	OXYGEN GR 5.0 (O2), 6PACK 2022FT3	Oxygen	0.00	0.09	Oxygen	7782-44-7	9-130-008037782-44-7		100%	No	No	No	No	
9-130-00058	SULFUR HEXAFLUORIDE (SF6), 50 LBS	Sulfur Hexafluoride	0.01	0.39	Sulfur Hexafluoride	2551-62-4	9-130-000582551-62-4		100%	No	No	No	No	
9-140-00802	TEOS, 5 GALLON CANISTER	Tetraethyl orthosilicate	0.01	0.54	Tetraethyl orthosilicate	78-10-4	9-140-0080278-10-4		100%	No	No	Yes	No	
9-130-00773	TETRAFLUOROMETHANE (CF4), 35LBS	Tetrafluoromethane	--	0.23	Tetrafluoromethane	75-73-0	9-130-0077375-73-0		100%	No	No	No	No	
9-130-00774	TRIFLUOROMETHANE (CHF3) 30 LBS	Trifluoromethane	--	0.18	Trifluoromethane	75-46-7	9-130-0077475-46-7		100%	No	No	No	No	
Insert New Chemicals Above This Line														

Density figures are taken from either PubChem, the SDS on file at onsemi, or Wikipedia.
Temperature is assumed to be 25 C if not indicated from source.
kg/L to lb/ft^3 conversion is: 62.428
Did not calculate mixtures components <1% (F/Kr/Ne)

Table A-34. Manufacturing Chemicals Composition

Oracle Item Number	Product Name	Area Used Per onsemi	Area Used Calculations	Waste Stream	UOM	UOM Amt	UOM Dscr	Denstiy [g/mL]	Density1 [lb/Gallon]	Constituent Name	CAS #	REF CAS	Min Wt.%	Max Wt. %	VOC?	HAP?	TAP? Non-Carcinogen (58S)	TAP? Carcinogen (586)
9-140-00012	ACETONE 85 % / IPA 15 %	Bowl cleans (non-process)	Photoresist and Organics	Solvent waste	DR	53	Gallon	0.792	6.61	Acetone	67-64-1	9-140-0001267-64-1		85	No	No	Yes	No
9-140-00012	ACETONE 85 % / IPA 15 %	Bowl cleans (non-process)	Photoresist and Organics	Solvent waste	DR	53	Gallon	0.792	6.61	Isopropyl Alcohol	67-63-0	9-140-0001267-63-0		15	Yes	No	Yes	No
9-140-00011	ACETONE 85%/15% IPA,1 Gallon	Photo CFA Coat tool, Line cleans (non-process)	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.792	6.61	Acetone	67-64-1	9-140-0001167-64-1		85	No	No	Yes	No
9-140-00011	ACETONE 85%/15% IPA,1 Gallon	Photo CFA Coat tool, Line cleans (non-process)	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.792	6.61	Isopropyl Alcohol	67-63-0	9-140-0001167-63-0		15	Yes	No	Yes	No
9-140-00025	ACID, HYDROCHLORIC (HCl) PPB 1Gallon BOT	Followed-up with Juan for usage	Acid and Bases		BTL	1	Gallon	1.19	9.93	Hydrochloric Acid	7647-01-0	9-140-000257647-01-0		36	No	Yes	Yes	No
9-140-00850	ACID, PHOSPHORIC 86% (H3PO4) 197L DRUM	Tool WSTG1D0100	Acid and Bases		DR	197	Liter	1.66	13.85	Phosphoric acid	7664-38-2	9-140-008507664-38-2	80	86	No	No	Yes	No
9-140-00349	ALCOHOL, ISOPROPYL (IPA) 99.9% 1 Gallon	CFA, Probe, aLL around fab	Photoresist and Organics		BTL	1	Gallon	0.785	6.55	Isopropyl Alcohol	67-63-0	9-140-0034967-63-0		99.9	Yes	No	Yes	No
9-140-00351	ALCOHOL, ISOPRPYL (IPA) 99.95% 55 Gallon	Tool WSTG1D0100 and WDNS1D0100	Photoresist and Organics		DR	55	Gallon	0.785	6.55	Isopropyl Alcohol	67-63-0	9-140-0035167-63-0		99.95	Yes	No	Yes	No
9-140-01151	AMMONIUM HYDROXIDE,(NH4OH	Tool WSTG1D0100	Acid and Bases	IW	DR	50	Gallon	0.9	7.51	Ammonia	7664-41-7	9-140-011517664-41-7		29	No	No	Yes	No
N62854G001	CAUT, 200 PM (1 Quart)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N62854G001108-65-6		99	Yes	No	Yes	No
N62854G001	CAUT, 200 PM (1 Quart)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Additive (Trade Secret)	Additive	N62854G001Additive		1	Yes	No	No	No
9-160-00619	DEVELOPER, CD2060 RI - 53.5 Gallon DRUM	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1	8.35	Diethanolamine	111-42-2	9-160-00619111-42-2	0.1	0.6	Yes	Yes	Yes	No
9-160-00619	DEVELOPER, CD2060 RI - 53.5 Gallon DRUM	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1	8.35	Tetramethylammonium hydroxide	75-59-2	9-160-0061975-59-2	0	0.6	Yes	No	No	No
9-160-00730	DEVELOPER, OPD10C X 53.5 Gallon	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1.02	8.51	Tetramethylammonium hydroxide	75-59-2	9-160-0073075-59-2	10	25	Yes	No	No	No
9-160-00475	DEVELOPER, OPD4130 53.5Gallon DRUM	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1	8.35	Tetramethylammonium hydroxide	75-59-2	9-160-0047575-59-2	1	2.5	Yes	No	No	No
N95909F001	DEVELOPER, OPD4262- 1 Drum	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	DR	53.5	Gallon	1	8.35	Tetramethylammonium hydroxide	75-59-2	N95909F00175-59-2	1	2.5	Yes	No	No	No
9-160-00569	DEVELOPER, OPD4262- 1 Gallon	Photo CFA Develop tool, bulk supply	Photoresist and Organics	IW	BTL	53.5	Gallon	1	8.35	Tetramethylammonium hydroxide	75-59-2	9-160-0056975-59-2	1	2.5	Yes	No	No	No
9-140-00099	DI WATER 70 % / IPA 30 % (70/30) BOT	CFA, Probe all around fab	Photoresist and Organics	IW	BTL	1	Gallon	1	8.35	Isopropyl Alcohol	67-63-0	9-140-0009967-63-0		30	Yes	No	Yes	No
9-140-00090	ETHYLENE GLYCOL (C2H6O2), 1Gallon	5/95 and 15/85 mix for track chillers and may be o	Photoresist and Organics		BTL	1	Gallon	1.125	9.39	Ethylene Glycol	107-21-1	9-140-00090107-21-1		5	Yes	Yes	Yes	No
N77810G002	FOC-376 (970mL)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	0.97	Liter	1	8.35	Crosslinker	Crosslinker	N77810G002Crosslinker	0.5	5	Yes	No	No	No
N77810G002	FOC-376 (970mL)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	0.97	Liter	1	8.35	Acrylic resin	9063-87-0	N77810G0029063-87-0	1	16	Yes	No	No	No
N77810G002	FOC-376 (970mL)	Photo CFA Coat tool	Photoresist and Organics	Solvent waste	BTL	0.97	Liter	1	8.35	Methyl 3-methoxy propionate	3852-09-3	N77810G0023852-09-3	79	99	Yes	No	No	No
9-160-00474	HMDS, CANISTER (MESA) 5Gallon BOT	Photo CFA Coat tool, Bulk supply	Photoresist and Organics	Solvent waste	CN	5	Gallon	0.774	6.46	1,1,1,3,3,3-Hexamethyldisilazane	999-97-3	9-160-00474999-97-3	99	100	Yes	No	No	No
9-140-00306	HYDROFLUORIC ACID PPB (HF) 1Gallon BOT	Quartz cleaning	Acid and Bases	IW	BTL	1	Gallon	0.97	8.10	Hydrogen fluoride	7664-39-3	9-140-003067664-39-3	0.1	49	No	Yes	No	No
9-160-00753	LEVEL M10-44 (B94947-22) 4L	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	4	Liter	1	8.35	Additive (Trade Secret)	Additive	9-160-00753Additive	0	10	Yes	No	No	No
9-160-00753	LEVEL M10-44 (B94947-22) 4L	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	4	Liter	1	8.35	Ethyl lactate	97-64-3	9-160-0075397-64-3	5	80	Yes	No	No	No
9-160-00753	LEVEL M10-44 (B94947-22) 4L	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	4	Liter	1	8.35	Polymer Solids (Proprietary)	Polymer Solids	9-160-00753Polymer Solids	20	95	Yes	No	No	No
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	9-160-00001123-91-1	0	1	Yes	Yes	No	Yes
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-000019063-87-0	5	40	Yes	No	No	No
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00001108-65-6	45	95	Yes	No	Yes	No
9-160-00001	MICROLENS, TMR-P15M2 - 2.7CP-Quart BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00001Additive	1	15	Yes	No	No	No
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	9-160-00673123-91-1	0	1	Yes	Yes	No	Yes
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-006739063-87-0	5	40	Yes	No	No	No
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00673108-65-6	45	95	Yes	No	Yes	No
9-160-00673	MICROLENS, TMR-P15M4 - 10.5 CP Quart	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00673Additive	1	15	Yes	No	No	No
9-140-01702	NITRIC ACID, (HNO3), 70 2.5L - EUR	Quartz cleaning	Acid and Bases	IW	BTL	2.5	Liter	1.115	9.31	Nitric Acid	7697-37-2	9-140-017027697-37-2	64	69.9	No	No	Yes	No
N81876E002	NMP (1 Gallon)	Photo CFA Coat tools, line clean, Bench	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Water	Water	N81876E002Water	0	1	No	No	No	No
N81876E002	NMP (1 Gallon)	Photo CFA Coat tools, line clean, Bench	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1-Methyl-2-pyrrolidinone	872-50-4	N81876E0002872-50-4	99	100	Yes	No	No	No
9-140-00001	NOVEC, 7200 ENGINEERED FLUID 3M 33LB/15KG	Probe chillers	Photoresist and Organics	Containerized waste	BTL			1	8.35	Ethyl Nonafluoroisobutyl Ether	163702-06-5	9-140-00001163702-06-5	50	70	No	No	No	No
9-140-00001	NOVEC, 7200 ENGINEERED FLUID 3M 33LB/15KG	Probe chillers	Photoresist and Organics	Containerized waste	BTL			1	8.35	Ethyl Nonafluorobutyl Ether	163702-05-4	9-140-00001163702-05-4	30	50	No	No	No	No
9-140-00849	PEROXIDE, HYDROGEN (H2O2) 53Gallon DRUM	Tool WSTG1D0100			DR	53	Gallon	1.4	11.68	Hydrogen peroxide	7722-84-1	9-140-008497722-84-1	20	35	No	No	Yes	No
N97982F001	PGMEA EBR SOLVENT 53.5 DRUM	Photo CFA Coat tools, bulk supply	Photoresist and Organics	Solvent waste	DR	53	Gallon	0.965	8.05	2-methoxy-1-methylethyl acetate	108-65-6	N97982F001108-65-6	90	100	Yes	No	Yes	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Acrylic resin	9063-87-0	N25329H0019063-87-0	10	25	Yes	No	No	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Sensitizer	Sensitizer	N25329H001Sensitizer	0.5	3	Yes	No	No	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Crosslinker	Crosslinker	N25329H001Crosslinker	2	6	Yes	No	No	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Acrylic monomer	Acrylic monomer	N25329H001Acrylic monomer	2	10	Yes	No	No	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	1-methoxy-2-propanol	107-98-2	N25329H001107-98-2	10	20	Yes	No	Yes	No
N25329H001	RESIST, FDER-PE (USB) (930mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.93	Liter	1.041	8.69	Methyl 3-methoxy propionate	3852-09-3	N25329H0013852-09-3	50	60	Yes	No	No	No
9-160-01027	RESIST, ILA X 1 Gallon	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Anisole	100-66-3	9-160-01027100-66-3	31	35	Yes	No	No	No
9-160-01027	RESIST, ILA X 1 Gallon	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	gamma-BUTYROIACTONE	96-48-0	9-160-0102796-48-0	65	69	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Coupling agent (Proprietary)	Coupling agent	9-160-00689Coupling agent	0.1	1	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Epoxy resin (Proprietary)	9063-87-0	9-160-006899063-87-0	0.1	2	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Ethyl lactate (EI)	97-64-3	9-160-0068997-64-3	35	45	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Melamine resin (Proprietary)	9063-87-0	9-160-006899063-87-0	1	5	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Phenolic resin (Proprietary)	9063-87-0	9-160-006899063-87-0	10	20	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Photosensitizer (Proprietary)	Sensitizer	9-160-00689Sensitizer	1	10	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propyleneglycol monoethylether acetate (PGEEA)	98516-30-4	9-160-0068998516-30-4	35	45	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Coupling agent (Proprietary)	Coupling agent	9-160-00689Coupling agent	0.1	1	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Epoxy resin (Proprietary)	9063-87-0	9-160-006899063-87-0	0.1	2	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Ethyl lactate (EI)	97-64-3	9-160-0068997-64-3	35	45	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Melamine resin (Proprietary)	9063-87-0	9-160-006899063-87-0	1	5	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Phenolic resin (Proprietary)	9063-87-0	9-160-006899063-87-0	10	20	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photosensitizer (Proprietary)	Sensitizer	9-160-00689Sensitizer	1	10	Yes	No	No	No
9-160-00689	RESIST, MFR-1401H2 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propyleneglycol monoethylether acetate (PGEEA)	98516-30-4	9-160-0068998516-30-4	35	45	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	2-methoxy-1-methylethyl acetate	108-65-6	N95906F001108-65-6	90	100	Yes	No	Yes	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Coupling agent (Proprietary)	Coupling agent	N95906F001Coupling agent	0.1	0.5	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Melamine resin (Proprietary)	9063-87-0	N95906F0019063-87-0	0.1	3	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Phenolic resin (Proprietary)	9063-87-0	N95906F0019063-87-0	5	15	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Naphthoquinonediazide(NQD) Ester (Proprietary)	Additive	N95906F001Additive	1	10	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Epoxy Resin (Proprietary)	9063-87-0	N95906F0019063-87-0	0.1	3	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	Propyleneglycol monoethylether acetate	98516-30-4	N95906F0019851 6-30-4	40	50	Yes	No	No	No
N95906F001	RESIST, MFR-1401LL (1 LIT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Liter	1	8.35	I-Ethyl lactate	687-47-8	N95906F001687-47-8	40	50	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	2-methoxy-1-methylethyl acetate	108-65-6	9-160-00468108-65-6	90	100	Yes	No	Yes	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Coupling agent (Proprietary)	Coupling agent	9-160-00468Coupling agent	0.1	0.5	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Melamine resin (Proprietary)	9063-87-0	9-160-004689063-87-0	0.1	3	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Phenolic resin (Proprietary)	9063-87-0	9-160-004689063-87-0	5	15	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Naphthoquinonediazide(NQD) Ester (Proprietary)	Additive	9-160-00468Additive	1	10	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Epoxy Resin (Proprietary)	9063-87-0	9-160-004689063-87-0	0.1	3	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	Propyleneglycol monoethylether acetate	98516-30-4	9-160-0046898516-30-4	40	50	Yes	No	No	No
9-160-00468	RESIST, MFR-1401LL (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	3.5	Gallon	1	8.35	I-Ethyl lactate	687-47-8	9-160-00468687-47-8	40	50	Yes	No	No	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00346108-94-1	10	20	Yes	No	Yes	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00346Acrylic monomer	1	10	Yes	No	No	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00346108-65-6	40	60	Yes	No	Yes	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00346Pigment	1	10	No	No	No	No
9-160-00346	RESIST, SB-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethyl 3-ethoxypropionate	763-69-9	9-160-00346763-69-9	5	15	Yes	No	No	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00634108-65-6	40	55	Yes	No	Yes	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00634Pigment	1	10	No	No	No	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00634108-94-1	10	20	Yes	No	Yes	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	ethyl 3-ethoxypropionate	763-69-9	9-160-00634763-69-9	10	20	Yes	No	No	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	ethylbenzene	100-41-4	9-160-00634100-41-4	0.1	1	Yes	Yes	Yes	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00634Acrylic monomer	1	10	Yes	No	No	No
9-160-00634	RESIST, SB5000L - BLUE (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00634Additive	1	5	Yes	No	No	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00754Acrylic monomer	1	10	Yes	No	No	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00754Additive	0.1	1	Yes	No	No	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00754Pigment	1	10	No	No	No	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00754108-94-1	10	20	Yes	No	Yes	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethylbenzene	100-41-4	9-160-00754100-41-4	0.1	1	Yes	Yes	Yes	No
9-160-00754	RESIST, SB-6510 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00754108-65-6	60	80	Yes	No	Yes	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00755Acrylic monomer	1	10	Yes	No	No	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00755108-94-1	10	20	Yes	No	Yes	No

Oracle Item Number	Product Name	Area Used Per onsemi	Area Used Calculations	Waste Stream	UOM	UOM Amt	UOM Dscr	Denstiy [g/mL]	Density1 [lb/Gallon]	Constituent Name	CAS #	REF CAS	Min Wt.%	Max Wt. %	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00755Additive	0.1	1	Yes	No	No	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00755Pigment	1	10	No	No	No	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethylbenzene	100-41-4	9-160-00755100-41-4	0.1	1	Yes	Yes	Yes	No
9-160-00755	RESIST, SB-6511 (SBS-A598A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00755108-65-6	60	80	Yes	No	Yes	No
N06514H001	RESIST, SC-7500 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N06514H001108-65-6	80	90	Yes	No	Yes	No
N06514H001	RESIST, SC-7500 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	N06514H001Pigment	1	10	No	No	No	No
N06514H001	RESIST, SC-7500 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N06514H001Additive	1	5	Yes	No	No	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00345108-65-6	45	55	Yes	No	Yes	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethyl 3-ethoxypropionate	763-69-9	9-160-00345763-69-9	5	15	Yes	No	No	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00345Pigment	1	10	No	No	No	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00345Acrylic monomer	1	10	Yes	No	No	No
9-160-00345	RESIST, SG-3000L 760mL BO	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00345108-94-1	10	20	Yes	No	Yes	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethyl 3-ethoxypropionate	763-69-9	9-160-00635763-69-9	5	15	Yes	No	No	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00635Pigment	1	10	No	No	No	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00635Additive	1	5	Yes	No	No	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00635108-94-1	20	30	Yes	No	Yes	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00635Acrylic monomer	1	10	Yes	No	No	No
9-160-00635	RESIST, SG5500L - GREEN (.760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00635108-65-6	30	50	Yes	No	Yes	No
9-160-00708	RESIST, SG6500 - GREEN (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00708Additive	0.1	1	Yes	No	No	No
9-160-00708	RESIST, SG6500 - GREEN (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00708108-65-6	65	85	Yes	No	Yes	No
9-160-00708	RESIST, SG6500 - GREEN (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00708Acrylic monomer	1	10	Yes	No	No	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	N97819G001Pigment	1	10	No	No	No	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	N97819G001Acrylic monomer	1	10	Yes	No	No	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	N97819G001108-94-1	10	20	Yes	No	Yes	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethylbenzene	100-41-4	N97819G001100-41-4	0.1	1	Yes	Yes	Yes	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N97819G001108-65-6	60	80	Yes	No	Yes	No
N97819G001	RESIST, SG-6510 (760mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N97819G001Additive	0.1	1	Yes	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00756Acrylic monomer	1	10	Yes	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00756Additive	1	5	Yes	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00756Pigment	5	15	No	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	YeLLow Pigment (Nickel Compound) (Proprietary)	Pigment	9-160-00756Pigment	1	5	No	No	No	No
9-160-00756	RESIST, SG-7500 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00756108-65-6	65	85	Yes	No	Yes	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00757Acrylic monomer	1	10	Yes	No	No	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Green Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00757Pigment	1	10	No	No	No	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	YeLLow Pigment (Nickel Compound) (Proprietary)	Pigment	9-160-00757Pigment	1	10	Yes	No	No	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00757108-94-1	1	10	Yes	No	Yes	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00757108-65-6	60	80	Yes	No	Yes	No
9-160-00757	RESIST, SG-8500 - GREEN (SGS-A266B) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol	107-98-2	9-160-00757107-98-2	1	5	Yes	No	Yes	No
N28794G001	RESIST, SG-8510 (Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	N28794G001Acrylic monomer	1	10	Yes	No	No	No
N28794G001	RESIST, SG-8510 (Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Oxime derivative (Proprietary)	Additive	N28794G001Additive	0.1	1	Yes	No	No	No
N28794G001	RESIST, SG-8510 (Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N28794G001108-65-6	70	90	Yes	No	Yes	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Blue Pigment (Copper Compound) (Proprietary)	Pigment	9-160-00002Pigment	1	10	No	No	No	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00002108-94-1	1	10	Yes	No	Yes	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00002Additive	0.1	1	Yes	No	No	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	ethylbenzene	100-41-4	9-160-00002100-41-4	0.1	1	Yes	Yes	Yes	No
9-160-00002	RESIST, SI-5500 760 mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00002108-65-6	60	80	Yes	No	Yes	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00557Acrylic monomer	1	10	Yes	No	No	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00557Additive	1	5	Yes	No	No	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00557108-94-1	5	15	Yes	No	Yes	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Carbon black	1333-86-4	9-160-00557Carbon black	5	15	No	No	Yes	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Ethyl 3-Ethoxypropionate	763-69-9	9-160-00557763-69-9	15	25	Yes	No	No	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00557108-65-6	30	50	Yes	No	Yes	No
9-160-00557	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00557108-65-6	30	50	Yes	No	Yes	No
9-160-00556	RESIST, SK-5000L (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol	107-98-2	9-160-00556107-98-2	1	5	Yes	No	Yes	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1.4-Dioxane	123-91-1	9-160-00900123-91-1	0	0.2	Yes	**Yes**	No	Yes
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Ethyl lactate	97-64-3	9-160-0090097-64-3	25	35	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Cresol	1319-77-3	9-160-009001319-77-3	0	1	Yes	**Yes**	Yes	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Diazo Photoactive Compound (Trade secret)	Additive	9-160-00900Additive	1	10	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	2-Methyl Butyl Acetate	624-41-9	9-160-00900624-41-9	1	10	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Organic Siloxane Surfactant (Trade secret)	Additive	9-160-00900Additive	0	1	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Anisole	100-66-3	9-160-00900100-66-3	10	20	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Cresol novolak resin	Additive	9-160-00900Additive	25	35	Yes	No	No	No
9-160-00900	RESIST, SPR220 3.0 (1Gallon BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	n-AMYl ACETATE	628-63-7	9-160-00900628-63-7	1	10	Yes	No	Yes	No
9-160-00344	RESIST, SR-3000L 760mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00344Acrylic monomer	1	10	Yes	No	No	No
9-160-00344	RESIST, SR-3000L 760mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00344108-65-6	40	60	Yes	No	Yes	No
9-160-00344	RESIST, SR-3000L 760mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00344108-94-1	10	20	Yes	No	Yes	No
9-160-00344	RESIST, SR-3000L 760mL BOT	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Ethyl 3-Ethoxypropionate	763-69-9	9-160-00344763-69-9	10	20	Yes	No	No	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00633Additive	0.1	1	Yes	No	No	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00633Acrylic monomer	1	10	Yes	No	No	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Ethyl 3-Ethoxypropionate	763-69-9	9-160-00633763-69-9	15	25	Yes	No	No	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00633108-65-6	50	70	Yes	No	Yes	No
9-160-00633	RESIST, SR5500L - RED (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol	107-98-2	9-160-00633107-98-2	1	5	Yes	No	Yes	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00636Acrylic monomer	1	10	Yes	No	No	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00636Additive	0.1	1	Yes	No	No	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Ethyl 3-Ethoxypropionate	763-69-9	9-160-00636763-69-9	15	25	Yes	No	No	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00636108-65-6	50	70	Yes	No	Yes	No
9-160-00636	RESIST, SR5502 - RED (SRS-A600A) (0.76L BOT)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol	107-98-2	9-160-00636107-98-2	0.1	5	Yes	No	Yes	No
N00993H001	RESIST, SR-8500 (0.76 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N00993H001108-65-6	80	90	Yes	No	Yes	No
N00993H001	RESIST, SR-8500 (0.76 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N00993H001Additive	0.1	1	Yes	No	No	No
N94906F001	RESIST, SW-8000 (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	cyclohexanone	108-94-1	N94906F001108-94-1	5	15	Yes	No	Yes	No
N94906F001	RESIST, SW-8000 (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	N94906F001Acrylic monomer	5	15	Yes	No	No	No
N94906F001	RESIST, SW-8000 (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N94906F001Additive	1	5	Yes	No	No	No
N94906F001	RESIST, SW-8000 (2.89 L)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	2.89	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N94906F001108-65-6	60	70	Yes	No	Yes	No
9-160-00810	RESIST, SW-8000 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	9-160-00810108-94-1	5	15	Yes	No	Yes	No
9-160-00810	RESIST, SW-8000 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	9-160-00810Acrylic monomer	5	15	Yes	No	No	No
9-160-00810	RESIST, SW-8000 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	9-160-00810Additive	1	5	Yes	No	No	No
9-160-00810	RESIST, SW-8000 X 760 mL	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	9-160-00810108-65-6	60	70	Yes	No	Yes	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	1-Methoxy-2-propanol acetate	108-65-6	N90997G001108-65-6	70	90	Yes	No	Yes	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	cyclohexanone	108-94-1	N90997G001108-94-1	1	10	Yes	No	Yes	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Multi functional acrylic monomer (Proprietary)	Acrylic monomer	N90997G001Acrylic monomer	1	10	Yes	No	No	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	YeLLow Pigment (Nickel Compound) (Proprietary)	Pigment	N90997G001Pigment	1	10	Yes	No	No	No
N90997G001	RESIST, SY-7500 (7.60 mL)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	0.76	Liter	1	8.35	Oxime derivative (Proprietary)	Additive	N90997G001Additive	0.1	1	Yes	No	No	No
9-160-00671	RESIST, TMR-1.55 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00671108-65-6	45	95	Yes	No	Yes	No
9-160-00671	RESIST, TMR-1.55 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	9-160-00671123-91-1	0	1	Yes	Yes	No	Yes
9-160-00671	RESIST, TMR-1.55 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-00671Acrylic type resin	1	40	Yes	No	No	No
9-160-00671	RESIST, TMR-1.55 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade secret)	Additive	9-160-00671Additive	0	10	Yes	No	No	No
9-160-00672	RESIST, TMR-1.9 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	9-160-00672123-91-1	0	1	Yes	Yes	No	Yes
9-160-00672	RESIST, TMR-1.9 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-00672Acrylic type resin	5	40	Yes	No	No	No
9-160-00672	RESIST, TMR-1.9 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00672108-65-6	45	95	Yes	No	Yes	No
9-160-00672	RESIST, TMR-1.9 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade secret)	Additive	9-160-00672Additive	1	15	Yes	No	No	No
9-160-00670	RESIST, TMR-10.5 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1,4-Dioxane	123-91-1	9-160-00670123-91-1	0	1	Yes	Yes	No	Yes

Oracle Item Number	Product Name	Area Used Per onsemi	Area Used Calculations	Waste Stream	UOM	UOM Amt	UOM Dscr	Denstiy [g/mL]	Density1 [lb/Gallon]	Constituent Name	CAS #	REF CAS	Min Wt.%	Max Wt. %	VOC?	HAP?	TAP? Non-Carcinogen (585)	TAP? Carcinogen (586)
9-160-00670	RESIST, TMR-10.5 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-006709063-87-0	5	40	Yes	No	No	No
9-160-00670	RESIST, TMR-10.5 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00670108-65-6	45	95	Yes	No	Yes	No
9-160-00670	RESIST, TMR-10.5 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00670Additive	1	15	Yes	No	No	No
9-160-00643	RESIST, TMR-2.7 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1,4-Dioxane	123-91-1	9-160-00643123-91-1	0	1	Yes	Yes	No	Yes
9-160-00643	RESIST, TMR-2.7 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-006439063-87-0	5	40	Yes	No	No	No
9-160-00643	RESIST, TMR-2.7 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00643108-65-6	45	95	Yes	No	Yes	No
9-160-00643	RESIST, TMR-2.7 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00643Additive	1	15	Yes	No	No	No
N97964F001	RESIST, TMR-3.8 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	1,4-Dioxane	123-91-1	N97964F001123-91-1	0	1	Yes	Yes	No	Yes
N97964F001	RESIST, TMR-3.8 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	N97964F0019063-87-0	5	40	Yes	No	No	No
N97964F001	RESIST, TMR-3.8 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade Secret)	Additive	N97964F001Additive	1	15	Yes	No	No	No
N97964F001	RESIST, TMR-3.8 (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N97964F001108-65-6	45	95	Yes	No	Yes	No
9-160-00647	RESIST, TMR-3.8 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	1,4-Dioxane	123-91-1	9-160-00647123-91-1	0	1	Yes	Yes	No	Yes
9-160-00647	RESIST, TMR-3.8 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	9-160-006479063-87-0	5	40	Yes	No	No	No
9-160-00647	RESIST, TMR-3.8 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Photoactive compound (Trade Secret)	Additive	9-160-00647Additive	1	15	Yes	No	No	No
9-160-00647	RESIST, TMR-3.8 (1Gallon)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Gallon	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	9-160-00647108-65-6	45	95	Yes	No	Yes	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acetone	67-64-1	N24500H00167-64-1	0	1	No	No	Yes	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N24500H001108-65-6	35	60	Yes	No	Yes	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade secret)	Additive	N24500H001Additive	1	15	Yes	No	No	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	2-HEPTANONE	110-43-0	N24500H001110-43-0	20	40	Yes	No	Yes	No
N24500H001	RESIST, TMR-E02 HM 2.9cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Novalak resin (Trade secret)	9063-87-0	N24500H0019063-87-0	1	30	Yes	No	No	No
N21357H001	RESIST, TMR-TS01E PM 50cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N21357H001108-65-6	45	95	Yes	No	Yes	No
N21357H001	RESIST, TMR-TS01E PM 50cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	N21357H0019063-87-0	5	40	Yes	No	No	No
N21357H001	RESIST, TMR-TS01E PM 50cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Photoactive compound (Trade Secret)	Additive	N21357H001Additive	1	15	Yes	No	No	No
N24499H001	RESIST, TMR-V005 PM 56cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Propylene Glycol Monomethyl Ether Acetate	108-65-6	N24499H001108-65-6	70	80	Yes	No	Yes	No
N24499H001	RESIST, TMR-V005 PM 56cP (1 Quart)	Photo CFA Coat tools	Photoresist and Organics	Solvent waste	BTL	1	Quart	1	8.35	Acrylic type resin (Trade Secret)	9063-87-0	N24499H0019063-87-0	20	30	Yes	No	No	No
9-140-00389	SOLVENT, ORGANIC CLEANER (SOC) 85% ACETO	Photo CFA Coat tools, nozzle clean	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.792	6.61	Methanol	67-56-1	9-140-0038967-56-1	99	100	Yes	Yes	Yes	No
9-140-00389	SOLVENT, ORGANIC CLEANER (SOC) 85% ACETO	Photo CFA Coat tools, nozzle clean	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.792	6.61	DIACETONE AICOHOI	123-42-2	9-140-00389123-42-2	10	20	No	No	Yes	No
9-160-00308	SOLVENT, PGMEA 1Gallon BOT	Photo CFA Coat tools, line clean, Bench	Photoresist and Organics	Solvent waste	BTL	1	Gallon	0.969	8.09	2-methoxy-1-methylethyl acetate	108-65-6	9-160-00308108-65-6	90	100	Yes	No	Yes	No
9-950-01676	SULFURIC ACID, 66-DEG BE, 750 LB DRUM		Acid and Bases	IW	DR	750	Pound			Sulfuric Acid	7664-93-9	9-950-01676764-93-9		93	No	No	Yes	No
9-140-13217	WPPS WET PAD PROTECTION SOL, KG 211 DRUM	Tool WSTG1D0100 and WDNS1D0100	Photoresist and Organics		DR	211	KG	1.055	8.80	Tetramethylammonium hydroxide	75-59-2	9-140-1321775-59-2	5	10	Yes	No	No	No
9-140-13217	WPPS WET PAD PROTECTION SOL, KG 211 DRUM	Tool WSTG1D0100 and WDNS1D0100	Photoresist and Organics		DR	211	KG	1.055	8.80	Diammonium peroxodisulphate	7727-54-0	9-140-132177727-54-0	1	5	No	No	No	No
Insert New Chemical Above This Line																		

Note:

[1] Specfic Gravity conversion is 1 g/cm^3 = 8.345 lb/gallon

[2] Proprietary constituents without a CAS# (additives, crosslinker, polymer, acrylic resin, sensitizer, etc.) conservatively assumed to be a VOC but not a HAP or TAP

Color filter array (CFA) is a mosaic of tiny color filters placed over the pixel sensors of an image sensor to capture color information.

Table A-45. onsemi Particle Size Distribution Wet Cooling Towers

TDS= **750** ppmw

EPRI Droplet Diameter (µm) [1]	Droplet Volume (µm3)	Droplet Mass (µg)	Particle Mass (Solids) (µg)	Solid Particle Volume (µm3)	Solid Particle Diameter (µm)	EPRI % Mass Smaller [1]	TSP % Mass Smaller	PM10 % Mass Smaller	PM2.5 % Mass Smaller
10	524	5.24E-04	3.93E-07	0.18	0.70	0			
20	4189	4.19E-03	3.14E-06	1.43	1.40	0.196			
30	14137	1.41E-02	1.06E-05	4.82	2.10	0.226			0.393
40	33510	3.35E-02	2.51E-05	11.42	2.79	0.514			
50	65450	6.54E-02	4.91E-05	22.31	3.49	1.816			
60	113097	1.13E-01	8.48E-05	38.56	4.19	5.702			
70	179594	1.80E-01	1.35E-04	61.23	4.89	21.348			
90	381704	3.82E-01	2.86E-04	130.13	6.29	49.812			
110	696910	6.97E-01	5.23E-04	237.58	7.68	70.509			
130	1150347	1.15E+00	8.63E-04	392.16	9.08	82.023		85.960	
150	1767146	1.77E+00	1.33E-03	602.44	10.48	88.012			
180	3053628	3.05E+00	2.29E-03	1041.01	12.57	91.032			
210	4849048	4.85E+00	3.64E-03	1653.08	14.67	92.468			
240	7238229	7.24E+00	5.43E-03	2467.58	16.77	94.091			
270	10305995	1.03E+01	7.73E-03	3513.41	18.86	94.689			
300	14137167	1.41E+01	1.06E-02	4819.49	20.96	96.288			
350	22449298	2.24E+01	1.68E-02	7653.17	24.45	97.011			
400	33510322	3.35E+01	2.51E-02	11423.97	27.94	98.34	94.585		
450	47712938	4.77E+01	3.58E-02	16265.77	31.44	99.071			
500	65449847	6.54E+01	4.91E-02	22312.45	34.93	99.071			
600	113097336	1.13E+02	8.48E-02	38555.91	41.91	100			

Data from "Calculating Realistic PM10 Emissions from Cooling Towers"

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

M E M O R A N D U M DRAFT

DATE: May 31st, 2024

TO: Nachammai Vairavan, Air Quality Permit Engineer

FROM: Tetra Tech, Administratively Reviewed by Christina Boulay, Air Quality Dispersion Modeling Analyst

PROJECT: T2-2023.0008 Project 63057, Tier 2 FEC permit renewal

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

Contents

Acronyms, Units, and Chemical Nomenclature 3

1.0 Summary 5

2.0 Background Information 7

2.1 Project Description 7

2.2 Facility Location and Area Classification 7

2.3 Air Impact Analysis Required for All Permits to Construct 8

2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses 8

2.5 Toxic Air Pollutant Analysis 10

3.0 Analytical Methods and Data 10

3.1 Emissions Source Data 11

3.1.1 Criteria Pollutant Emissions Rates and Modeling Applicability 11

3.1.2 Toxic Air Pollutant Emissions Rates 14

3.1.3 Emissions Release Parameters 14

3.2 Background Concentrations 16

3.3 Impact Modeling Methodology 16

3.3.1 General Overview of Impact Analyses 16

3.3.2 Modeling Protocol 17

3.3.3 Modeling Methodology 17

3.3.4 Model Selection 17

3.3.5 Meteorological Data 17

3.3.6 Effects of Terrain on Modeled Impacts 18

3.3.7 Facility Layout and Effects of Building Downwash 19
3.3.8 NOx Chemistry 20
3.3.9 Ambient Air Boundary 20
3.3.9 Receptor Network 20
3.3.10 Good Engineering Practice Stack Height 21
4.0 NAAQS and TAP Impact Modeling Results 22
4.1 Results for NAAQS Analyses 22
4.1.1 Significant Impact Level Analyses 22
4.1.2 Cumulative NAAQS Impact Analyses 22
4.2 Results for TAPs Impact Analyses 23
5.0 Conclusions 23
References 24

Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
acfm	Actual cubic feet per minute
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
Bison	Bison Engineering, Inc.
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
Consultant Abb	TRINITY Consultants
Facility Abb	Onsemi
DEQ	Idaho Department of Environmental Quality
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
FEC	Facility Emissions Cap
GEP	Good Engineering Practice
HAP	Hazardous Air Pollutant
hr	hours
IC	Internal Combustion
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
m	Meters
m/sec	Meters per second
MERP	Modeled Emission Rates as Precursors
mmBtu	Million British Thermal Units
NAAQS	National Ambient Air Quality Standards
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NWS	National Weather Service
O_3	Ozone
Pb	Lead
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
ppb	parts per million

PRIME	Plume Rise Model Enhancement
PTC	Permit to Construct
PTE	Potential to Emit
SER	Significant Emission Rate
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TAP	Toxic Air Pollutant
tpy	tons per year
VOC	Volatile Organic Compounds
$\mu g/m^3$	Micrograms per cubic meter of air

1.0 Summary

Evaluation of the modeling files and analyses was primarily the responsibility of the DEQ contracted firm, Tetra Tech for Onsemi – Nampa. Onsemi – Nampa submitted a Tier II FEC Operating Permit Renewal application for their current permit No. T2-2016.0064 at their manufacturing facility at 1401 North Kings Road in Nampa, Idaho 83687. The *Idaho Administrative Procedures Act* 58.01.01.203.02 and 203.03 (*Idaho Air Rules* Section 203.02 and 203.03) requires that no permit be issued unless it is demonstrated that applicable emissions do not result in violation of a National Ambient Air Quality Standard (NAAQS) or Toxic Air Pollutant (TAP) increment. This memorandum provides a summary of the analyses used to demonstrate compliance with applicable NAAQS and TAP increments, as required by *Idaho Air Rules* Section 203.02 and 203.03.

This document provides details of the review of the modeling analysis submitted as part of the application to renew the facility's Tier 2 federal emission cap (FEC) permit. The modeling analysis submitted as part of the renewal application would be eligible to use the 1/8 significant emission rate (SER) thresholds except the goal of the Tier 2 FEC program is for a facility to model the potential ambient air impacts of facility wide emissions of criteria pollutants above the BRC so no other threshold is used to establish modeling requirements when a facility is under the FEC program. Current potential to emit (PTE) will be compared to the BRC thresholds rather than the entire requested FEC limit, which includes Onsemi's growth component and the facility-wide PTE.

Dispersion modeling analyses for the national ambient air quality standards (NAAQS) above the BRC level and toxic air pollutants (TAPs) above the emission screening limit (EL) were performed for facility wide potential to emit (PTE). The PTE is representative of baseline actual emissions plus operational variability for controlled and uncontrolled emissions scenarios for each source. Proposed facility-wide FEC limits are greater than the sum of the PTE from each individual source, with the difference representing proposed growth. The proposed growth is representative of potential future new or modified emission sources. It would not be representative to include proposed growth in facility-wide modeling for this application for the following reasons: Sources included in the renewal application are already modeled at their maximum PTE, therefore additional emissions magnitude would not be possible under source physical or operational constraints. Proposed growth emissions are not associated with any specific emission unit, but rather are applied on a facility-wide basis. Therefore, assigning proposed growth to any emission unit in this renewal may not be an accurate representation of how future growth could occur.

Trinity Consultants, Onsemi's permitting and modeling consultant, prepared the PTC application and performed ambient air impact analyses for this project. DEQ review of submitted data and analyses, as summarized by this memorandum, addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility or modification will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not address/evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emission estimates was primarily the responsibility of the DEQ permit writer and is addressed in the main body of the DEQ Statement of Basis, and emission calculation methods were not evaluated in this modeling review memorandum. Evaluation of the modeling files and analyses was primarily the responsibility of the DEQ contracted firm, Tetra Tech.

Table 1 presents key assumptions and results to be considered in the development of the permit. *Idaho Air Rules* require air impact analyses be conducted in accordance with methods outlined in 40 CFR 51, *Appendix W Guideline on Air Quality Models* (*Appendix W*). *Appendix W* requires that air quality impacts be assessed using atmospheric dispersion models with emissions and operations representative of design capacity or as limited by an enforceable permit condition.

The submitted information and analyses, in combination with DEQ's analyses:

1. Utilized appropriate methods and models;

2. Was conducted using reasonably accurate or conservative model parameters and input data (review of emissions estimates was addressed by the DEQ permit writer);
3. Adhered to established DEQ guidelines for new source review dispersion modeling;
4. Showed:
    a) that estimated potential/allowable emissions are at a level defined as BRC and do not require a NAAQS compliance demonstration; or
    b) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or
    c) that predicted pollutant concentrations from emissions associated with the project as modeled, when appropriately combined with co-contributing sources and background concentrations, were below applicable NAAQS at ambient air locations where and when the project has a significant impact;
5. Showed that TAP emissions increases associated with the project will not result in increased emissions above ELs or ambient air impacts exceeding allowable TAP increments.

This conclusion assumes that conditions in Table 1 are representative of facility design capacity or operations as limited by an enforceable permit condition. The DEQ permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to ensure compliance with applicable standards and ensure the requirements of *Appendix W* are met regarding emissions representative of design capacity or permit allowable rates.

Summary of Submittals and Actions

February 7, 2023: Application received by DEQ.
February 8, 2023: Regulatory start date.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Recommendation/Explanation/Consideration
General Emission Rates. Emission rates used in the air impact analyses, as listed in this memorandum, must represent maximum potential emissions as given by design capacity, inherently limited by the nature of the process or configuration of the facility, or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emission rates greater than those used in the air impact analyses.
Criteria Pollutant Modeling Applicability. The final emission inventory indicates that facility-wide emissions of SO_2 are at levels considered BRC, and as such, NAAQS compliance demonstrations for this pollutant is not required for permit issuance. Stated facility-wide criteria air pollutant emission rates of 24-hour PM_{10}, 24-hour and annual $PM_{2.5}$, Annual and 1-hour NO_2, and 1-hour and 8-hour CO are above BRC. This project would be eligible to use the 1/8 SER thresholds except the goal of the Tier 2 FEC program is for the facility to conduct ambient impact analyses using current versions of AERMOD and associated programs and current meteorological datasets and the current facility pollutant emission rates and release parameters. DEQ determined that project-specific air impact modeling of pollutants above BRC was necessary to demonstrate compliance with those NAAQS. Air impact modeling was performed for 24-hour PM_{10}, 24-hour and annual $PM_{2.5}$, Annual and 1-hour NO_2, and 1-hour and 8-hour CO to demonstrate compliance with the NAAQS.	BRC is evaluated for emissions only on an annual-averaged basis and only for non-fugitive emissions. Permit restrictions on averaging periods shorter than annual are not necessary to assure emissions are below BRC thresholds. A NAAQS compliance demonstration may be required for applicable facility-wide emissions rates greater than BRC thresholds. Emissions listed in the permit application and DEQ Statement of Basis must represent maximum allowable emissions as given by design capacity, inherently limited by the nature of the process or configuration of the facility, or as limited by the issued permit for the specific pollutant and averaging period.
Compliance with TAP Increments. Allowable Project emission increases of Ammonia exceed emission screening levels (EL) of *Idaho Air Rules* 585 for an emergency venting	Changes in the calculation of TAP emission increases resulting from the project could trigger the assessment of additional TAPs for compliance with applicable TAP

scenario, thereby requiring air impact modeling. Maximum modeled impacts of Ammonia were below the Acceptable Ambient Concentrations of a non-Carcinogenic TAP (AACs).	increments. The Chi/Q value was not evaluated as part of this review.

2.0 Background Information

This section provides background information applicable to the project and the site where the facility is located. It also provides a brief description of the applicable air impact analyses requirements for the project.

2.1 Project Description

This project is for a modeling analyses that is required for a Tier 2 FEC permit renewal application of the semiconductor facility Onsemi located in Nampa, Canyon County, Idaho. The FEC program requires the facility to perform air modeling analyses of NAAQS compliance for pollutants with facility wide emissions above the BRC. As with all semiconductor facilities, Onsemi uses high quantities of VOC's in the manufacturing process that may be emitted to the ambient air when uncontrolled. There are two exhaust streams for the manufacturing process. The primary exhaust stream from manufacturing contains VOCs and TAPs and will either be treated (controlled) through a VOC Abatement Unit including natural gas combustion from the abatement process or bypass the VOC Abatement Unit as uncontrolled emissions. During maximum manufacturing production, a second exhaust stream from manufacturing will either be controlled through a second VOC Abatement Unit or bypass the unit as uncontrolled emissions. Controlled or Uncontrolled emissions of VOCs from processes do not exceed emission thresholds that are considered significant for production of secondary pollutants such as ozone and $PM_{2.5}$. The other main exhaust stream consists of particulate matter and TAP emissions associated with manufacturing tool operations which is controlled and treated through one of three wet scrubbers. A Thermal Processing Unit (TPU) will be used to treat specific manufacturing process gas streams such as perfluorinated compound gas species. A TPU consists of a natural gas direct fired combustor coupled with its own scrubber system for the removal of toxic exhaust gases. Each TPU will be drawn to the existing packed-bed wet chemical scrubber system when VOC Abatement Units are not operating. When a VOC Abatement Unit is operational, TPU emissions are drawn through the VOC abatement process. The use of the VOC's and the TPU may increase emissions of other criteria pollutants such as $PM_{2.5}$, NO_X and CO which have the potential to cause ambient air to exceed the NAAQS, therefore, the ambient air impacts from the facility have been evaluated using the estimated emissions of criteria pollutants and toxic air pollutants from the controlled and the uncontrolled scenarios.

Pollutant-emitting processes/activities affected by the project include:

- Natural gas combustion sources such as four boilers, one water heater and a Makeup Air Unit (MAU);
- Two VOC abatement units;
- One TPU;
- Diesel fuel combustion units such as two emergency generators;
- Cooling towers;
- Three wet packed bed scrubbers for the manufacturing activities;
- One Thermal Processing Unit; and
- Other supporting operations such as fugitive emissions from the chemical dock.

No other emission sources are described in the modeling report of the application. The PTC addresses all air pollutant emitting activities associated with the facility.

2.2 Facility Location and Area Classification

The Onsemi facility is located at at 1401 North Kings Road, Nampa, Idaho, in Canyon County (Northing: 4,827,163 meters; Easting: 537,576 meters; UTM Zone 11). Canyon County is designated as an

attainment area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$). The area is not classified as non-attainment for any criteria pollutants. The facility is located within a light to moderate industrial and commercial area. The closest residential receptors are located 1 km away from the facility. Potential receptors of concern where sensitive populations may be present such as a golf club, the centennial job corps, a community work center and a home health care center are located within 1-km of the facility. The closest school is 2km away from the facility.

2.3 Air Impact Analyses Required for All Permits to Construct

Idaho Air Rules Sections 203.02 and 203.03:

> *No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*
>
> ***02. NAAQS**. The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*
>
> ***03. Toxic Air Pollutants.** Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. *Idaho Air Rules* Section 202.02 states:

> ***02. Estimates of Ambient Concentrations**. All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

DEQ's finding of *satisfaction* for not causing a violation of NAAQS or TAP increment is the key requirement for permit issuance. DEQ's stationary source modeling group has determined that *satisfaction* constitutes a high level of confidence. This is a level between what is *more likely than not* and what is *beyond reasonable doubt*, considering all sources of variability and uncertainty in methods and data used in the analyses.

2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses

A SIL analysis may be performed for the proposed project in lieu of a cumulative NAAQS impact analysis as a screening approach to demonstrate *de minimis* impacts. The SIL analysis involves modeling criteria air pollutant emissions, those occurring from a new facility or the realized emission increase resulting from a proposed modification, to determine the potential impacts to ambient air. Air impact analyses are required by *Idaho Air Rules* to be conducted according to methods outlined in *Appendix W*. *Appendix W* requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in *Idaho Air Rules* Section 006 (referred to as a "significant contribution" in *Idaho Air Rules*) or as incorporated by reference as per *Idaho Air Rules* Section 107.03.b. Table 2 lists the applicable SILs.

If modeled maximum pollutant impacts to ambient air from the emissions sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to

demonstrate compliance with NAAQS and *Idaho Air Rules* Section 203.02.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing impacts to ambient air (typically the design values consistent with the form of the standard) from facility-wide emissions and emissions from any nearby co-contributing sources, and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period at the facility location and the area of significant impact. The resulting pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SILs and specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis for the modeling domain.

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Impact Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Design Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.3[k]	9[l]	Mean of maximum 1st highest[m]
Carbon monoxide (CO)	1-hour	2,000	40,000[n]	Maximum 2nd highest[o]
	8-hour	500	10,000[n]	Maximum 2nd highest[o]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[p] (7.8 $\mu g/m^3$)	75 ppb[q] (196 $\mu g/m^3$)	Mean of maximum 4th highest[r]
	3-hour	25	1,300[n]	Maximum 2nd highest[o]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 $\mu g/m^3$)	100 ppb[s] (188 $\mu g/m^3$)	Mean of maximum 8th highest[t]
	Annual	1.0	100[u]	Maximum 1st highest[o]
Lead (Pb)	3-month[v]	NA	0.15[u]	Maximum 1st highest[o]
	Quarterly	NA	1.5[u]	Maximum 1st highest[o]
Ozone (O_3)	8-hour	40 TPY VOC[w]	70 ppb[x]	Not typically modeled

a. *Idaho Air Rules* Section 006 (definition for significant contribution) or as incorporated by reference as per *Idaho Air Rules* Section 107.03.b.
b. Micrograms per cubic meter.
c. Incorporated into *Idaho Air Rules* by reference, as per *Idaho Air Rules* Section 107.
d. The maximum 1st highest modeled value is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. Not to be exceeded more than once per year on average over 3 years.
g. Concentration at any modeled receptor when using five years of meteorological data.
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
i. 3-year mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.
j. 5-year mean of the 8th highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1st highest modeled 24-hour impacts at the modeled receptor for each year.
k. This value is the upper limit as listed in 40 CFR 51.165(b)(2). Without monitoring data supporting this value, DEQ will use the 0.2 $\mu g/m^3$ value recommended by EPA (EPA, 2018).
l. 3-year mean of annual concentration.
m. 5-year mean of annual averages at the modeled receptor.
n. Not to be exceeded more than once per year.
o. Concentration at any modeled receptor.
p. Interim SIL established by EPA policy memorandum.
q. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
r. 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.
s. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
t. 5-year mean of the 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.
u. Not to be exceeded in any calendar year.
v. 3-month rolling average.
w. An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.
x. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

If the cumulative NAAQS impact analysis indicates a violation of the standard, the permit may not be issued if the proposed project contributes (usually defined as impacts exceeding the SIL) to the modeled violation. This evaluation is made specific to both time and space. As an example, consider a hypothetical case where the SIL analysis indicates the project (new source or modification) has impacts exceeding the SIL and the cumulative impact analysis indicates a violation of the NAAQS. If project-specific impacts are below the SIL at the specific receptors showing the violations during the times when modeled violations occurred, then the project does not have a significant contribution to the specific violations.

Compliance with *Idaho Air Rules* Section 203.02 is generally demonstrated if: a) applicable specific criteria pollutant emission increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation (DEQ, 2014) (see Section 3.1.1 of this memorandum); or b) all modeled impacts of the SIL analysis are below the applicable SIL and/or project related emissions are at a level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or d) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.5 Toxic Air Pollutant Analyses

Emissions of toxic substances are generally addressed by *Idaho Air Rules* Section 161:

> *Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.*

Permitting requirements for TAPs from new or modified sources are specifically addressed by *Idaho Air Rules* Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Per Section 210, if the total project-wide emissions increase of any TAP associated with a new source or modification exceeds screening emission levels (ELs) of *Idaho Air Rules* Section 585 or 586, then the ambient air impact of the emissions increase must be estimated. If ambient air impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of *Idaho Air Rules* Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of *Idaho Air Rules* Section 586, then compliance with TAP requirements has been demonstrated.

Idaho Air Rules Section 210.20 states that if TAP emissions from a specific source are covered by or addressed by the Department or EPA under 40 CFR 60, 61, or 63, then a TAP impact analysis under Section 210 is not required for that TAP. This applies only to TAPs that are also Hazardous Air Pollutants (HAPs) regulated by the Clean Air Act. This exclusion applies where there is a federal rule that covers the activity, or the activity involves equipment or is in a source category addressed by the federal rule. The DEQ permit writer evaluates the applicability of specific TAPs to the Section 210.20 exclusion.

3.0 Analytical Methods and Data

This section describes the methods and data used in analyses to demonstrate compliance with applicable

air quality standards and air quality impact assessment requirements. The DEQ Statement of Basis provides a discussion of the methods and data used to estimate criteria and TAP emission rates.

3.1 Emissions Source Data

All the sources listed below were included in the modeling analysis.

- One natural gas fired TPU processing unit;
- One natural gas fired makeup air unit;
- Two natural gas volatile organic compounds (VOC) abatement units;
- Four natural gas fired boilers;
- One natural gas fired hot water boiler;
- Two diesel-fired emergency generators;
- Cooling towers;
- Manufacturing emissions - controlled using three wet scrubbers; and
- Exhaust from the makeup air unit to support general heating (MAUB) and fugitive emissions from the heated air by the MAU to the chemical dock.

The PTE is representative of baseline actual emissions plus operational variability for controlled and uncontrolled emissions scenarios. In addition, the current operating permit contains a Facility Emissions Cap (FEC) limit.

The emission rates listed in this memorandum must represent the maximum allowable rate as averaged over the specified period.

Emission rates used in the impact modeling applicability analyses and air impact modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emission inventory. All criteria air pollutant and TAP emission rates listed in Section 3.1.1 of this memorandum must be equal to or greater than the facility's potential emissions calculated in the PTC emission inventory or proposed permit allowable emission rates.

3.1.1 Criteria Pollutant Emissions Rates and Modeling Applicability

A criteria pollutant-specific NAAQS compliance demonstration may not be required where facility-wide potential to emit (PTE) values for that criteria pollutant would qualify for a BRC permit exemption as per *Idaho Air Rules* Section 221 (equal to 10 percent of the emissions defined as *significant*) if it were not for potential emissions of other criteria pollutants or TAPs. DEQ's regulatory interpretation policy of exemption provisions of *Idaho Air Rules* is: "A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant" (DEQ 2014). The interpretation policy also states that the exemption criteria of uncontrolled PTE not to exceed 100 ton/year (*Idaho Air Rules* Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analysis is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. The BRC exemption cannot be used to exempt a project from a pollutant-specific NAAQS compliance demonstration in cases where a PTC is required (a modification as per *Idaho Air Rules* Section 005.68) for the action regardless of emissions quantities, such as the modification of an existing emissions or throughput limit.

The submitted emission inventory shows that facility-wide controlled and uncontrolled PTE emissions of SO_2, VOC and Lead are less than BRC levels, as listed in Table 3. Fugitive emissions, as defined in *Idaho Air Rules* Section 005.47, are not considered in determining whether a source meets the applicable exemption criteria unless required by federal law, as stated in *Idaho Air Rules* Section 220.01. For this facility wide modeling analysis, no fugitive emissions from manufacturing operations were exempted from the NAAQS and AAC compliance demonstration.

Table 3. CRITERIA POLLUTANT NAAQS COMPLIANCE DEMONSTRATION APPLICABILITY			
Criteria Pollutant	**BRC Level (ton/year)**	**Applicable Facility Wide PTE Emissions[a] (ton/year)**	**NAAQS Compliance Demonstration Required?**
PM_{10}	1.5	3.4	Yes
$PM_{2.5}$	1.0	1.3	Yes
Carbon Monoxide (CO)	10.0	14.9	Yes
Sulfur Dioxide (SO_2)	4.0	0.25	No
Nitrogen Oxides (NOx)	4.0	11.7	Yes
Lead (Pb)	0.06	9.0E-5	No
Ozone (as VOC)	4.0	2.01	No

[a.] Fugitive emissions are excluded from consideration as per *Idaho Air Rules*.

Table 4 provides criteria pollutant emission rates for those pollutants requiring a NAAQS compliance demonstration.

Table 4. EMISSION RATES FOR MODELING APPLICABILITY, SIL ANALYSES, AND CUMULATIVE NAAQS IMPACT ANALYSES			
Emissions Point Label and Description	**Pollutant**	**Averaging Period**	**Emissions Rate (lb/hr)[a]**
Boiler 1 – Kewanee Boiler Low NO_X burners - Natural Gas fueled boiler with a vertical exhaust with rain cap	PM_{10}	24-hour	6.36E-02[b]
	$PM_{2.5}$	24-hour	4.77E-02[b]
		Annual	2.09E-01c
	NO_X	1-hour	9.12E-02
		Annual	4E-01[c]
	CO	1 and 8-hour	6.19E-01
Boiler 2 – Kewanee Boiler Low NO_X burners - Natural Gas fueled boiler with a vertical exhaust with rain cap	PM_{10}	24-hour	6.36E-02[b]
	$PM_{2.5}$	24-hour	4.77E-02[b]
		Annual	2.09E-01[c]
	NO_X	1-hour	9.12E-02
		Annual	4E-01[c]
	CO	1 and 8-hour	6.19E-01
Boiler 3 – Kewanee Boiler Low NO_X burners - Natural Gas fueled boiler with a vertical exhaust with rain cap	PM_{10}	24-hour	6.36E-02[b]
	$PM_{2.5}$	24-hour	4.77E-02[b]
		Annual	2.09E-01[c]
	NO_X	1-hour	9.12E-02
		Annual	4E-01[c]
	CO	1 and 8-hour	6.19E-01
Boiler 4 – Kewanee Boiler Low NO_X burners - Natural Gas fueled boiler with a vertical exhaust with rain cap	PM_{10}	24-hour	6.36E-02[b]
	$PM_{2.5}$	24-hour	4.77E-02[b]
		Annual	2.09E-01[c]
	NO_X	1-hour	9.12E-02
		Annual	4E-01c
	CO	1 and 8-hour	6.19E-01
Manufacturing emissions - VOC Abatement systems	PM_{10}	24-hour	2.98E-02[b]
	$PM_{2.5}$	24-hour	2.98E-02[b]
		Annual	1.31E-01[c]

Table 4. EMISSION RATES FOR MODELING APPLICABILITY, SIL ANALYSES, AND CUMULATIVE NAAQS IMPACT ANALYSES			
Emissions Point Label and Description	**Pollutant**	**Averaging Period**	**Emissions Rate (lb/hr)[a]**
	NO_X	1-hour	3.92E-01
		Annual	1.72E+00[c]
	CO	1 and 8-hour	3.29E-01
Manufacturing emissions through wet scrubbers	PM_{10}	24-hour	1.17E-02[b]
	$PM_{2.5}$	24-hour	1.17E-02[b]
		Annual	5.12E-02[c]
	NO_X	1-hour	--
		Annual	--
	CO	1 and 8-hour	--
Exhaust stack and fugitive manufacturing emissions from the Makeup Air Unit (MAUB)	PM_{10}	24-hour	3.58E-02[b]
	$PM_{2.5}$	24-hour	3.58E-02[b]
		Annual	1.57E-01[c]
	NO_X	1-hour	4.71E-01
		Annual	2.06E+00[c]
	CO	1 and 8-hour	3.95E-01
Water Heater	PM_{10}	24-hour	5.60E-04[b]
	$PM_{2.5}$	24-hour	5.60E-04[b]
		Annual	2.45E-03[c]
	NO_X	1-hour	7.36E-03
		Annual	3.22E-02[c]
	CO	1 and 8-hour	6.18E-03
TPU - control system	PM_{10}	24-hour	6.04E-04[b]
	$PM_{2.5}$	24-hour	6.04E-04[b]
		Annual	2.64E-03[c]
	NO_X	1-hour	7.94E-03
		Annual	3.48E-02[c]
	CO	1 and 8-hour	6.67E-03
Emergency Generator 2	PM_{10}	24-hour	3.75E-03[b]
	$PM_{2.5}$	24-hour	3.75E-03[b]
		Annual	1.64E-02[c]
	NO_X	1-hour	2.51E-01
		Annual	1.10E+00[c]
	CO	1 and 8-hour	5.62E-02
Emergency Generator 3	PM_{10}	24-hour	6.15E-03[b]
	$PM_{2.5}$	24-hour	6.15E-03[b]
		Annual	2.69E-02[c]
	NO_X	1-hour	4.75E-01
		Annual	2.08E+00[c]
	CO	1 and 8-hour	7.26E-02
Cooling Towers	PM_{10}	24-hour	4.41E-01[b]
	$PM_{2.5}$	24-hour	2.02E-03[b]
		Annual	8.83E-03[c]
	NO_X	1-hour	--
		Annual	--
	CO	1 and 8-hour	--

a. Pounds per hour emission rate (unless otherwise listed) used in impact modeling analyses for specified averaging periods.
b. Daily emissions divided by 24hours/day.
c. Annual emissions divided over 8,760 hours/year.

Exclusion from Impact Analyses by Modeling Thresholds

A NAAQS compliance demonstration must be performed for pollutant increases that would not qualify for the BRC exemption from the requirement to demonstrate compliance with NAAQS.

Secondary Pollutant Formation

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, NOx, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource-intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

EPA issued final Modeled Emission Rates as Precursors (MERPs) guidance that may be used for Tier 1 compliance demonstrations using default minimum MERP values specific to regions within the U.S. (EPA 2019). The guidance establishes the applicability criteria and methods to evaluate impacts from secondary pollutant formation for permitting projects. EPA has modeled hypothetical sources for secondary formation of $PM_{2.5}$ and ozone. This resource can be accessed at: https://www.epa.gov/scram/merps-view-qlik. EPA issued revised guidance in 2022 for assessing ambient impacts for $PM_{2.5}$ and ozone in permitting projects attributed to precursor emissions of SO_2, NO_x, and VOCs (EPA 2022).

An 8-hour ozone SIL compliance demonstration for secondary formation of ozone from VOCs and/or NOx precursor emissions is triggered by an emission increase of either pollutant greater than the SER of 40 ton/year, as specified in Section 006.108 of the *Idaho Air Rules*. Only ozone precursor(s) with potential annual emissions exceeding the SER are required to be included in the SIL analysis. The project emission increase of NO_X was estimated at 10.01 ton/year for uncontrolled emissions and 11.73 ton/year for controlled emissions and the project emission increase of VOCs was estimated at 9 for ton/year for uncontrolled emissions and 2.09 ton/year for controlled emissions deeming a secondary pollutant formation demonstration not applicable.

3.1.2 Toxic Air Pollutant Emissions Rates

The application asserts that TAP emission increases resulting from the proposed project are below ELs for all TAPs except ammonia. Emission rates used in the TAP modeling analyses are shown in Table 5: TAPs from the manufacturing process that are also Hazardous Air Pollutants (HAPs) were not included in the analyses since they are covered or addressed by a NESHAP or NSPS.

Table 5. MODELED EMISSION RATES FOR NON-CARCINOGENIC TAPS

Source ID	Description	24-Hour Averaged Emission Rates (pounds/hour)
		Ammonia
MAU	Fugitive from manufacturing emissions	1.77

3.1.3 Emissions Release Parameters

Table 6 lists emission release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for emission point sources modeled in the air impact analyses. Table 7 lists emission release parameters for volume and area sources modeled.

Table 6. POINT SOURCE STACK PARAMETERS USED IN MODELING						
Source ID	**UTM Coordinates (UTM Y, UTM X)**	**Stack Height (meters)[a]**	**Stack Gas Exhaust Temp. (Kelvin)[b]**	**Stack Flow Velocity (meters/sec)[c]**	**Stack Diameter (meters)[a]**	**Stack Orientation**
BOI01	4827153, 537536	13.4 (43.96 ft)	477.59 (399.99 F)	5.67 (2854.45 acfm)	0.55 (1.8 ft)	Cap
BOI02	4827151, 537538	13.4 (43.96 ft)	477.59 (399.99 F)	5.67 (2854.45 acfm)	0.55 (1.8 ft)	Cap
BOI03	4827148, 537541	13.4 (43.96 ft)	393.71 (249 F)	7.96 (2854.45 acfm)	0.41 (1.33 ft)	Cap
BOI04	4827147, 537543	13.4 (43.96 ft)	477.59 (399.99 F)	5.67 (2854.45 acfm)	0.55 (1.8 ft)	Cap
HEAT	4827140, 537543	14.17 (46.49 ft)	294.26 (70 F)	1.37 (22.8 acfm)	0.1 (0.33 ft)	Vertical
VOC02UN	4827180, 537494	11.28 (37.01 ft)	304.26 (88 F)	12.62 (7814.66 acfm)	0.61 (2 ft)	Vertical
GEN02_S1	4827110, 537559.4	3.66 (12 ft)	753.71 (897 F)	50 (1871.99 acfm)	0.15 (0.5 ft)	Vertical
GEN02_S2	4827110, 537559.8	3.66 (12 ft)	753.71 (897 F)	50 (1871.99 acfm)	0.15 (0.5 ft)	Vertical
GEN03_S1	4827105, 537554.4	3.66 (12 ft)	735.93 (865 F)	50 (1871.99 acfm)	0.15 (0.5 ft)	Vertical
GEN03_S2	4827105, 537554.9	3.66 (12 ft)	735.93 (865 F)	50 (1871.99 acfm)	0.15 (0.5 ft)	Vertical
COOL01A	4827134, 537539.5	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL01B	4827132, 537537.3	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL01C	4827130, 537535.2	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL01D	4827133, 537540.8	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL01E	4827131, 537538.6	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL01F	4827128, 537536.4	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL02A	4827138, 537535.1	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL02B	4827136, 537532.9	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL02C	4827134, 537530.8	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL02D	4827137, 537536.4	4.88 (16 ft)	297.05 (75.02 F)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL02E	4827135, 537534.2	4.88 (16 ft)	297.05 (75.02 ºF)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL02F	4827133, 537532	4.88 (16 ft)	297.05 (75.02 ºF)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL03A	4827143, 537530.7	4.88 (16 ft)	297.05 (75.02 ºF)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL03B	4827141, 537528.5	4.88 (16 ft)	297.05 (75.02 ºF)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL03C	4827139, 537526.3	4.88 (16 ft)	297.05 (75.02 ºF)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL03D	4827142, 537531.9	4.88 (16 ft)	297.05 (75.02 ºF)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL03E	4827139, 537529.8	4.88 (16 ft)	297.05 (75.02 ºF)	8.53 (40064.72 acfm)	1.68 (5.5 ft)	Vertical
COOL04A	4827131, 537517	6.71 (22 ft)	295.38 (72.02 ºF)	11.03 (209701.78 acfm)	3.38 (11.08 ft)	Vertical
COOL04B	4827128, 537521.9	6.71 (22 ft)	295.38 (72.02 ºF)	11.03 (209701.78 acfm)	3.38 (11.08 ft)	Vertical
COOL05A	4827122, 537526	6.71 (22 ft)	295.38 (72.02 ºF)	11.03 (209701.78 acfm)	3.38 (11.08 ft)	Vertical
COOL05B	4827121, 537529.5	6.71 (22 ft)	295.38 (72.02 ºF)	11.03 (209701.78 acfm)	3.38 (11.08 ft)	Vertical
FS_01	4827160, 537547.2	14.94 (49 ft)	293.15 (68 ºF)	11.4 (30130.29 acfm)	1.26 (4.13 ft)	Vertical
FS_02	4827157, 537550.1	14.94 (49 ft)	293.15 (68 ºF)	11.4 (30130.29 acfm)	1.26 (4.13 ft)	Vertical
FS_03	4827153, 537553.7	14.94 (49 ft)	293.15 (68 ºF)	11.4 (30130.29 acfm)	1.26 (4.13 ft)	Vertical
VOC01	4827115, 537595.1	3.66 (12.01 ft)	304.26 (88 ºF)	28.4 (7805.49 acfm)	0.41 (1.33 ft)	Vertical
VOC02	4827181, 537487	3.66 (12.01 ft)	304.26 (88 ºF)	28.4 (7805.49 acfm)	0.41 (1.33 ft)	Vertical
VOC01UN	4827113, 537586.8	13.72 (45.01 ft)	304.26 (88 ºF)	5.61 (7731.3 acfm)	0.91 (2.99 ft)	Vertical
MAU5BPT	4827199, 537510.1	11.18 (36.68 ft)	Ambient	14.08 (7321.96 acfm)	0.56 (1.83 ft)	Vertical

a. Values in meters with equivalent value in parentheses given in feet.
b. Temperature values in parentheses given in degrees Fahrenheit.
c. Flow rate in meters/second with volumetric flow in parentheses given in actual cubic feet per minute (acfm).

Table 7. VOLUME SOURCE RELEASE PARAMETERS				
Source	**UTM Coordinates**	**Release Height (meters)[a]**	**Initial Horizontal Dimension σ_y (meters)**	**Initial Vertical Dimension σ_z (meters)**
MAU5B_01	4827196.763 ,537519.274	4.16 (13.63 ft)	1.42	3.865
MAU5B_02	4827180.563 ,537495.304	4.16 (13.63 ft)	1.42	3.865
MAU5B_03	4827171.363 ,537505.634	4.16 (13.63 ft)	1.42	3.865

a. Values in meters with equivalent value in parentheses given in feet.

All release parameters from the point and volume sources presented above were measured directly at the source. Except for the source's base elevation which was calculated using AERMAP and USGS National Elevation Dataset (NED) 1/3 arc second tiff file.

3.2 Background Concentrations

Background concentrations are used if a cumulative NAAQS impact analysis is needed to demonstrate compliance with applicable NAAQS. A background concentration tool was used to establish ambient air background concentrations for this project. The design value background concentration tool is accessed from the Northwest International Air Quality Environmental Science and Technology Consortium website (NW AIRQUEST: https://arcg.is/1jXmHH) using the location-specific coordinates. These background air pollutant levels are based on regional-scale air impact modeling of criteria pollutants in Washington, Oregon, and Idaho. The modeling was performed for years 2014-2017 using updated air pollutant emission inventories. Modeled background values were adjusted by the tool according to available contemporaneous ambient air monitoring data and improved interpolation techniques to weight the influence of monitored values with distance from the monitoring site.

Background ambient air was obtained from the NW AIRQUEST website following the methodology described above. The closest design value estimated by the NW AIRQUEST tool was used as background concentrations for the NAAQS impact analysis.

Background concentrations are listed in Table 8.

Table 8. DEQ-RECOMMENDED AMBIENT BACKGROUND CONCENTRATIONS		
Pollutant	**Averaging Period**	**Background Concentration ($\mu g/m^3$)[a,b]**
$PM_{2.5}$	24-hr	26.01
	Annual	7.2[c]
PM_{10}	24-hr	79.39
NO_2	1-hr	83.40 (44.32 ppb[f])
	Annual	23.51 (12.49 ppb)
CO	1-hr	2,824 (24.65 ppb)
	8-hr	1,646 (1436.80 ppb)

a. Micrograms per cubic meter, except where noted otherwise.
b. NW AIRQUEST ambient background lookup tool, 2014-2017.
c. The $PM_{2.5}$ Annual background concentration value was taken from new Nampa Ridgecrest site because the 2017-2019 Nampa Fire Station was being impacted by local sources. This background concentration is a more accurate value.

3.3 Impact Modeling Methodology

This section describes the modeling methods used by the applicant's consultant and/or DEQ to demonstrate preconstruction compliance with applicable air quality standards.

3.3.1 General Overview of Impact Analyses

Trinity Consultants performed the project-specific 24-hour PM_{10}, 24-hour and annual $PM_{2.5}$, Annual and

1-hour NO_2, and 1-hour and 8-hour CO air pollutant emissions inventory and air impact analyses that were submitted with the application.
The submitted information/analyses, in combination with results from DEQ's air impact analyses, demonstrate compliance with applicable air quality standards to DEQ's satisfaction, provided the facility is operated as described in the submitted application and in this memorandum.

Table 9 provides a brief description of parameters used in the air impact dispersion modeling analyses.

Table 9. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Canyon County	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 22112 was used by Trinity Consultants.
Meteorological Data	2017-2021 surface data from Boise and upper air data from Boise Airport	See Section 3.3.4 of this memorandum for additional details of the meteorological data.
Terrain	Considered	1/3 arcsecond National Elevation Dataset (NED) was acquired from the USGS for the surrounding area. AERMAP version 18081 was used to process terrain elevation data for all buildings and receptors. See Section 3.3.6 for more details.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD. See Section 3.3.7.
NO_2 Chemistry	Tier 2	Tier 2 Ambient Ratio Method (ARM2) assumes default minimum (0.5) and maximum (0.9) ambient ratios of NO_2/NOx. See Section 3.3.7.
Receptor Grid	**NAAQS Analyses**	
	fenceline	25-meter spacing
	fenceline – 400 meters	25-meter spacing
	fenceline - 750 meters	50-meter spacing
	fenceline – 2500 meters	150-meter spacing
	fenceline – 5000 meters	500-meter spacing
	hotspots	10-meter spacing

3.3.2 Modeling Protocol

A modeling protocol was submitted October 6th, 2022, and a conditional modeling protocol approval was provided to Onsemi on December 14th, 2022. The modeling report did not differ from the modeling protocol approved by ODEQ

3.3.3 Modeling Methodology

Final project-specific modeling and other required air impact analyses were generally conducted using data and methods described in the DEQ *Air Modeling Guideline* (DEQ 2021).

3.3.4 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in *Appendix W*. The refined, steady state, multiple-source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. AERMOD retains the single straight-line trajectory of ISCST3 but includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

AERMOD version 22112 was used for the air impact modeling analyses to evaluate impacts of the facility. This version was the current version at the time the application was received by DEQ.

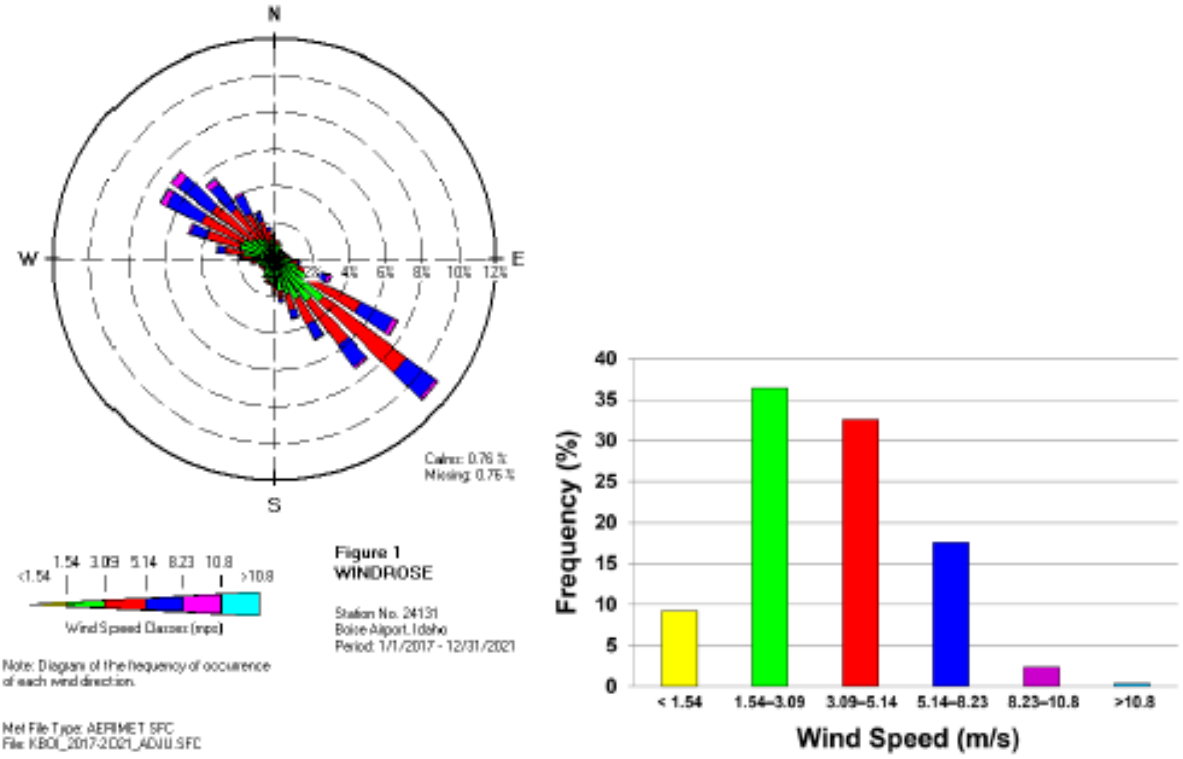
3.3.5 Meteorological Data

DEQ processed a meteorological dataset from Boise Idaho (Boise; station ID KBOI - 24131), covering the years 2017 to 2021. The upper air soundings required by AERMET were obtained from the Boise

Airport station (site ID 726810). Surface characteristics were determined by DEQ staff using AERSURFACE Version 20060. Land Cover, Impervious, and Tree Canopy data were collected in 2016 National Land Cover Database (NLCD) format. DEQ modeling staff evaluated annual moisture conditions for the AERSURFACE runs based on 31 years of Boise Airport precipitation data. Years 2018 and 2021 were assessed as having average moisture content, defined as total annual precipitation that is within the 30th and 70th percentiles of the 31-year precipitation data. Zero years were assessed as dry years, defined as total annual precipitation lower than the 30th percentile of the 31-year precipitation data. Years 2017, 2019, and 2020 were assessed as wet years, defined as total annual precipitation greater than the 70th percentile of the 31-year precipitation data. Continuous snow cover for extended periods was evident from examination of local climatological records for the years 2017-2021 and therefore was assessed in the processing.

Figure 1 shows a wind rose and wind speed histogram at the Boise Airport. AERMINUTE Version 15272 was used to process Automated Surface Observing Systems (ASOS) wind data for use in AERMET. The percent calm distribution for the period from 2017-2021 is 0.76%. Missing data account for 0.76 % of the data period. Impact modeling results presented in this memorandum were obtained by using the most recently processed meteorological dataset (AERMET Version 22112) generated by DEQ. The "adjust u star" (ADJ_U*) option was applied in AERMET to enhance model performance during low wind speeds under stable conditions. DEQ used the meteorological data with the ADJ_U* option enabled. DEQ determined that these data are adequately representative of the meteorology at the Onsemi site for minor source permitting.

Figure 1. (LEFT) WIND ROSE AND (RIGHT) WIND SPEED HISTOGRAM AT THE BOISE AIRPORT IN IDAHO (2017-2021**)**



3.3.6 Effects of Terrain on Modeled Impacts

The facility is located in flat terrain and surrounded by light industrial, commercial, agricultural and residential areas. The closest hill is located beyond the 5km receptor grid so no additional terrain

processing or flagpole receptors were required.

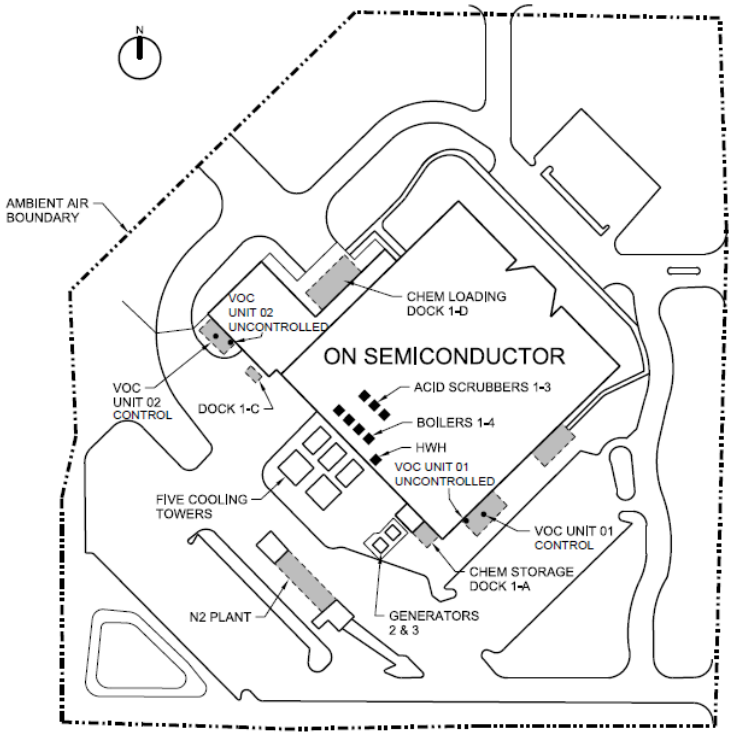
Submitted ambient air impact analyses used terrain data extracted from United States Geological Survey (USGS) National Elevation Dataset (NED) 1/3-arcsecond Tagged Image File Format (TIFF) files.

The terrain preprocessor AERMAP version 18081 was used by Trinity Consultants to extract the elevations from the NED files and assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emission plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain.

3.3.7 Facility Layout and Effects of Building Downwash

The sources modeled for this application have been modeled before. The facility's layout has been verified extensively before for previous permitting efforts and for this modeling analyses, the facility's layout was verified using google earth. The following figure shows the facility's layout as submitted by Onsemi.

Figure 2. Onsemi Nampa Facility Layout



DEQ verified proper identification of the site location, building locations, and the ambient air boundary by comparing a graphical representation of the modeling input file to plot plans submitted in the application. Aerial photographs on Google Earth (available at https://www.google.com/earth) were also used to assure that horizontal coordinates of existing structures and emission sources were accurate as described in the application.

Potential downwash effects on emission plumes were accounted for in the model by using building dimensions and locations (locations of building corners, base elevation, and building heights). Dimensions and orientation of proposed buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME version 04274) to

calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD.

3.3.8 NOx Chemistry

The atmospheric chemistry of NO, NO_2, and O_3 complicates accurate prediction of NO_2 impacts resulting from NOx emissions. The conversion of NO to NO_2 can be conservatively addressed using several methods as outlined in a *2014 EPA NO_2 Modeling Clarification Memorandum* (EPA 2014). The guidance outlines a three-tiered approach:

- Tier 1 – assume full conversion of NO to NO_2 where total NOx emissions are modeled and modeled impacts are assumed to be 100 percent NO_2.
- Tier 2 – use an ambient ratio to adjust impacts from the Tier 1 analysis or use of the Ambient Ratio Method 2 (ARM2), which is incorporated into the AERMOD model.
- Tier 3 – use a detailed screening method to account for $NO/NO_2/O_3$ chemistry such as the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM).

Onsemi used the Tier 2 ARM2 algorithms in its 1-hour NO_2 ambient air impact modeling analyses. Default ambient ratios of 0.5 and 0.9 were used for minimum and maximum ratios, respectively.

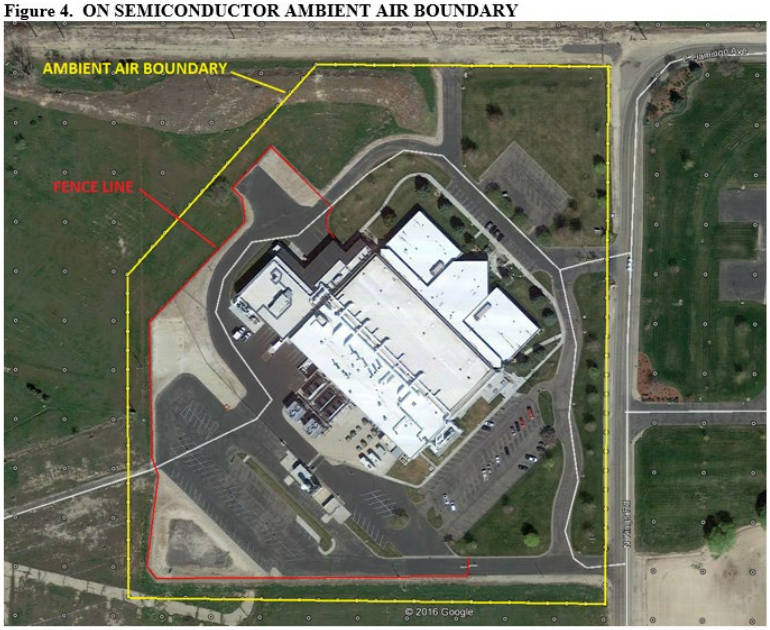
3.3.9 Ambient Air Boundary

Ambient air is defined in Section 006 of the *Idaho Air Rules* as "that portion of the atmosphere, external to buildings, to which the general public has access." Ambient air is typically considered areas external to the identified property boundary where the facility is located, assuming that reasonable measures will be taken to preclude public access.

The ambient air boundary used for this project was established along the facility's leased property line as shown below in Figure 4. The entire perimeter of the facility along the ambient air boundary line will be posted with no trespassing signs, as described in the submitted application, to preclude public access. Although most of the facility is fenced and gated, which effectively precludes access, the fencing is inside of what was used as the ambient air boundary.

DEQ review concluded that the ambient air boundary employed in the final air impact analyses precluded public access based on the methods described in the modeling report according to the criteria described in DEQ's *Modeling Guideline*[2]. The modeling demonstration appropriately addressed air pollutant impacts to areas considered to be ambient air.

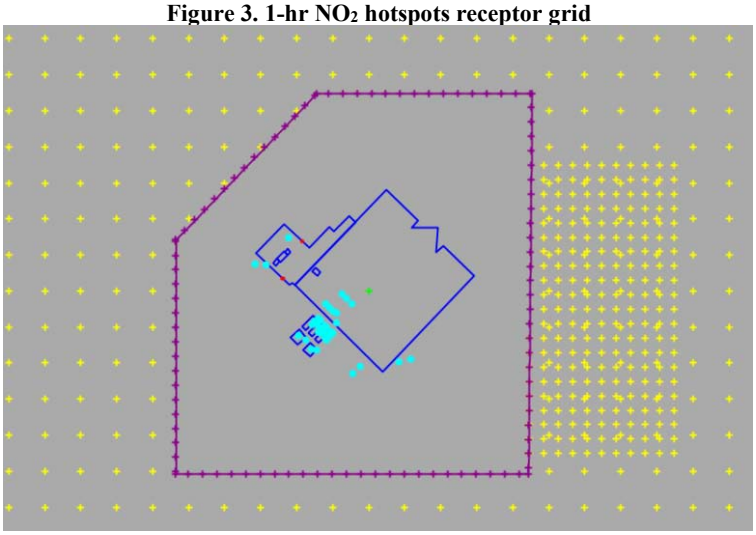
Figure 4. ON SEMICONDUCTOR AMBIENT AIR BOUNDARY



3.3.10 Receptor Network

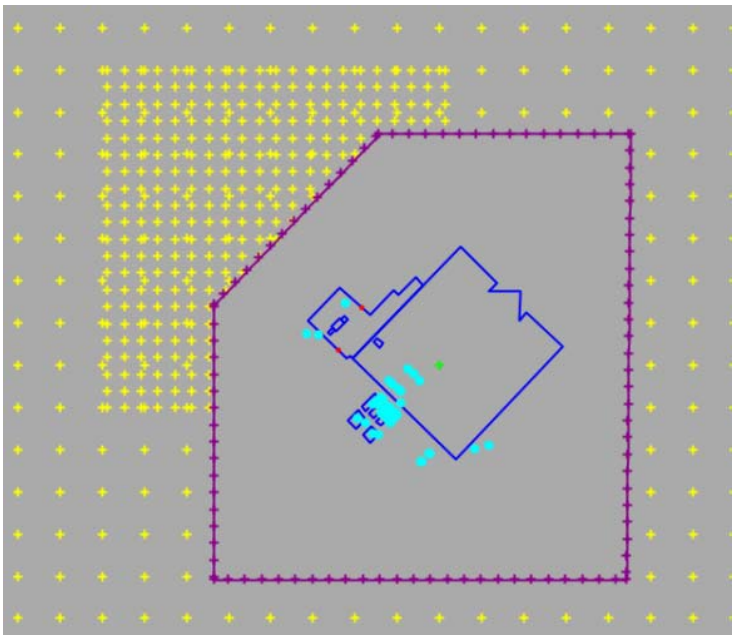
Table 9 describes the receptor spacing used in air impact modeling. The receptor grid and the additional hotspots for areas where high impacts were identified are likely to provide adequate resolution of impacts from facility wide emissions to ambient air. The figure below shows the hotspots receptor grid developed for 1-hr NO_2 and 24hr $PM_{2.5}$ modeling analysis.

Figure 3. 1-hr NO_2 hotspots receptor grid



a) Purple line represents the facility's ambient air boundary;
b) Blue dots represent the modeled emission sources;
c) Blue lines represent the facility's buildings; and
d) Yellow dots represent receptors placed beyond the ambient air boundary.

Figure 4. 24-hr $PM_{2.5}$ hotspots receptor grid



a) Purple line represents the facility's ambient air boundary;
b) Blue dots represent the modeled emission sources;
c) Blue lines represent the facility's buildings; and
d) Yellow dots represent receptors placed beyond the ambient air boundary.

3.3.11 Good Engineering Practice Stack Height

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with *Idaho Air Rules* Section 512.03.b:

H = S + 1.5L, where:

H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.

S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of the nearby structure.

Emission release points from all sources are below GEP stack height. Therefore, it is important to account for plume downwash caused by structures at the facility.

4.0 NAAQS and TAPs Impact Modeling Results

This section presents air impact modeling results used to demonstrate compliance with applicable standards and increments.

4.1 Results for NAAQS Analyses

4.1.1 Significant Impact Level Analyses

The FEC requires that all pollutants above the BRC to be modeled to evaluate their impacts to the NAAQS, regardless if the modeled impacts are below or above the SIL.

4.1.2 Cumulative NAAQS Impact Analyses

Table 10 and Table 11 provide results for the Cumulative NAAQS Impact analysis for a controlled and uncontrolled emission scenario respectively. For each modeled pollutant, the total impact was calculated by adding the design value (DV) of the impact to the ambient background value. The sum was then compared to the NAAQS. Ambient impacts for the facility, when combined with approved ambient

backgrounds, were below the NAAQS at all receptors where the facility-modeled impacts exceeded the SIL.

Table 10. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSES (CONTROLLED SCENARIO)						
Pollutant	**Averaging Period**	**Modeled Design Value Concentration ($\mu g/m^3$)[a]**	**Background Concentration ($\mu g/m^3$)**	**Total Ambient Impact ($\mu g/m^3$)**	**NAAQS ($\mu g/m^3$)**	**Percent of NAAQS**
$PM_{2.5}$[b]	24-hour	5.73	26	31.74	35	91%
	Annual	1.17	7.2	8.37	9	93%
PM_{10}[c]	24-hour	10.80	79.4	90.19	150	60%
NO_2[d]	1-hour	101.72	83.4	185.12	188	98%
	Annual	11	23.5	34.51	100	35%
CO[f]	1-hour	1186.80	2824	4011	40,000	10%
	8-hour	437.27	1646	2083	10,000	21%

[a.] Micrograms per cubic meter.

Table 11. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSES (UNCONTROLLED SCENARIO)						
Pollutant	**Averaging Period**	**Modeled Design Value Concentration ($\mu g/m^3$)[a]**	**Background Concentration ($\mu g/m^3$)**	**Total Ambient Impact ($\mu g/m^3$)**	**NAAQS ($\mu g/m^3$)**	**Percent of NAAQS**
$PM_{2.5}$[b]	24-hour	5.47	26	31.48	35	90%
	Annual	1.06	7.2	8.26	9	92%
PM_{10}[c]	24-hour	10.47	79.4	89.86	150	60%
NO_2[d]	1-hour	90.21	83.4	173.61	188	92%
	Annual	9.60	23.5	33.11	100	33%
CO[f]	1-hour	1171.94	2824	3996	40,000	10%
	8-hour	431.06	1646	2077	10,000	21%

[a.] Micrograms per cubic meter.

4.2 Results for TAPs Impact Analyses

Dispersion modeling was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 and 586 for those TAPs with facility-wide emissions exceeding screening emission levels (ELs). Table 12 lists the maximum modeled impacts for specific TAPs. All modeled impacts are below applicable AACs and AACCs.

Table 12. TAP AIR IMPACT ANALYSIS RESULTS			
TAP	**Maximum Modeled Impact ($\mu g/m^3$)[a]**	**AAC ($\mu g/m^3$)**	**Percent of AAC**
Ammonia[b]	44.50	900	5%

[a.] Micrograms per cubic meter.
[b.] Non-carcinogenic TAP. Modeled impact and AAC represent a 24-hour averaged concentration.
[c.] Carcinogenic TAP. Modeled impact and AACC represent annual or period-average concentration.

5.0 Conclusions

The analyses and information submitted with the PTC application, combined with DEQ air impact analyses, demonstrated to DEQ's satisfaction that applicable emissions resulting from the proposed Onsemi semiconductor facility in Nampa, Idaho, as described in this memorandum, will not cause or significantly contribute to a violation of any ambient air quality standard or TAP increment.

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APPENDIX C – 40 CFR 63 SUBPART ZZZZ AND 40 CFR 60 SUBPART IIII

The applicable parts are highlighted in yellow. Additional explanation is provided in italics.

40 CFR 63, Subpart ZZZZ ..... National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

§ 63.6580 What is the purpose of subpart ZZZZ?

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

§ 63.6585 Am I subject to this subpart?

You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

(a) A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

(b) A major source of HAP emissions is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons (9.07 megagrams) or more per year or any combination of HAP at a rate of 25 tons (22.68 megagrams) or more per year, except that for oil and gas production facilities, a major source of HAP emissions is determined for each surface site.

(c) An area source of HAP emissions is a source that is not a major source.

(d) If you are an owner or operator of an area source subject to this subpart, your status as an entity subject to a standard or other requirements under this subpart does not subject you to the obligation to obtain a permit under 40 CFR part 70 or 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable.

(e) If you are an owner or operator of a stationary RICE used for national security purposes, you may be eligible to request an exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C.

(f) The emergency stationary RICE listed in paragraphs (f)(1) through (3) of this section are not subject to this subpart. The stationary RICE must meet the definition of an emergency stationary RICE in §63.6675, which includes operating according to the provisions specified in §63.6640(f).

(1) Existing residential emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

(2) Existing commercial emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

(3) Existing institutional emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in §63.6640(f)(4)(ii).

onsemi operates two stationary emergency RICE located at an area source of HAP emissions. Therefore, §63.6585(a) and (c) are applicable.

§ 63.6590 What parts of my plant does this subpart cover?

This subpart applies to each affected source.

(a) Affected source. An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand.

(1) Existing stationary RICE.

(i) For stationary RICE with a site rating of more than 500 brake horsepower (HP) located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before December 19, 2002.

(ii) For stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iii) For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iv) A change in ownership of an existing stationary RICE does not make that stationary RICE a new or reconstructed stationary RICE.

(2) New stationary RICE.

(i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(3) Reconstructed stationary RICE. (i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after June 12, 2006.

The two engines operated by onsemi commenced construction after June 12, 2006. Therefore, they are new stationary RICE.

(b) Stationary RICE subject to limited requirements.

(1) An affected source which meets either of the criteria in paragraphs (b)(1)(i) through (ii) of this section does not have to meet the requirements of this subpart and of subpart A of this part except for the initial notification requirements of §63.6645(f).

(i) The stationary RICE is a new or reconstructed emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii).

(ii) The stationary RICE is a new or reconstructed limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(2) A new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis must meet the initial notification requirements of §63.6645(f) and the requirements of §§63.6625(c), 63.6650(g), and 63.6655(c). These stationary RICE do not have to meet the emission limitations and operating limitations of this subpart.

(3) The following stationary RICE do not have to meet the requirements of this subpart and of subpart A of this part, including initial notification requirements:

(i) Existing spark ignition 2 stroke lean burn (2SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(ii) Existing spark ignition 4 stroke lean burn (4SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(iii) Existing emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii).

(iv) Existing limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(v) Existing stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(c) Stationary RICE subject to Regulations under 40 CFR Part 60. An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

(1) A new or reconstructed stationary RICE located at an area source;

(2) A new or reconstructed 2SLB stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(3) A new or reconstructed 4SLB stationary RICE with a site rating of less than 250 brake HP located at a major source of HAP emissions;

(4) A new or reconstructed spark ignition 4 stroke rich burn (4SRB) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(5) A new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(6) A new or reconstructed emergency or limited use stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(7) A new or reconstructed compression ignition (CI) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

Compliance with Subpart ZZZZ is shown through complying with 40 CFR 60 Subpart IIII and no further analysis is required for the purposes of this Subpart.

40 CFR 60, Subpart IIII..... Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

§ 60.4200..... Am I subject to this subpart?

(a) The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) and other persons as specified in paragraphs (a)(1) through (4) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

(1) Manufacturers of stationary CI ICE with a displacement of less than 30 liters per cylinder where the model year is:

(i) 2007 or later, for engines that are not fire pump engines;

(ii) The model year listed in Table 3 to this subpart or later model year, for fire pump engines.

(2) Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are:

(i) Manufactured after April 1, 2006, and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

(3) Owners and operators of any stationary CI ICE that are modified or reconstructed after July 11, 2005 and any person that modifies or reconstructs any stationary CI ICE after July 11, 2005.

(4) The provisions of §60.4208 of this subpart are applicable to all owners and operators of stationary CI ICE that commence construction after July 11, 2005.

(b) The provisions of this subpart are not applicable to stationary CI ICE being tested at a stationary CI ICE test cell/stand.

(c) If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart applicable to area sources.

(d) Stationary CI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C (or the exemptions described in 40 CFR part 89, subpart J and 40 CFR part 94, subpart J, for engines that would need to be certified to standards in those parts), except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security.

(e) Owners and operators of facilities with CI ICE that are acting as temporary replacement units and that are located at a stationary source for less than 1 year and that have been properly certified as meeting the standards that would be applicable to such engine under the appropriate nonroad engine provisions, are not required to meet any other provisions under this subpart with regard to such engines.

onsemi operates two emergency engines that are subject to 40 CFR 63 Subpart ZZZZ and are required to meet the requirements of 40 CFR 63 Subpart ZZZZ by meeting the requirements of 40 CFR part 60 subpart IIII in accordance with 40 CFR 63.6590(c).

§ 60.4201 ..... What emission standards must I meet for non-emergency engines if I am a stationary CI internal combustion engine manufacturer?

onsemi does not operate non-emergency engines. This section is not applicable.

§ 60.4202 ..... What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?

onsemi is not an emergency engine manufacturer. This section is not applicable.

§ 60.4203 ..... How long must my engines meet the emission standards if I am a manufacturer of stationary CI internal combustion engines?

onsemi is not an emergency engine manufacturer. This section is not applicable.

§ 60.4204 ..... What emission standards must I meet for non-emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

onsemi does not operate non-emergency engines. This section is not applicable.

§ 60.4205 ..... What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of less than 10 liters per cylinder that are not fire pump engines must comply with the emission standards in Table 1 to this subpart. Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards in 40 CFR 94.8(a)(1).

Table 1 to Subpart IIII of Part 60—Emission Standards for Stationary Pre-2007 Model Year Engines With a Displacement of <10 Liters per Cylinder and 2007-2010 Model Year Engines >2,237 KW (3,000 HP) and With a Displacement of <10 Liters per Cylinder

Maximum engine power	Emission standards for stationary pre-2007 model year engines with a displacement of <10 liters per cylinder and 2007-2010 model year engines >2,237 KW (3,000 HP) and with a displacement of <10 liters per cylinder in g/KW-hr (g/HP-hr)				
	NMHC + NO_X	HC	NO_X	CO	PM
KW<8 (HP<11)	10.5 (7.8)			8.0 (6.0)	1.0 (0.75)
8≤KW<19 (11≤HP<25)	9.5 (7.1)			6.6 (4.9)	0.80 (0.60)
19≤KW<37 (25≤HP<50)	9.5 (7.1)			5.5 (4.1)	0.80 (0.60)
37≤KW<56 (50≤HP<75)			9.2 (6.9)		
56≤KW<75 (75≤HP<100)			9.2 (6.9)		
75≤KW<130 (100≤HP<175)			9.2 (6.9)		
130≤KW<225 (175≤HP<300)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)
225≤KW<450 (300≤HP<600)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)
450≤KW≤560 (600≤HP≤750)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)
KW>560 (HP>750)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)

onsemi owns and operates two pre-2007 model year emergency stationary CI ICE, each with displacements less than 10 liters per cylinder and must comply with the emission standards as listed in Table 1. (b) Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in §60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.

(c) Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.

(d) Owners and operators of emergency stationary CI engines with a displacement of greater than or equal to 30 liters per cylinder must meet the requirements in this section.

(1) For engines installed prior to January 1, 2012, limit the emissions of NOX in the stationary CI internal combustion engine exhaust to the following:

(i) 17.0 g/KW-hr (12.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) 45 · n−0.2 g/KW-hr (34 · n−0.2 g/HP-hr) when maximum engine speed is 130 or more but less than 2,000 rpm, where n is maximum engine speed; and

(iii) 9.8 g/kW-hr (7.3 g/HP-hr) when maximum engine speed is 2,000 rpm or more.

(2) For engines installed on or after January 1, 2012, limit the emissions of NOX in the stationary CI internal combustion engine exhaust to the following:

(i) 14.4 g/KW-hr (10.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) 44 · n−0.23 g/KW-hr (33 · n−0.23 g/HP-hr) when maximum engine speed is greater than or equal to 130 but less than 2,000 rpm and where n is maximum engine speed; and

(iii) 7.7 g/KW-hr (5.7 g/HP-hr) when maximum engine speed is greater than or equal to 2,000 rpm.

(3) Limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.40 g/KW-hr (0.30 g/HP-hr).

(e) Owners and operators of emergency stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests in-use must meet the NTE standards as indicated in §60.4212.

(f) Owners and operators of any modified or reconstructed emergency stationary CI ICE subject to this subpart must meet the emission standards applicable to the model year, maximum engine power, and displacement of the modified or reconstructed CI ICE that are specified in paragraphs (a) through (e) of this section.

§ 60.4206 ..... How long must I meet the emission standards if I am an owner or operator of a stationary CI internal combustion engine?

Owners and operators of stationary CI ICE must operate and maintain stationary CI ICE that achieve the emission standards as required in §§60.4204 and 60.4205 over the entire life of the engine.

onsemi is subject to this Subpart and must comply with this section.

§ 60.4207 ..... What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?

(a) Beginning October 1, 2007, owners and operators of stationary CI ICE subject to this subpart that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(a).

(b) Beginning October 1, 2010, owners and operators of stationary CI ICE subject to this subpart with a displacement of less than 30 liters per cylinder that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted.

40 CFR 80.510(b)

(b) all NR diesel fuel is subject to the following per-gallon standards:

(1) Sulfur content.

(i) 15 ppm maximum for NR diesel fuel.

(2) Cetane index or aromatic content, as follows:

(i) A minimum cetane index of 40; or

(ii) A maximum aromatic content of 35 volume percent.

(c) [Reserved]

(d) Beginning June 1, 2012, owners and operators of stationary CI ICE subject to this subpart with a displacement of greater than or equal to 30 liters per cylinder are no longer subject to the requirements of paragraph (a) of this section, and must use fuel that meets a maximum per-gallon sulfur content of 1,000 parts per million (ppm).

(e) Stationary CI ICE that have a national security exemption under §60.4200(d) are also exempt from the fuel requirements in this section.

onsemi owns and operates two stationary CI ICE subject to this subpart and are required to meet the requirements of 40 CFR 80.510(b) for nonroad diesel.

§ 60.4208 ..... What is the deadline for importing or installing stationary CI ICE produced in previous model years?

(a) After December 31, 2008, owners and operators may not install stationary CI ICE (excluding fire pump engines) that do not meet the applicable requirements for 2007 model year engines.

(b) After December 31, 2009, owners and operators may not install stationary CI ICE with a maximum engine power of less than 19 KW (25 HP) (excluding fire pump engines) that do not meet the applicable requirements for 2008 model year engines.

(c) After December 31, 2014, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 19 KW (25 HP) and less than 56 KW (75 HP) that do not meet the applicable requirements for 2013 model year non-emergency engines.

(d) After December 31, 2013, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 56 KW (75 HP) and less than 130 KW (175 HP) that do not meet the applicable requirements for 2012 model year non-emergency engines.

(e) After December 31, 2012, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 130 KW (175 HP), including those above 560 KW (750 HP), that do not meet the applicable requirements for 2011 model year non-emergency engines.

(f) After December 31, 2016, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 560 KW (750 HP) that do not meet the applicable requirements for 2015 model year non-emergency engines.

(g) After December 31, 2018, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power greater than or equal to 600 KW (804 HP) and less than 2,000 KW (2,680 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that do not meet the applicable requirements for 2017 model year non-emergency engines.

(h) In addition to the requirements specified in §§60.4201, 60.4202, 60.4204, and 60.4205, it is prohibited to import stationary CI ICE with a displacement of less than 30 liters per cylinder that do not meet the applicable requirements specified in paragraphs (a) through (g) of this section after the dates specified in paragraphs (a) through (g) of this section.

(i) The requirements of this section do not apply to owners or operators of stationary CI ICE that have been modified, reconstructed, and do not apply to engines that were removed from one existing location and reinstalled at a new location.

§ 60.4209 ..... What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?

If you are an owner or operator, you must meet the monitoring requirements of this section. In addition, you must also meet the monitoring requirements specified in §60.4211.

(a) If you are an owner or operator of an emergency stationary CI internal combustion engine that does not meet the standards applicable to non-emergency engines, you must install a non-resettable hour meter prior to startup of the engine.

(b) If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in §60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.

onsemi must install a non-resettable hour meter prior to startup of their engines.

§ 60.4210 ..... What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?

onsemi is not an engine manufacturer. Therefore, this section does not apply.

§ 60.4211 ..... What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?

(a) If you are an owner or operator and must comply with the emission standards specified in this subpart, you must do all of the following, except as permitted under paragraph (g) of this section:

(1) Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions;

(2) Change only those emission-related settings that are permitted by the manufacturer; and

(3) Meet the requirements of 40 CFR parts 89, 94 and/or 1068, as they apply to you.

(b) If you are an owner or operator of a pre-2007 model year stationary CI internal combustion engine and must comply with the emission standards specified in §§60.4204(a) or 60.4205(a), or if you are an owner or operator of a CI fire pump engine that is manufactured prior to the model years in table 3 to this subpart and must comply with the emission standards specified in §60.4205(c), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) through (5) of this section.

(1) Purchasing an engine certified according to 40 CFR part 89 or 40 CFR part 94, as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's specifications.

onsemi is required to meet the emission standards of this subpart and must comply with the compliance requirements of this section.

(2) Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in this subpart and these methods must have been followed correctly.

(3) Keeping records of engine manufacturer data indicating compliance with the standards.

(4) Keeping records of control device vendor data indicating compliance with the standards.

(5) Conducting an initial performance test to demonstrate compliance with the emission standards according to the requirements specified in §60.4212, as applicable.

(c) If you are an owner or operator of a 2007 model year and later stationary CI internal combustion engine and must comply with the emission standards specified in §60.4204(b) or §60.4205(b), or if you are an owner or operator of a CI fire pump engine that is manufactured during or after the model year that applies to your fire pump engine power rating in table 3 to this subpart and must comply with the emission standards specified in §60.4205(c), you must comply by purchasing an engine certified to the emission standards in §60.4204(b), or §60.4205(b) or (c), as applicable, for the same model year and maximum (or in the case of fire pumps, NFPA nameplate) engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in paragraph (g) of this section.

(d) If you are an owner or operator and must comply with the emission standards specified in §60.4204(c) or §60.4205(d), you must demonstrate compliance according to the requirements specified in paragraphs (d)(1) through (3) of this section.

(1) Conducting an initial performance test to demonstrate initial compliance with the emission standards as specified in §60.4213.

(2) Establishing operating parameters to be monitored continuously to ensure the stationary internal combustion engine continues to meet the emission standards. The owner or operator must petition the Administrator for approval of operating parameters to be monitored continuously. The petition must include the information described in paragraphs (d)(2)(i) through (v) of this section.

(i) Identification of the specific parameters you propose to monitor continuously;

(ii) A discussion of the relationship between these parameters and NOX and PM emissions, identifying how the emissions of these pollutants change with changes in these parameters, and how limitations on these parameters will serve to limit NOX and PM emissions;

(iii) A discussion of how you will establish the upper and/or lower values for these parameters which will establish the limits on these parameters in the operating limitations;

(iv) A discussion identifying the methods and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments; and

(v) A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

(3) For non-emergency engines with a displacement of greater than or equal to 30 liters per cylinder, conducting annual performance tests to demonstrate continuous compliance with the emission standards as specified in §60.4213.

(e) If you are an owner or operator of a modified or reconstructed stationary CI internal combustion engine and must comply with the emission standards specified in §60.4204(e) or §60.4205(f), you must demonstrate compliance according to one of the methods specified in paragraphs (e)(1) or (2) of this section.

(1) Purchasing, or otherwise owning or operating, an engine certified to the emission standards in §60.4204(e) or §60.4205(f), as applicable.

(2) Conducting a performance test to demonstrate initial compliance with the emission standards according to the requirements specified in §60.4212 or §60.4213, as appropriate. The test must be conducted within 60 days after the engine commences operation after the modification or reconstruction.

(f) If you own or operate an emergency stationary ICE, you must operate the emergency stationary ICE according to the requirements in paragraphs (f)(1) through (3) of this section. In order for the engine to be considered an emergency stationary ICE under this subpart, any operation other than emergency operation, maintenance and testing, emergency demand response, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (f)(1) through (3) of this section, is prohibited. If you do not operate the engine according to the requirements in paragraphs (f)(1) through (3) of this section, the engine will not be considered an emergency engine under this subpart and must meet all requirements for non-emergency engines.

(1) There is no time limit on the use of emergency stationary ICE in emergency situations.

(2) You may operate your emergency stationary ICE for any combination of the purposes specified in paragraphs (f)(2)(i) through (iii) of this section for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraph (f)(3) of this section counts as part of the 100 hours per calendar year allowed by this paragraph (f)(2).

(i) Emergency stationary ICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.

In order for the engines operated at this facility to be considered emergency engines the facility must comply with this section.

(ii) Emergency stationary ICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP-002-3, Capacity and Energy Emergencies (incorporated by reference, see §60.17), or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP-002-3.

(iii) Emergency stationary ICE may be operated for periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency.

(3) Emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing and emergency demand response provided in paragraph (f)(2) of this section. Except as provided in paragraph (f)(3)(i) of this section, the 50 hours per calendar year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

(i) The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:

(A) The engine is dispatched by the local balancing authority or local transmission and distribution system operator;

(B) The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.

(C) The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.

(D) The power is provided only to the facility itself or to support the local transmission and distribution system.

(E) The owner or operator identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the engine owner or operator.

(ii) [Reserved]

(g) If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must demonstrate compliance as follows:

(1) If you are an owner or operator of a stationary CI internal combustion engine with maximum engine power less than 100 HP, you must keep a maintenance plan and records of conducted maintenance to demonstrate compliance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, if you do not install and configure the engine and control device according to the manufacturer's emission-related written instructions, or you change the emission-related settings in a way that is not permitted by the manufacturer, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of such action.

(2) If you are an owner or operator of a stationary CI internal combustion engine greater than or equal to 100 HP and less than or equal to 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer.

(3) If you are an owner or operator of a stationary CI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer. You must conduct subsequent performance testing every 8,760 hours of engine operation or 3 years, whichever comes first, thereafter to demonstrate compliance with the applicable emission standards.

(h) The requirements for operators and prohibited acts specified in 40 CFR 1039.665 apply to owners or operators of stationary CI ICE equipped with AECDs for qualified emergency situations as allowed by 40 CFR 1039.665.

§ 60.4212 ..... What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?

Owners and operators of stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests pursuant to this subpart must do so according to paragraphs (a) through (e) of this section.

(a) The performance test must be conducted according to the in-use testing procedures in 40 CFR part 1039, subpart F, for stationary CI ICE with a displacement of less than 10 liters per cylinder, and according to 40 CFR part 1042, subpart F, for stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder.

(b) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1039 must not exceed the not-to-exceed (NTE) standards for the same model year and maximum engine power as required in 40 CFR 1039.101(e) and 40 CFR 1039.102(g)(1), except as specified in 40 CFR 1039.104(d). This requirement starts when NTE requirements take effect for nonroad diesel engines under 40 CFR part 1039.

(c) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8, as applicable, must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in 40 CFR 89.112 or 40 CFR 94.8, as applicable, determined from the following equation:

$$\text{NTE requirement for each pollutant} = (1.25) \times (\text{STD}) \qquad \text{(Eq. 1)}$$

Where:

STD = The standard specified for that pollutant in 40 CFR 89.112 or 40 CFR 94.8, as applicable.

Alternatively, stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8 may follow the testing procedures specified in §60.4213 of this subpart, as appropriate.

(d) Exhaust emissions from stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in §60.4204(a), §60.4205(a), or §60.4205(c), determined from the equation in paragraph (c) of this section.

Where:

STD = The standard specified for that pollutant in §60.4204(a), §60.4205(a), or §60.4205(c).

Alternatively, stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) may follow the testing procedures specified in §60.4213, as appropriate.

(e) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1042 must not exceed the NTE standards for the same model year and maximum engine power as required in 40 CFR 1042.101(c).

§ 60.4213 ..... What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of greater than or equal to 30 liters per cylinder?

onsemi does not own or operate any CI internal combustion engines with a displacement greater than or equal to 30 liters per cylinder. Therefore, this section is not applicable.

§ 60.4214 ..... What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of non-emergency stationary CI ICE that are greater than 2,237 KW (3,000 HP), or have a displacement of greater than or equal to 10 liters per cylinder, or are pre-2007 model year engines that are greater than 130 KW (175 HP) and not certified, must meet the requirements of paragraphs (a)(1) and (2) of this section.

(1) Submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (a)(1)(i) through (v) of this section.

(i) Name and address of the owner or operator;

(ii) The address of the affected source;

(iii) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;

(iv) Emission control equipment; and

(v) Fuel used.

(2) Keep records of the information in paragraphs (a)(2)(i) through (iv) of this section.

(i) All notifications submitted to comply with this subpart and all documentation supporting any notification.

(ii) Maintenance conducted on the engine.

(iii) If the stationary CI internal combustion is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards.

(iv) If the stationary CI internal combustion is not a certified engine, documentation that the engine meets the emission standards.

(b) If the stationary CI internal combustion engine is an emergency stationary internal combustion engine, the owner or operator is not required to submit an initial notification. Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner or operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time.

onsemi owns and operates two stationary emergency engines that are not subject to any conditions in Table 5 of this subpart and must keep record as listed above.

(c) If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached.

(d) If you own or operate an emergency stationary CI ICE with a maximum engine power more than 100 HP that operates or is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §60.4211(f)(2)(ii) and (iii) or that operates for the purposes specified in §60.4211(f)(3)(i), you must submit an annual report according to the requirements in paragraphs (d)(1) through (3) of this section.

(1) The report must contain the following information:

(i) Company name and address where the engine is located.

(ii) Date of the report and beginning and ending dates of the reporting period.

(iii) Engine site rating and model year.

(iv) Latitude and longitude of the engine in decimal degrees reported to the fifth decimal place.

(v) Hours operated for the purposes specified in §60.4211(f)(2)(ii) and (iii), including the date, start time, and end time for engine operation for the purposes specified in §60.4211(f)(2)(ii) and (iii).

(vi) Number of hours the engine is contractually obligated to be available for the purposes specified in §60.4211(f)(2)(ii) and (iii).

(vii) Hours spent for operation for the purposes specified in §60.4211(f)(3)(i), including the date, start time, and end time for engine operation for the purposes specified in §60.4211(f)(3)(i). The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.

(2) The first annual report must cover the calendar year 2015 and must be submitted no later than March 31, 2016. Subsequent annual reports for each calendar year must be submitted no later than March 31 of the following calendar year.

(3) The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (www.epa.gov/cdx). However, if the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, the written report must be submitted to the Administrator at the appropriate address listed in §60.4.

(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).

§ 60.4215 ..... What requirements must I meet for engines used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?

onsemi is not located in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands. Therefore, this section does not apply.

§ 60.4216 ..... What requirements must I meet for engines used in Alaska?

onsemi is not located in Alaska. Therefore, this section does not apply.

§ 60.4217 ..... What emission standards must I meet if I am an owner or operator of a stationary internal combustion engine using special fuels?

onsemi does not combust special fuels. Therefore, this section is not applicable.

§ 60.4218 ..... What parts of the General Provisions apply to me?

Table 8 to this subpart shows which parts of the General Provisions in §§60.1 through 60.19 apply to you.

Table 8 to Subpart IIII of Part 60—Applicability of General Provisions to Subpart IIII

General Provisions citation	Subject of citation	Applies to subpart	Explanation
§60.1	General applicability of the General Provisions	Yes	
§60.2	Definitions	Yes	Additional terms defined in §60.4219.
§60.3	Units and abbreviations	Yes	
§60.4	Address	Yes	
§60.5	Determination of construction or modification	Yes	
§60.6	Review of plans	Yes	
§60.7	Notification and Recordkeeping	Yes	Except that §60.7 only applies as specified in §60.4214(a).
§60.8	Performance tests	Yes	Except that §60.8 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder and engines that are not certified.
§60.9	Availability of information	Yes	
§60.10	State Authority	Yes	
§60.11	Compliance with standards and maintenance requirements	No	Requirements are specified in subpart IIII.
§60.12	Circumvention	Yes	
§60.13	Monitoring requirements	Yes	Except that §60.13 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder.
§60.14	Modification	Yes	
§60.15	Reconstruction	Yes	
§60.16	Priority list	Yes	
§60.17	Incorporations by reference	Yes	
§60.18	General control device requirements	No	
§60.19	General notification and reporting requirements	Yes	

§ 60.4219..... What definitions apply to this subpart?

The definitions of this Subpart apply and no further discussion is required.

APPENDIX D – FACILITY DRAFT COMMENTS

The following comments were received from the facility on December 15, 2025:

Facility Comment: We request some changes to account for the TPUs as process equipment, not as emissions control devices. The application introduced this with the following language:

"The TPU is currently being used to control tetraethoxysilane (TEOS) gas. Left uncontrolled, reaction by-products of TEOS and other process gases could collect in the piping which results in process complications. The TPU is being used as process-related equipment rather than an emissions control device. Therefore, onsemi is requesting the removal of permit condition 4.9.2. The emissions inventory only includes natural gas combustion emissions for the TPU."

The TPUs are in use for the process equipment mechanical integrity and safe operation. They would be operated the same even in the absence of air quality regulations. The emissions inventory considers the natural gas combustion emissions from the TPUs but does not rely on a pollutant control efficiency from exhaust streams routed to the TPU. To reflect this in the permit, onsemi requests:

- Removal of Condition 4.9 (4.9.1 and 4.9.2) and 4.6.4
- Relocating Conditions 4.6.1, 4.6.2, 4.6.3, and 4.6.5 to Section 6 of the permit.
- In Tables 1.1, 3.1, and 4.1 relocate mention of the TPUs from the emissions control device column to the source column.

DEQ Response: Permit Condition 4.9 (4.9.1 and 4.9.2) and 4.6.4 have been removed and in Tables 1.1, 3.1, and 4.1, the mention of the TPUs is relocated from the emissions control device column to the source column. These changes were made so as to be consistent with way the thermal processing unit is being treated across the different facilities. In the Micron permit, the TPU is treated as process equipment.

Permit Condition 4.6.1, 4.6.2, 4.6.3, and 4.6.5 are not relocated. DEQ has left it in section 4 of the permit as the TPU units share the same control devices as manufacturing processes and is a better fit to this section of the permit.

Facility Comment: Additionally, can we change all descriptions of Thermal Processing Units (TPUs) to Gas Abatement? This reflects more generalized equipment descriptions for this process. TPU is a relic of a single equipment vendor's nomenclature but is not necessarily descriptive of like-kind equipment from other vendors.

DEQ Response: It has been updated.

Facility Comment: In Table 1.1, The control efficiency of 90-99.99% listed for the scrubbers should be shifted to the VOC abatement. The scrubbers have control efficiency as low as 40%. See the emission inventory tabs: "Gasses", "Photoresists and Other Organics", and "Acids Bases" for equipment-specific control efficiencies.

DEQ Response: It has been updated.

Facility Comment: Are we able to submit the annual reporting required in Condition 3.7 via email rather than a printed copy? Can this be specified in the permit? For context, there were email discussions between onsemi and DEQ representatives where DEQ requested email submittal for the most recent annual emissions report and for reports moving forward. It would be helpful to have an email option specified in the permit for the annual emissions report.

DEQ Response: Yes, it can be submitted via email. The email address for submittal is added to the permit condition 3.7

Facility Comment: Please update the references in Condition 3.11 to point to the most recent application submittal and not the 2017 modeling demonstration. The Chi/Q factors in this condition also need to be updated to the most recent application submittal factors (14.31 for 24-hr, 2.91 for annual).

DEQ Response: Both the references and the Chi/Q factors have been updated accordingly.

Facility Comment: Please update the references in Condition 6.4 to point to the emission inventory appendix instead of the 2017-2018 submittal for the prior permitting action.

DEQ Response: "the permittee's application dated November 9, 2016, the revised modeling file received December 1, 2017, and the revised emissions inventory spreadsheet received May 9, 2018" has been updated to "Appendix A of this permit".

Facility Comment: Please expand Table 1.1 listing of fuel types for the emergency generators consistent with the fuel types listed in Condition 7.3.

DEQ Response: It has been expanded to be consistent with the fuel types listed in Condition 7.3.

Facility Comment: Throughout the permit and SOB, can we change the nomenclature of boilers (i.e. BOI#) from "BOI" to "BLR". This is simply to bring it to consistency with facility nomenclature.

DEQ Response: It has been changed in both the Sob and Permit.

Facility Comment: Have cooling towers identified as "CT#" instead of "COOL#" to match the facility's internal nomenclature.

DEQ Response: It has been updated.

Facility Comment: Change boiler models and names to correct historic discrepancies (administrative change, does not affect emissions)

- The three identical boilers are Cleaver Brooks, Model MTHG-105 and named BLR01, BLR02, BLR03. These have Low-NO_x burners.
- The additional single boiler is Cleaver Brooks, Model ICB-700-200-125 and named BLR04.

DEQ Response: It has been updated.

Facility Comment: Change the VOC abatement unit model numbers to correct historic discrepancies (administrative change, does not affect emissions).

- VOC01 is a Munters 1ZS-2946-TH
- VOC02 is a Munters 1ZS-D1500-TH

DEQ Response: It has been updated.

Facility Comment: The hot water heater has been replaced with a like-kind new unit: A.O. Smith BT-100 400. Build date 04/07/2025.

DEQ Response: It has been updated.

The following comments were received from the facility on January 14, 2026:

Facility Comment: We have no additional comments and can proceed to the next step of permit issuance.

DEQ Response: Sure.

APPENDIX E – PROCESSING FEE

T2 Processing Fee Calculation Worksheet

Instructions:
Insert the following information and answer the following questions either Y or N. Insert the permitted emissions in tons per year into the table. TAPS only apply when the Tier II is being used for New Source Review.

Facility Name: **onsemi**
Permit No.: **T2-2023.0008**
Project ID: **PROJ 63057**

N	Did this permit meet the requirements of IDAPA 58.01.01.407.02 for a fee exemption Y/N?
N	Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N
Y	Is this a synthetic minor permit? Y/N

Emissions Inventory	
Pollutant	Permitted Emissions (T/yr)
NO_X	11.7
PM10	3.4
PM	1.3
SO_2	0.3
CO	14.9
VOC	53.0
Total:	84.5
Fee Due	**$ 10,000.00**

Comments: The facility is permitted as a synthetic minor source of HAP emissions.