Statement of Basis

Permit to Construct and Tier II Operating Permit No. T2-2016.0064
Project ID 61813

ON Semiconductor
Nampa, Idaho

Facility ID 027-00095

Final

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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

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

Description

ON Semiconductor (ON) manufactures semiconductor devices (also called chips or die) on silicon wafers.

Due to the changing manufacturing demand, ON 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.

Manufacturing

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

Cleaning

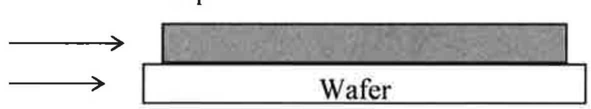
Silicon wafers are cleaned to remove particles and contaminants such as dust. Aqueous acid or acid mixtures are the most commonly used cleaning solutions. Use of acids is generally necessary because of the solubility characteristics of silicon, silicon oxide, and common contaminants. A variety of acids may be used depending on the nature of the material to be removed.

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 later 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

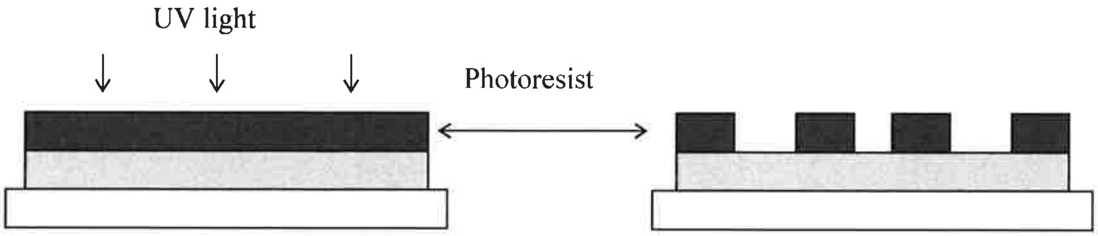


Photolithography

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 During
And After Photo

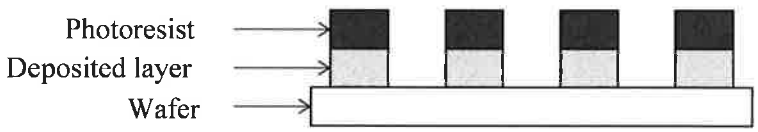


Etch

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

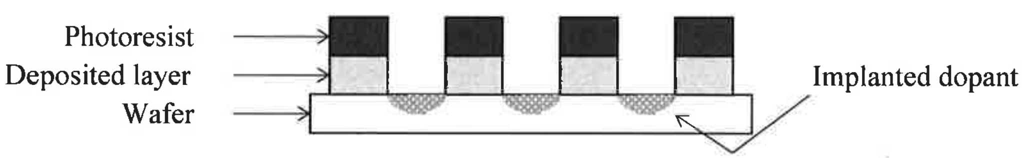


Doping (Diffusion and Implant)

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.

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 above, 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 acid scrubbers to treat acid emissions, two VOC abatement units to oxidize VOC, one Thermal Processing Unit (TPU) to treat specific manufacturing process gas streams such as perfluorinated compound gas species, The other TPU is also permitted as operation variability for this facility. How these control devices are used at the facility is described under Emissions Inventories section.

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 (MAU5B) 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 equipment.

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).

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 (A, but will become S upon issuance of this permit)
April 1, 2011	T2-2010.0185 project 60671, renewal of Permit to Construct and Tier II Operation Permit (PTC/T2) with Facility Emissions Cap (FEC), Permit status (S)
July 14, 2006	P-060013, Initial FEC permit, Permit status (S)

Application Scope

This is a renewal of the PTC/T2 that contains FEC.

The applicant has proposed to:

- Reduce PM_{10} FEC limit,
- Add a $PM_{2.5}$ FEC limit,
- Remove new emergency generator (NGEN 01) and a sixth cooling tower (NCOOL 06) from the existing permit,
- Add two thermal processing units in the permit as operational variability emission units, and
- Limit routine testing and maintenance activities to 100 hr /yr and 2 hr/day for each emergency generator.
- Name Kewanee boiler as Boiler 3 (BOI03) and Cleaver Brooks boiler as Boiler 4 (BOI04).

  (Noted that BOI03 is identified as a Cleaver Brooks Boiler and that BOI04 is identified as a Kewanee Boiler in the emission calculations, modeling files and modeling report of the application.)

Application Chronology

November 9, 2016	DEQ received an application and an application fee.
December 9, 2016	DEQ determined that the application was incomplete.
December 21, 2017	DEQ received supplemental information from the applicant.
January 20, 2017	DEQ determined that the application was complete.
February 6, 2017	DEQ request information on a point source (i.e., MAU 5B) that was missed in the EI and modeling.
June 20, 2017	DEQ received additional information and an updated modeling report.
September 7, 2017	DEQ received revised emissions inventory (EI).

September 19, 2017	DEQ made available the draft permit and statement of basis for peer and regional office review.
December 1, 2017	DEQ received revised modeling files.
April 24, 2018	DEQ made available the draft permit and statement of basis for applicant review.
May 9 and June 5, 2018	DEQ received revised EI and an amendment to $PM_{10}/PM_{2.5}$ NAAQS compliance.
July 5 – August 6, 2018	DEQ provided a public comment period on the proposed action
August 17, 2018	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.
BOI01 BOI02 BOI04 (b)	Boiler (3 units): Manufacturer: Cleaver Brooks Model: LNEG-84/105 Heat input rating: 8.37 MMBtu/hr Fuel: Natural Gas	9 ppm ultra-low NOx burners	(a)
BOI03(b)	Boiler (1 unit): Manufacturer: Kewanee Model: MTHG-084 Heat input rating: 8.165 MMBtu/hr Fuel: Natural Gas	None	(a)
HEAT	Hot Water Heater: Manufacturer: A.O. Smith Model: BT 100 300 Heat input rating: 75,100 Btu/hr Date of construction: 1/7/2014 Fuel: Natural Gas	None	(a)
VOC01 VOC02	VOC Abatement Unit (2): Manufacturer: Munters Zeol Model: Z97181 Manufacture Date: 2006 Heat input rating: 2.0 MMBtu/hr Fuel: Natural Gas	These units are control equipment of manufacturing processes.	(a)
MAU5B	Makeup Air Unit: Heat input rating: 6.0 MMBtu/hr Fuel: Natural Gas	None	(a)
COOL01 COOL02 COOL03 COOL04 COOL05	Cooling Towers (5): Recirculation Rate: 1,150 GPM (3) Air Flow: 239,500 acfm (3 units) Recirculation Rate: 1,694 GPM (2) Air Flow: 418,800 acfm (2)	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: No. 2 Fuel Oil (ULSD)	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	None	(a)

Source ID No.	Sources	Control Equipment	Emission Point ID No.
	Fuel: No. 2 Fuel Oil (ULSD)		
TPU01/TPU02	Thermal Processing Unit (TPU, 2): Manufacturer: BOC Edwards Model: Kronis-S Construction Date: 2003/to be constructed Heat input rating: 60,000 Btu/hr Fuel: Natural Gas	These units are control equipment for treating specific manufacturing process gas streams, such as perfluorinated compound gas species.	TPU emissions are drawn through either the VOC abatement units or packed-bed wet scrubber system
N/A	Storage Tanks:	None	N/A
N/A	Manufacturing Processes: Including processes as listed: cleaning, diffusion, photolithography, etch, doping, metallization, and assembly.	Wet Scrubbers (3): Manufacturer: Lantec Model: H9610601 Control Efficiency: 90 - 99.9%	Exhaust streams are sent through control equipment stacks, such as a VOC abatement stack and a wet scrubber stack. Note: Operational variability includes a 50% increase in manufacturing processes.

(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. ON is requesting to name the Kewanee boiler as Boiler 3 and Cleaver Brooks boiler as Boiler 4 in the 6/20/2017 application amendment. The switch has been made here.

Emission sources at ON are divided into two general emission units consisting of manufacturing and support system emissions. Support system emissions consist of boiler, emergency generators, MAU, hot water heater, cooling towers, TPUs, and tanks. Descriptions of these emission units follow.

Emissions Inventories

FEC Emissions Calculations

The existing permitted FEC was evaluated using new actual baseline emissions data including emissions for future growth and operational variability.

Baseline actual emission units include:

- Four natural gas boilers based on actual use uncontrolled
- One natural gas hot water boiler based on actual use uncontrolled
- Two diesel-fired emergency generators based on actual use for maintenance and testing uncontrolled
- Cooling towers based on 8,760 hr/yr uncontrolled
- Manufacturing emissions based on actual use. Particulate Matter (PM) emissions controlled using three wet scrubbers. No VOC abatement controls over the baseline operating period.

Operational variability emission units include:

- Two thermal processing units based on 8,760 hr/yr uncontrolled
- Manufacturing emissions assuming a 50% increase in operations over the next 5 years. PM emissions controlled using three wet scrubbers. No VOC abatement controls.
- Using the delta from potential operating hours of 8,760 hr/yr for each natural gas emission unit subtracting out baseline actual emissions uncontrolled
- Using the delta from a proposed operating limit of 100 hr/yr for each emergency generator subtracting out baseline actual emissions uncontrolled
- Two natural gas VOC abatement units based on 8,760 hr/yr

ON 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.

"*Uncontrolled operational scenario*" in the EI calculation and this SOB means no VOC abatement units are used to control VOC. "*Controlled operational scenario*" in the EI calculation and this SOB means VOC abatement units are used to control VOC.

Manufacturing Process

VOC and TAP Emissions Mass Balance

The manufacturing processes are the principal source of VOC and toxic air pollutant (TAP) emissions from the facility. The following describes how VOC and TAP emissions are calculated and controlled as provided in the application.

VOC and TAP emissions from manufacturing process are estimated based on a conservative mass-balance method. The bath nature of the manufacturing process dictates that materials be used in different quantities and different ratios in each of the hundreds of different tools used. Also, as technology continually improves, there may be wholesale changes in the way tools operate or in the type or quantity of material required for a given process. A mass-balance method of estimating emission can best account for thee continuous variations in the production process.

With the exception of some support operations(e.g., general-production cleans, discussed below), all VOC-containing waste materials from manufacturing are segregated and handled as solid non-hazardous waste, hazardous waste, or industrial wastewater. Tracking the production of bulk hazardous waste allows a mass-balance calculation to estimate manufacturing emissions. Any VOCs or TAPs are assumed to be emitted if they cannot be accounted for in the bulk hazardous waste. This is a conservative approach, since the material constituents may also be consumed in the manufacturing process. This mass-balance method accounts for all sources of VOC or TAP emissions in the manufacturing process, including production, fugitive emission, hazardous or volatile tank or line losses. For this reason, these specific sources of emissions are not fully described separately, but are instead included as part of the manufacturing emissions unit.

The quantity of materials issued from the ON warehouse and the quantity of bulk liquid hazardous waste shipped offsite are the basic elements of the mass-balance method. Production materials containing VOCs and TAPs are used throughout the semiconductor manufacturing process and in related support operations. These production materials containing VOC and TAP constituents will be tracked. Chemical handlers at ON are specifically tasked with providing materials to the production and support areas on an as-needed basis. Some materials purchased for use at ON are received and directly distributed in bulk quantities. Records of these bulk shipments are also retained.

The constituents of production material can change at any time and be replaced with non-VOC or non-TAP constituents, or with different volatile constituents. Some of the projection processes are abated with pollution-control devices, while others are not. To account for these controls, the specific constituents must be identified. Even if the material constituents do change, however, the mass-balance method can account for the changes and reflect any impact on emissions.

Baseline actual VOC and TAP emissions from manufacturing operations were calculated as "uncontrolled operational scenario" (i.e., no VOC abatement units are used to control VOC) based on one year of facility data.

Operational variability VOC and TAP emissions from manufacturing operations were calculated as "uncontrolled operational scenario" based on a 50 percent increase in facility operations over the next 5 years.

In the emissions inventory (EI) spreadsheet, each carcinogenic TAP hourly emissions rate is calculated by dividing the sum of 12-month emissions rate by 8,760 hr/yr. Each non-carcinogenic TAP hourly emissions rate is calculated by dividing the highest monthly emissions rate of the year by 30 days/month and 24 hrs/day.

For future EI calculation, if a TAP emissions rate is approaching to its regulatory limit, DEQ recommends non-carcinogenic TAP hourly emissions rate to be estimated by using the maximum monthly average hourly rate in lb/hr of the months. Each monthly average hourly rate in lb/hr will be calculated by dividing monthly emissions rate by the operating hours of the month.

VOC Abatement Units

There are two existing permitted VOC abatement units (VOC-01 and VOC-02) located at the ON 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. ON 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

ON uses up to three wet 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.

Pollutant	CAS	Control Percentage (%) [1]
Acetic Acid	64-19-7	99
Chlorine	7782-50-5	96
Hydrochloric acid	7647-01-0	99
Hydrofluoric acid	7664-39-3	99.9
Nitric acid	7697-37-2	98
Hydrogen peroxide	7722-84-1	90
Phosphoric acid	7664-38-2	99

[1] Control percentages provided by manufacturer and can be found in Appendix C of the application and in the May 8, 2018 submittal for phosphoric acid control.

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

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 PM_{10} and $PM_{2.5}$.

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. ON has no future plan to install any additional wet scrubbers.

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. ON 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

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 6.0 MMBtu/hr direct-fired natural gas makeup air unit (MAU 5B) is used in a section of the ON facility where material and chemical storage, loading of materials, and other non-FAB activities occur. MAU 5B contains a strobic fan that captures heated flow from the 90-Day storage room, solvent storage room, corrosives storage room, and materials staging area identified in Figure 1 of the 6/20/2017 submittal.

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 ON 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 ON.

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. ON 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. ON 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. ON 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.

ON has no plans to install any additional cooling towers.

Thermal Processing Unit

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 natural gas direct fired combustor coupled with its own scrubber system for the removal of toxic exhaust gases. TPU emissions will be drawn either to the existing packed-bed wet chemical scrubber system or to the VOC abatement units.

One TPU was purchased in January of 2015 but was not put into service until August 2015. The rated heat input capacity of the TPU is 60,000 Btu/hr. Therefore, there is no usage data available for estimating baseline actual emissions. Two TPUs are proposed for operation variability for this facility. A second TPU has not yet been purchased. Criteria pollutant and TAP emissions were calculated as uncontrolled (drawn through the wet scrubber system) and controlled (drawn through the VOC Abatement system) for two TPUs based on each operating on natural gas 8,760 hr/yr. Emission rates for the TPU 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 2 summarizes ON's estimated baseline actual emissions for the period August 1, 2014 through July 31, 2015. Prior to this time the facility was operated by a different manufacturer and was transferred to ON Semiconductor in June 2014. Table 2 presents the maximum emission rate over the year long 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 2011 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 2 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	2.06	0.13	0.015	0.73	0.81	16.69	0.01
Operational Variability Component	1.28	1.09	0.23	10.29	12.70	9.22	0.16
Total PTE	3.35	1.21	0.25	11.03	13.51	25.91	0.17
Proposed Growth Component	1.65	0.79	5.75	14.97	12.49	27.09	39.83
Existing 2011 FEC Limits[b]	11	N/A	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 3 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	2.06	0.13	0.015	0.73	0.81	0.31	0.01
Operational Variability Component	1.42	1.22	0.23	10.29	12.70	1.12	0.18
Total PTE	3.48	1.34	0.26	12.74	14.95	1.43	0.19
Proposed Growth Component	1.52	0.66	5.75	14.97	12.49	51.57	39.81
Existing 2011 FEC Limits[b]	11	N/A	6	26	26	53	40

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)]
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

TAP Emissions

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

Table 4 BASELINE PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS

Pollutant	Facility-Wide Total[1] (PTE) (lb/hr)	IDAPA 58.01.01.585/586 EL (lb/hr)	Exceeds EL	
3-Methylchloranthrene	7.67E-08	2.50E-06	Below	Carcinogenic TAP
Benzene	9.24E-05	8.00E-04	Below	Carcinogenic TAP
Benzo(A)Pyrene	5.11E-08	2.00E-06	Below	Carcinogenic TAP
Formaldehyde	3.20E-03	5.10E-04	**Exceeds**	Carcinogenic TAP
Hexane	7.67E-02	12.00	Below	Non-Carcinogenic TAP
Naphthalene	2.60E-05	9.10E-05	Below	Non-Carcinogenic TAP
Pentane	1.11E-01	1.18E+02	Below	Non-Carcinogenic TAP
Toluene	1.45E-04	2.50E+01	Below	Non-Carcinogenic TAP
POM	4.86E-07	2.00E-06	Below	Carcinogenic TAP
PAH	0.00E+00	9.10E-05	Below	Carcinogenic TAP
Xylene	3.60E-03	2.90E+01	Below	Non-Carcinogenic TAP
Acetaldehyde	0.00E+00	3.00E-03	Below	Carcinogenic TAP
Acrolein	0.00E+00	1.70E-02	Below	Non-Carcinogenic TAP
Ethylbenzene	3.60E-03	29	Below	Non-Carcinogenic TAP
Ethylene Glycol	5.79E-02	0.846	Below	Non-Carcinogenic TAP
2-Propanol, 1-Methoxy	5.62E-02	24	Below	Non-Carcinogenic TAP
1-Methoxy-2-Propanol Acetate	1.39E+01	24	Below	Non-Carcinogenic TAP
Cyclohexanone	1.82E-01	6.67	Below	Non-Carcinogenic TAP
Diethanolamine	4.07E-01	1	Below	Non-Carcinogenic TAP
1,4-Dioxane	6.85E-03	1.40E-03	**Exceeds**	Carcinogenic TAP
Carbon Black	9.30E-02	0.23	Below	Non-Carcinogenic TAP
Ethanol	1.96E-01	125	Below	Non-Carcinogenic TAP
Acetic Acid	3.21E-08	1.67	Below	Non-Carcinogenic TAP
Methanol	9.83E-03	17.3	Below	Non-Carcinogenic TAP
Isopropanol	1.54E+00	65.3	Below	Non-Carcinogenic TAP
Acetone	3.24E+00	119	Below	Non-Carcinogenic TAP
Hydrochloric Acid	1.50E-07	0.05	Below	Non-Carcinogenic TAP
Phosphoric Acid	5.03E-03	0.067	Below	Non-Carcinogenic TAP
Nitric Acid	1.73E-03	0.333	Below	Non-Carcinogenic TAP
Hydrogen Peroxide	1.96E-02	0.1	Below	Non-Carcinogenic TAP
Ethyl Silicate	8.17E-02	5.67	Below	Non-Carcinogenic TAP

Pollutant	Facility-Wide Total[1] (PTE) (lb/hr)	IDAPA 58.01.01.585/586 EL (lb/hr)	Exceeds EL	
Arsenic	8.52E-06	1.50E-06	**Exceeds**	Carcinogenic TAP
Barium	1.88E-04	3.30E-02	Below	Non-Carcinogenic TAP
Beryllium	5.11E-07	2.80E-05	Below	Carcinogenic TAP
Cadmium	4.69E-05	3.70E-06	**Exceeds**	Carcinogenic TAP
Chromium	5.97E-05	3.30E-02	Below	Non-Carcinogenic TAP
Cobalt	3.58E-06	3.30E-03	Below	Non-Carcinogenic TAP
Copper	3.62E-05	1.30E-02	Below	Non-Carcinogenic TAP
Manganese	1.62E-05	6.70E-02	Below	Non-Carcinogenic TAP
Mercury	1.11E-05	1.00E-03	Below	IDAPA 58.01.01.215, 25 lb/yr
Molybdenum	4.69E-05	3.33E-01	Below	Non-Carcinogenic TAP
Nickel	8.95E-05	2.75E-05	**Exceeds**	Carcinogenic TAP
Selenium	1.02E-06	1.30E-02	Below	Non-Carcinogenic TAP
Vanadium	9.80E-05	3.00E-03	Below	Non-Carcinogenic TAP
Zinc	1.24E-03	3.33E-01	Below	Non-Carcinogenic TAP

a) Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. The total is compared to benzo(a)pyrene.

The TAP PTE for formaldehyde, 1,4-dioxane, arsenic, cadmium, and nickel exceed the respective annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586, therefore, modeling is performed for these TAP.

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.

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

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

concentration for carcinogens (AACC) for toxic air pollutants (TAP). For each TAP where the hourly emissions exceed the EL, ON 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).

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 5 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	5	**100**	B
$PM_{2.5}$	< 100	2	**100**	B
SO_2	< 100	6	**100**	B
NO_X	< 100	26	**100**	B

Pollutant	Uncontrolled PTE (T/yr)	Permitted FEC Limits (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
CO	< 100	26	**100**	B
VOC	> 100	53	**100**	SM
HAP (single)	unknown	<25	**10**	unknown
HAP (Total)	> 10	<10	**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 PTC/T2 be issued to the facility for the renewal of the FEC permit. Therefore, a PTC/T2 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 58.01.01.200-228 and 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.

Rules for Control of Odors (IDAPA 58.01.01.775-776)

IDAPA 58.01.01.775-776 .... Rules for Control of Odors – General Rules

No person shall allow, suffer, cause, or permit the emission of odorous gases, liquids, or solids into the atmosphere in such quantities as to cause air pollution. This requirement is assured by Permit Conditions 2.5 and 2.6.

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 2.7, 2.8, and 2.9.

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 2.10.

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 2.13 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 2.14 and 2.15.

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 ON Semiconductor is not a major source of HAP emissions and is therefore not subject to this subpart.

40 CFR 63, Subpart JJJJJ.................................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. ON Semiconductor 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.

PERMIT SCOPE

Permit Conditions 1.1, 1.2 and 1.3

Permit Condition 1.1 states the purpose of this permitting action. Permit Condition 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 T2-2010.0185 project 60899 issued July 25, 2011.

Revised Table 1.1

Table 1.1 lists all sources of regulated emissions in this permit. "**Thermal processing units**" is added to the table because the two thermal processing units (TPU) are proposed as operational variability for this project. The first one was installed in 2015 and the second one has not been purchased.

"**Low NOx burners in three units**" is added to the table because the existing Kewanne Boilers 1, 2, 4 will be replaced with Cleaver Brooks boilers with low-NOx burners.

"**and One Air Makeup Unit**" is added to the table; it was missed in the existing permit.

FACILITY-WIDE CONDITIONS

Revised Permit Condition 2.13

Because the fuel-burning equipment (i.e., the boilers) at the facility is allowed to burn natural gas only, the PM grain loading standards for burning wood products, coal, and liquid fuel are deleted from PC 2.13.

Revised Permit Conditions 2.14 and 2.15

The facility does not use coal, and therefore the requirements of sulfur content in the coal are deleted from PCs 2.14 and 2.15.

New Permit Condition 2.16

The permittee is subject to 40 CFR 63 and 60 for the two emergency engines. Permit Condition 2.16 states that should there be any conflict between the requirements of the permit condition and the requirements of the document (i.e., 40 CFR 63 Subpart ZZZZ and 40 CFR 60 Subpart IIII), the requirements of the document shall govern, including any amendments to that regulation.

FACILITY EMISSIONS CAP REQUIREMENTS

Revised Permit Condition 3.1

Permit Condition 3.1 is revised to using the standard language in the FEC permit condition template. It reads "The PM_{10}, $PM_{2.5}$, SO_2,, NO_x, CO, VOC, Lead, and HAP emissions from the facility shall not exceed any corresponding **facility emissions cap (FEC) limits** ~~emissions rate limits~~ listed in Table 3.2. ~~Hazardous air pollutants are those listed in or pursuant to Section 112(b) of the Clean Air Act.~~"

Revised Table 3.1

Table 3.1 is revised to add "**Thermal processing units**" and "**Low NOx burners in three units**". Refer to discussions under Table 1.1 of this section for details.

Revised Permit Conditions 3.3, 3.4, and 3.5

Permit Condition 3.3 is revised to reflect newly proposed FEC limits (i.e., $PM_{2.5}$ and PM_{10} limits).

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	**2**	**5** ~~11~~	6	26	26	53	40	<10	<25

$PM_{2.5}$ is being modeled and has a FEC limit. **$PM_{2.5}$** is added to PC 3.4 together with the other pollutants with FEC emissions limits. "...application, dated December 20, 2010..." is updated with "application, dated **November 9, 2016, the revised modeling file received December 1, 2017, and the revised emissions inventory spreadsheet received May 9, 2018...**" in PCs 3.4 and 3.5.

Errors exist in the previously submitted spreadsheets. Specifically, these errors are missing MAU5B in the calculation and miscalculating lb/hr emissions for non-carcinogenic TAP from the manufacturing process. The errors are corrected, and the EI spreadsheet is revised.

New Permit Condition 3.6

Demonstration of preconstruction compliance with toxic standards was added as a general FEC permit condition requiring the permittee to maintain documentation of compliance with the requirements of IDAPA 58.01.01.210 for modifications that may increase toxic air pollutants. This is taken from DEQ's FEC permit condition template.

Revised Permit Condition 3.8.1

The notice and recordkeeping of ambient concentration estimates was revised to include the following requirements: this notice shall also identify new or modified emission factors used to estimate emissions for purposes of this review of the estimate of ambient concentration analysis and for determining compliance with the Criteria Pollutant Facility Emissions Cap Compliance and the HAP Facility Emissions Cap Compliance permit conditions.

Revised Permit Condition 3.8.2

The notice and recordkeeping of ambient concentration estimates was revised to include reference to the proposed toxic standards permit condition (Permit Condition 3.6). This is taken from DEQ's FEC permit condition template.

Revised Permit Condition 3.9

Permit Condition 3.9 is updated to be consistent with the current DEQ's FEC permit condition template.

New Permit Condition 3.11

Acids collected from the manufacturing processes and routed to wet scrubber control devices are anticipated to create particulate matter emissions at the ambient conditions upon release to the atmosphere. The applicant did not include them in the December 1, 2018 modeling analysis. Permit Condition 3.11 specifies how these particulates are addressed and included in the modeling and NAAQS demonstration for $PM_{2.5}$ and PM_{10}.

Refer to Section 4.2 of the modeling memo (Appendix B) and PC 3.11 for more details.

SEMICONDUCTOR AND SUPPORT OPERATIONS

Revised Table 4.1

Table 4.1 is revised by adding "**Thermal processing units**" and "**Thermal processing unit stacks.**"

Revised Permit Conditions 4.4.2, 4.4.3, and 4.4.4

The operating requirements were revised to include the following terminology "shall be maintained **in accordance with the manufacturer specifications**". The original permit condition did not specify that the operating parameters need to be maintained in accordance with the manufacturer specifications.

New Permit Condition 4.4.7

According to the May 8, 2018 and June 5, 2018 submittals, phosphoric acid is controlled by a wet scrubber with 99% control efficiency. Phosphoric acid is emitted in a particulate form (i.e., acid mist) at the scrubber stack temperate.

The application and June 5, 2018 submittal provide the scrubber control efficiency for each chemical controlled by a wet scrubber and emitted in a particulate form. These control efficiencies are used in the revised EI and NAAQS compliance. They need to be specified in the permit. New Permit Condition 4.4.7 is added to the permit:

The permittee shall control emissions of the following chemicals with a wet scrubber. The scrubber shall provide the minimum control efficiency as listed in the following table:

Chemicals	Scrubber Control Efficiency
Hydrochloric acid	99%
Phosphoric acid	99%
Hydrofluoric acid	99.9%
Acetic acid	99%
Nitric acid	98%
Hydrogen peroxide	90%

Revised Permit Condition 4.5

The following definitions are added to PC 4.5:

"Controlled operation scenario" means when a VOC abatement unit is operating to oxidize the air pollutants.
"Uncontrolled operation scenario" means when no VOC abetment unit is operating.

Revised Permit Condition 4.5.1

The permit condition is revised to make it easy to follow:

"Unless the emissions are vented to the atmosphere, scrubber exhaust, ~~thermal processing unit,~~ or general exhaust **as allowed by Permit Condition 4.5.2,** or an alternate VOC abatement technology device is used ~~(as allowed by the VOC abatement unit operating conditions permit conditions)~~, the permittee shall route emissions from the coat tracks to a VOC abatement unit. The permittee shall operate the VOC abatement units to control emissions from the coat tracks thereby limiting the facility's potential to emit VOCs and substances regulated by IDAPA 58.01.01.585 and 586."

According to the application, thermal processing unit emissions are drawn through the VOC abatement units, or packed-bed wet scrubber system when VOC abatement units are not operating. Permit Condition 4.5.2 does not mention thermal processing unit. Therefore, "thermal processing unit" is removed from the revised PC 4.5.1.

New Permit Condition 4.6

Thermal processing unit (TPU) operating conditions were added in permit condition 4.6. Permit Condition 4.6 requires the permittee to use TPU to treat specific manufacturing gas streams, such as perfluorinated compound gas species. The emissions from the TPUs could either route to the wet scrubber system or to the VOC abatement units. Permit condition 4.6 also requires the units to combust natural gas, to be properly operated and maintained, to keep the pilot light lit, and to follow manufacturer operating specifications.

New Permit Condition 4.9

Thermal processing unit monitoring and recordkeeping requirements are added in permit conditions 4.9.1 and 4.9.2. Refer to PC 4.9 for details.

REQUIREMENTS FOR POLLUTANTS REGULATED BY IDAPA 58.01.01.585-586

Revised Permit Condition 5.2

Permit Condition 5.2 is revised for clarification purpose. It reads "The permittee shall monitor **monthly** material usage and **hours in the month of the calculation** to calculate monthly average hourly process emissions of substances listed at IDAPA 8.01.01.585 and 586.

Chi/Q values are updated based on the information in the modeling memo. They reads:

> "CQ24-hr =Chi/Q value for 24-hour averaging period = **33.34** ~~15.04~~ μg/m^3 per lb/hr
> *CQannual = Chi/Q value for annual averaging period =* ***5.29*** ~~*3.06*~~ *μg/m^3 per 1b/hr"*

NATURAL GAS-FIRED BOILERS AND AIR MAKEUP UNIT

Revised Permit Conditions 6.1

The air makeup unit (MAU6B) was unintentionally missed in the existing permit. It is now included in the analysis and permit. PC 6.1 is revised to add "**The permittee also operates a direct-fired natural gas air makeup unit rated at 6.0 MMBtu/hr**."

Revised Permit Condition 6.2

PC 6.2 is revised to reflect that three existing Kewanne boilers will be replaced with Cleaver Brooks boilers with low-NOx burners. It reads: **"The three boilers rated at 8.37 MMBtu/hr will use low NOx burners to control NOx emissions. Emissions of the boiler rated at 8.165 MMBtu/hr and emissions of the air makeup unit are uncontrolled."**

Revised Permit Condition 6.3

The revised PC 6.3 reads: "The boilers **and air makeup unit** shall only combust natural gas as fuel."

Revised Permit Condition 6.4

"The permittee shall monitor and record the fuel usage for the boilers **and air makeup** on a monthly basis using available data. Emissions from the boilers **and air makeup** shall be included in the rolling 12-month criteria pollutant FEC compliance demonstration required by…"

Application date has been updated from "December 20, 2010" to "**November 9, 2016, the revised modeling file received December 1, 2017, and the revised emissions inventory spreadsheet received May 9, 2018.**"

EMERGENCY CI ENGINES

Revised Permit Conditions 7.1, 7.2, 7.4, and 7.5

Permit Conditions 7.1, 7.2, and 7.5 are revised to remove the requirements related to the new emergency engine. The applicant has requested to remove the new emergency engine from the existing permit. The new emergency engine that is never built was included as operational variability for the previous permitting action.

Permit Conditions 7.4 and 7.5 are revised to reflect new proposed daily and annual hours for emergency engine routine testing and maintenance activities. 4 hr/day is changed to 2 hr/day, and 200 hr/yr is changed to 100 hr/yr.

Permit Conditions 7.6 to 7.12

The two emergency engines are subject to 40 CFR 63 Subpart ZZZZ and are required to meet requirements in 40 40 CFR 63 Subpart ZZZZ by complying with 40 CFR 60 Subpart IIII. Permit Conditions 7.6 to 7.12 include the requirements to which the two engines are subject. Permit Conditions 7.6 to 7.12 replace the old PCs 7.6 to 7.14 in the existing permit. Regulatory analysis can be found in Appendix C of the SOB.

Public Comment Period

A public comment period was made available to the public in accordance with IDAPA 58.01.01.209.01.c. During this time, comments were submitted in response to DEQ's proposed action. Refer to the chronology for public comment period dates.

A response to public comments document has been crafted by DEQ based on comments submitted during the public comment period. That document is part of the final permit package for this permitting action.

APPENDIX A – EMISSIONS INVENTORIES

AERMOD inputs for TPE model, controlled scenario

	Source ID	NO2 (lb/hr)	NO2_AN (tpy)	CO (lb/hr)	PM10 (lb/hr)	PM10_AN (tpy)	PM25 (lb/hr)	PM25_AN (tpy)	Toxics (lb/hr)	% of total to each source
1	BOI01	0.09123	0.39960	0.61854	0.063612	0.27862	0.04771	0.20897	1	
2	BOI02	0.091233	0.399601	0.618543	0.063612	0.278621	0.047709	0.208965	1	
3	BOI03	0.910000	3.985800	0.590000	0.059000	0.258420	0.059000	0.258420	1	
4	BOI04	0.091233	0.399601	0.618543	0.063612	0.278621	0.047709	0.208965	1	
5	HEAT	0.007363	0.032249	0.006185	0.000560	0.002451	0.000560	0.002451	1	
6	GEN02_S1		0.550209	2.463624	0.054747	0.008212	0.054747	0.008212	1	
7	GEN02_S2		0.550209	2.463624	0.054747	0.008212	0.054747	0.008212	1	
8	GEN03_S1		1.040013	3.181217	0.089727	0.013459	0.089727	0.013459	1	
9	GEN03_S2		1.040013	3.181217	0.089727	0.013459	0.089727	0.013459	1	
10	COOL01A				0.012367	0.054166	0.000056	0.000247	1	
11	COOL01B				0.012367	0.054166	0.000056	0.000247	1	
12	COOL01C				0.012367	0.054166	0.000056	0.000247	1	
13	COOL01D				0.012367	0.054166	0.000056	0.000247	1	
14	COOL01E				0.012367	0.054166	0.000056	0.000247	1	
15	COOL01F				0.012367	0.054166	0.000056	0.000247	1	
16	COOL02A				0.012367	0.054166	0.000056	0.000247	1	
17	COOL02B				0.012367	0.054166	0.000056	0.000247	1	
18	COOL02C				0.012367	0.054166	0.000056	0.000247	1	
19	COOL02D				0.012367	0.054166	0.000056	0.000247	1	
20	COOL02E				0.012367	0.054166	0.000056	0.000247	1	
21	COOL02F				0.012367	0.054166	0.000056	0.000247	1	
22	COOL03A				0.012367	0.054166	0.000056	0.000247	1	
23	COOL03B				0.012367	0.054166	0.000056	0.000247	1	
24	COOL03C				0.012367	0.054166	0.000056	0.000247	1	
25	COOL03D				0.012367	0.054166	0.000056	0.000247	1	
26	COOL03E				0.012367	0.054166	0.000056	0.000247	1	
27	COOL03F				0.012367	0.054166	0.000056	0.000247	1	
28	COOL04A				0.054650	0.239367	0.000250	0.001093	1	
29	COOL04B				0.054650	0.239367	0.000250	0.001093	1	
30	COOL05A				0.054650	0.239367	0.000250	0.001093	1	
31	COOL05B				0.054650	0.239367	0.000250	0.001093	1	
32	FS_01				0.005687	0.024909	0.005687	0.024909	1	
33	FS_02				0.005687	0.024909	0.005687	0.024909	1	
34	FS_03				0.005687	0.024909	0.005687	0.024909	1	
35	VOC01	0.201961	0.884588	0.169647	0.015349	0.067229	0.015349	0.067229	1	
36	VOC01_UN								1	
37	VOC02	0.201961	0.884588	0.169647	0.015349	0.067229	0.015349	0.067229	1	
38	VOC02_UN								1	
39	MAUSBP01	0.441180	1.932350	0.370590	0.033529	0.146859	0.033529	0.146859	1	0.75
40	MAUSBV01	0.036765	0.161029	0.030882	0.002794	0.012238	0.002794	0.012238	1	0.0625
41	MAUSBV02	0.036765	0.161029	0.030882	0.002794	0.012238	0.002794	0.012238	1	0.0625
42	MAUSBV03	0.073529	0.322059	0.061765	0.005588	0.024476	0.005588	0.024476	1	0.125
	TOTALS	2.183222	12.742940	14.574910	1.073009	3.477530	0.586115	1.344934	########	
										1
	Check AI	0.588239	2.58E+00	0.494119	0.044706	1.96E-01	0.044706	1.96E-01	1	
	Check EI	0.588235	2.58E+00	0.494118	0.044706	1.96E-01	0.044706	1.96E-01	1	

boi	1.09428
cool	1.932457
gen	0.043342
fs/voc	0.209186
heat	0.002451

AERMOD inputs for TPE model, uncontrolled scenario

	Source ID	NO2 (lb/hr)	NO2_AN (tpy)	CO (lb/hr)	PM10 (lb/hr)	PM10_AN (tpy)	PM25 (lb/hr)	PM25_AN (tpy)		
1	BOI01	0.09123	0.39960	0.61854	0.063612	0.27862	0.04771	0.20897		
2	BOI02	0.09123	0.39960	0.61854	0.063612	0.27862	0.04771	0.20897		
3	BOI03	0.91000	3.98580	0.59000	0.059000	0.25842	0.05900	0.25842		
4	BOI04	0.09123	0.39960	0.61854	0.063612	0.27862	0.04771	0.20897		
5	HEAT	0.00736	0.03225	0.006185	0.000560	0.00245	0.000560	0.00245		
6	GEN02_S1		0.55021	2.46362	0.054747	0.008212	0.05475	0.00821		
7	GEN02_S2		0.55021	2.46362	0.054747	0.008212	0.05475	0.00821		
8	GEN03_S1		1.04001	3.18122	0.089727	0.01346	0.08973	0.01346		
9	GEN03_S2		1.04001	3.18122	0.089727	0.01346	0.08973	0.01346		
10	COOL01A				0.01237	0.05417	5.65E-05	2.47E-04		
11	COOL01B				0.01237	0.05417	5.65E-05	2.47E-04		
12	COOL01C				0.01237	0.05417	5.65E-05	2.47E-04		
13	COOL01D				0.01237	0.05417	5.65E-05	2.47E-04		
14	COOL01E				0.01237	0.05417	5.65E-05	2.47E-04		
15	COOL01F				0.01237	0.05417	5.65E-05	2.47E-04		
16	COOL02A				0.01237	0.05417	5.65E-05	2.47E-04		
17	COOL02B				0.01237	0.05417	5.65E-05	2.47E-04		
18	COOL02C				0.01237	0.05417	5.65E-05	2.47E-04		
19	COOL02D				0.01237	0.05417	5.65E-05	2.47E-04		
20	COOL02E				0.01237	0.05417	5.65E-05	2.47E-04		
21	COOL02F				0.01237	0.05417	5.65E-05	2.47E-04		
22	COOL03A				0.01237	0.05417	5.65E-05	2.47E-04		
23	COOL03B				0.01237	0.05417	5.65E-05	2.47E-04		
24	COOL03C				0.01237	0.05417	5.65E-05	2.47E-04		
25	COOL03D				0.01237	0.05417	5.65E-05	2.47E-04		
26	COOL03E				0.01237	0.05417	5.65E-05	2.47E-04		
27	COOL03F				0.01237	0.05417	5.65E-05	2.47E-04		
28	COOL04A				0.05465	0.23937	0.000250	0.001093		
29	COOL04B				0.05465	0.23937	0.000250	0.001093		
30	COOL05A				0.05465	0.23937	0.000250	0.001093		
31	COOL05B				0.05465	0.23937	0.000250	0.001093		
32	FS_01	3.92E-03	1.72E-02	0.003294	5.985E-03	2.621E-02	5.985E-03	2.621E-02		
33	FS_02	3.92E-03	1.72E-02	0.003294	5.985E-03	2.621E-02	5.985E-03	2.621E-02		
34	FS_03	3.92E-03	1.72E-02	0.003294	5.985E-03	2.621E-02	5.985E-03	2.621E-02		
35	VOC01	0	0	0.00000	0	0	0	0		
36	VOC01_UN	0	0	0.00000	0.00000	0.00000	0.00000	0.00000		
37	VOC02	0	0	0.00000	0	0	0	0		
38	VOC02_UN	0	0	0.00000	0.00000	0.00000	0.00000	0.00000		
39	MAU5BPT	0.441176	1.932353	0.370588	0.033529	0.146859	0.033529	0.146859	1	0.75
40	MAU5BV01	0.036765	0.161029	0.030882	0.002794	0.012238	0.002794	0.012238	1	0.0625
41	MAU5BV02	0.036765	0.161029	0.030882	0.002794	0.012238	0.002794	0.012238	1	0.0625
42	MAU5BV03	0.073529	0.322059	0.061765	0.005588	0.024476	0.005588	0.024476	1	0.125
	TOTALS	1.791062	11.025296	14.245496	1.043205	3.346988	0.556311	1.214393	1.000000	

2.576471
5.15E-02
3.18045

TAP Result Summary

Source ID	Maximum Modeled Result By Source Group		Emissions						
	Model Annual (ug/m3)/(lb/hr	Modeled 24-Hour (ug/m3)/(lb/hr)	FORM (lb/hr)	DIOXANE (lb/hr)	H2O2 (lb/hr)	ARSENIC (lb/hr)	CADMIUM (lb/hr)	P_ACID (lb/hr)	NICKEL (lb/hr)
Averaging Time	Annual	24-Hour	Annual	Annual	24-Hour	Annual	Annual	24-Hour	Annual
BOI	4.41853	34.13911	2.45E-03	0.00E+00	0.00E+00	6.52E-06	3.59E-05	0.00E+00	6.85E-05
HEAT	5.57685	59.98452	5.52E-06	0.00E+00	0.00E+00	1.47E-08	8.10E-08	0.00E+00	1.55E-07
FS_Controlled	3.23804	18.58155	0.00E+00	0.00E+00	1.31E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOC_Controlled	5.29484	33.34166	3.03E-04	1.03E-04	0.00E+00	8.08E-07	4.44E-06	1.33E+00	8.48E-06
VOC_Uncontroll	3.33041	19.46569	0.00E+00	6.85E-03	0.00E+00	0.00E+00	0.00E+00	1.33E+00	0.00E+00
FS_Uncontrolled	3.23804	18.58155	8.82E-06	0.00E+00	1.31E+00	2.35E-08	1.29E-07	0.00E+00	2.47E-07
MAU58	6.55674	36.17835	4.41E-04	0.00E+00	0.00E+00	1.18E-06	6.47E-06	0.00E+00	1.24E-05
Total Controlled --	--		0.002755	0.000103	1.308379	0.000007	0.000040	1.329631	0.000077
Total Uncontroll --	--		2.46E-03	0.00E+00	1.31E+00	6.56E-06	3.61E-05	0.00E+00	6.89E-05
CHECK NUMBERS									
MAX			2.76E-03	1.03E-04	1.31E+00	7.35E-06	4.04E-05	1.33E+00	7.71E-05
PTE			2.76E-03	6.85E-03	2.45E-01	7.35E-06	4.04E-05	2.69E-01	7.71E-05
EL or STD			5.10E-04	1.40E-03	0.1	1.50E-06	3.70E-06	0.067	2.75E-05

Source ID	Maximum Screening Impacts						
	FORM (ug/m3)	DIOXANE (ug/m3)	H2O2 (ug/m3)	ARSENIC (ug/m3)	CADMIUM (ug/m3)	P_ACID (ug/m3)	NICKEL (ug/m3)
Averaging Time							
BOI	1.08E-02	0.00E+00	0.00E+00	2.88E-05	1.59E-04	0.00E+00	3.03E-04
HEAT	3.08E-05	0.00E+00	0.00E+00	8.21E-08	4.52E-07	0.00E+00	8.62E-07
FS_Controlled	0.00E+00	0.00E+00	2.43E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOC_Controlled	1.60E-03	5.44E-04	0.00E+00	4.28E-06	2.35E-05	4.43E+01	4.49E-05
VOC_Uncontroll	0.00E+00	2.28E-02	0.00E+00	0.00E+00	0.00E+00	2.59E+01	0.00E+00
FS_Uncontrolled	2.86E-05	0.00E+00	2.43E+01	7.62E-08	4.19E-07	0.00E+00	8.00E-07
MAU58	2.89E-03	0.00E+00	0.00E+00	7.71E-06	4.24E-05	0.00E+00	8.10E-05
Total Controlled --	0.015338	0.000544	24.311714	0.000041	0.000225	44.332103	0.000429
Total Uncontroll --	1.38E-02	2.28E-02	2.43E+01	3.67E-05	2.02E-04	2.59E+01	3.85E-04
CHECK NUMBERS							
MAX	0.015338	0.022799	24.341831	0.000041	0.000225	44.332103	0.000429
PTE							
EL or STD	7.70E-02	7.10E-01	75	0.00023	0.00056	50	4.20E-03

REPORT TABLES

Table 18 . RESULTS FOR TAP IMPACT ANALYSES - CONTROLLED

TAP	Averaging Period	Maximum Modeled Impact (µg/m³)ᵃ	AAC or AACC (µg/m3)a		
				CHECK	1.53E-02
					2.28E-02
Formaldehyde	Annual	1.53E-02	7.70E-02	OK	2.43E+01
1,4-Dioxane	Annual	5.44E-04	7.10E-01	OK	4.09E-05
Hydrogen peroxide	24-hr	2.43E-01	75	OK	2.25E-04
Arsenic	Annual	4.09E-05	0.00023	OK	4.43E+01
Cadmium	Annual	2.25E-04	0.00056	OK	4.29E-04
Phosphoric acid	24-hr	4.43E-01	50	OK	0.00E+00
Nickel	annual	4.29E-04	4.20E-03	OK	0.00E+00

[a] Micrograms/cubic meter.

Table 18 . RESULTS FOR TAP IMPACT ANALYSES - UNCONTROLLED

TAP	Averaging Period	Maximum Modeled Impact (µg/m³)ᵃ	AAC or AACC (µg/m3)a	
Formaldehyde	Annual	1.38E-02	7.70E-02	OK
1,4-Dioxane	Annual	2.28E-02	7.10E-01	OK
Hydrogen peroxide	24-hr	2.43E-01	75	OK
Arsenic	Annual	3.67E-05	0.00023	OK
Cadmium	Annual	2.02E-04	0.00056	OK
Phosphoric acid	24-hr	2.59E-01	50	OK
Nickel	annual	3.85E-04	4.20E-03	OK

[a] Micrograms/cubic meter.

Toxic Emissions for Modeling

Only Toxics that are over the IDAPA 58.01.01.585/586 emission limits are included in this sheet.
There are two toxic scenarios, controlled and uncontrolled.
For both scenarios all boiler, heater and MAU5B toxic emissions are the same.
Emergency generators are not considered for either scenario
The H2O2 from manufacturing emissions always exits through the acid scrubbers (FS)
All Emissions presented here are the TOTAL for the source group. Not individual units, unless there is only one unit in the source group.

Controlled

All remaining manufacturing emissions are controlled (by a factor of 0.015) and exit through the VOC## stack.
All TPU emissions exit through the VOC## stack with the full emission rates (aka no control for these emissions). There are two TPUs so emissions are doubled

Controlled Emissions

Source ID	FORM (lb/hr)	DIOXANE (lb/hr)	H2O2 (lb/hr)	ARSENIC (lb/hr)	CADMIUM (lb/hr)	P_ACID (lb/hr)	NICKEL (lb/hr)
BOI	2.45E-03	0.00E+00	0.00E+00	6.52E-06	3.59E-05	0.00E+00	6.85E-05
HEAT	5.52E-06	0.00E+00	0.00E+00	1.47E-08	8.10E-08	0.00E+00	1.55E-07
FS	0.00E+00	0.00E+00	1.96E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOC	3.03E-04	1.03E-04	0.00E+00	8.08E-07	4.44E-06	5.03E-01	8.48E-06
MAU5B	4.41E-04	0.00E+00	0.00E+00	1.18E-06	6.47E-06	0.00E+00	1.24E-05
TOTALS	3.20E-03	1.03E-04	1.96E-01	8.52E-06	4.69E-05	5.03E-01	8.95E-05

4.41E-04
0.00E+00
0.00E+00
1.18E-06
6.47E-06
0.00E+00
1.24E-05

Uncontrolled:

All remaining manufacturing emissions are not controlled and exit through VOC##_UNC stack.
All TPU emissions exit through the SCRUBBER stack with the full emission rates (aka no control for these emissions). There are two TPU units so emissions are doubled.

Uncontrolled Emissions

Source ID	FORM (lb/hr)	DIOXANE (lb/hr)	H2O2 (lb/hr)	ARSENIC (lb/hr)	CADMIUM (lb/hr)	P_ACID (lb/hr)	NICKEL (lb/hr)
Boiler	2.45E-03	0.00E+00	0.00E+00	6.52E-06	3.59E-05	0.00E+00	6.85E-05
HEAT	5.52E-06	0.00E+00	0.00E+00	1.47E-08	8.10E-08	0.00E+00	1.55E-07
FS	8.82E-06	0.00E+00	1.96E-01	2.35E-08	1.29E-07	0.00E+00	2.47E-07
VOC_UNC	0.00E+00	6.85E-03	0.00E+00	0.00E+00	0.00E+00	5.03E-01	0.00E+00
MAU5B	4.41E-04	0.00E+00	0.00E+00	1.18E-06	6.47E-06	0.00E+00	1.24E-05
TOTAL	2.90E-03	6.85E-03	1.96E-01	7.74E-06	4.26E-05	5.03E-01	8.13E-05

Table 1

ON Semiconductor

Criteria Pollutant Summary (Uncontrolled - Uncontrolled here means that no VOC abatement unit is used. The use of wet scrubber has been counted when calculating emissions from manufacturing)

Source	PM10		PM2.5		NOX		SOX		CO		Lead			Manu VOC		Total VOC	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(lb/yr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
Baseline Actual																	
Manufacturing Emissions	1.14E-02	0.050	1.14E-02	0.050										3.80	16.63	3.80	16.63
Boiler 1	0.0636	0.0164	0.0477	0.0123	0.0912	0.0236	0.0142	0.0037	0.6185	0.1598	0.0000	0.0021	0.0000			4.60E-02	1.19E-02
Boiler 2	0.0636	0.0164	0.0477	0.0123	0.0912	0.0236	0.0142	0.0037	0.6185	0.1598	0.0000	0.0021	0.0000			4.60E-02	1.19E-02
Boiler 4	0.0636	0.0164	0.0477	0.0123	0.0912	0.0236	0.0142	0.0037	0.6185	0.1598	0.0000	0.0021	0.0000			2.80E-02	7.23E-03
Boiler 3	0.0590	0.0152	0.0590	0.0152	0.9100	0.2351	0.0046	0.0012	0.5900	0.1524	0.0000	0.0021	0.0000			4.60E-02	1.19E-02
Water Heater	0.000033	0.000145	0.000033	0.000145	0.0004	0.0019	0.00000261	0.0000	0.0004	0.0016	0.0000	0.0000	0.0001			2.39E-05	1.05E-04
Generator 2	0.3285	0.0015	0.3285	0.0015	22.0084	0.1031	0.4270	0.0020	4.9272	0.0231						0.99	4.62E-03
Generator 3	0.5384	0.0022	0.5384	0.0022	41.6005	0.1706	0.0220	0.0001	6.3624	0.0261						0.83	3.41E-03
Cooling Tower	0.4412	1.9325	0.0020	0.0088													
MAU 5B	0.00263656	0.011548133	0.00263656	0.011548133	0.034691579	0.15194912	0.000208149	0.000911695	0.0291409	0.12763726	1.735E-07	0.0015195	7.5975E-07	0	0	1.91E-03	0.0083572
Subtotal Support Systems		2.06		0.11		0.73		0.015		0.81		0.01					0.06
Operational Variability																	
Manufacturing Emissions	5.69E-03	0.025	5.69E-03	0.025										1.90	8.31	1.90	8.31
TPU 1	4.47E-04	1.96E-03	4.47E-04	1.96E-03	5.88E-03	2.58E-02	3.53E-05	1.55E-04	4.94E-03	2.16E-02	2.94E-08	2.58E-04	1.29E-07			3.24E-04	1.42E-03
TPU 2	4.47E-04	1.96E-03	4.47E-04	1.96E-03	5.88E-03	2.58E-02	3.53E-05	1.55E-04	4.94E-03	2.16E-02	2.94E-08	2.58E-04	1.29E-07			3.24E-04	1.42E-03
Boiler 1	5.99E-02	2.62E-01	5.99E-02	1.97E-01	8.59E-02	3.76E-01	1.34E-02	5.86E-02	5.82E-01	2.55E+00	3.86E-06	3.38E-02	1.69E-05			0.00E+00	1.90E-01
Boiler 2	5.99E-02	2.62E-01	5.99E-02	1.97E-01	8.59E-02	3.76E-01	1.34E-02	5.86E-02	5.82E-01	2.55E+00	3.86E-06	3.38E-02	1.69E-05			0.00E+00	1.90E-01
Boiler 4	5.99E-02	2.62E-01	5.99E-02	1.97E-01	8.59E-02	3.76E-01	1.34E-02	5.86E-02	5.82E-01	2.55E+00	3.86E-06	3.38E-02	1.69E-05			0.00E+00	1.90E-01
Boiler 3	5.55E-02	2.43E-01	5.55E-02	2.43E-01	8.56E-01	3.75E+00	4.33E-03	1.90E-02	5.55E-01	2.43E+00	3.77E-06	3.30E-02	1.65E-05			2.63E-02	1.15E-01
VOC Abatement Unit 1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
VOC Abatement Unit 2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Water Heater	5.27E-04	2.31E-03	5.27E-04	2.31E-03	6.93E-03	3.03E-02	4.16E-05	1.82E-04	5.82E-03	2.55E-02	3.46E-08	3.03E-04	1.52E-07			3.81E-04	1.67E-03
Generator 2 Growth	0.33	1.49E-02	0.33	1.49E-02	22.01	9.97E-01	0.43	0.019350784	4.93	2.23E-01						0.99	4.47E-02
Generator 3 Growth	0.54	2.47E-02	0.54	2.47E-02	41.60	1.91E+00	0.02	0.001008586	6.36	2.92E-01						0.83	3.82E-02
MAU 5B	4.21E-02	0.184263632	4.21E-02	0.184263632	5.54E-01	2.42452147	3.32E-03	0.014547129	4.65E-01	2.03659803	2.77E-06	0.0242452	1.21E-05	0	0	3.04E-02	0.13334868
Subtotal Support Systems		1.28		1.09		10.29		0.230		12.70		0.16			0.00		0.91
Total PTE		**3.35**		**1.21**		**11.03**		**0.25**		**13.51**		**0.17**			**24.94**		**25.91**
Proposed Growth		**1.65**		**0.79**		**14.97**		**5.75**		**12.49**		**39.83**			**0.06**		**27.09**
Proposed FEC		**5**		**2**		**26**		**6**		**26**		**40**			**25**		**53**

Table 2
ON Semiconductor
Criteria Pollutant Summary (Controlled - controlled here means that VOC abatement unit is used. The use of wet scrubber has always been counted when calculating emissions from manufacturing)

Source	PM10		PM2.5		NOX		SOX		CO		Lead			Manu VOC		Total VOC	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(lb/yr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
Baseline Actual																	
Manufacturing Emissions	1.14E-02	0.050	1.14E-02	0.050										0.06	0.25	0.06	0.25
Boiler 1	0.0636	0.0164	0.0477	0.0123	0.0912	0.0236	0.0142	0.0037	0.6185	0.1598	0.0000	0.0021	0.0000			4.60E-02	1.19E-02
Boiler 2	0.0636	0.0164	0.0477	0.0123	0.0912	0.0236	0.0142	0.0037	0.6185	0.1598	0.0000	0.0021	0.0000			4.60E-02	1.19E-02
Boiler 4	0.0636	0.0164	0.0477	0.0123	0.0912	0.0236	0.0142	0.0037	0.6185	0.1598	0.0000	0.0021	0.0000			2.80E-02	7.23E-03
Boiler 3	0.0590	0.0152	0.0590	0.0152	0.9100	0.2351	0.0046	0.0012	0.5900	0.1524	0.0000	0.0021	0.0000			4.60E-02	1.19E-02
Water Heater	0.000033	0.000145	0.000033	0.000145	0.0004	0.0019	0.00000261	0.0000	0.0004	0.0016	0.0000	0.0000	0.0001			2.39E-05	1.05E-04
Generator 2	0.3285	0.0015	0.3285	0.0015	22.0084	0.1031	0.4270	0.0020	4.9272	0.0231						0.99	4.62E-03
Generator 3	0.5384	0.0022	0.5384	0.0022	41.6005	0.1706	0.0220	0.0001	6.3624	0.0261						0.83	3.41E-03
Cooling Tower	0.4412	1.9325	0.0020	0.0088													
MAU 5B	0.0026	0.0115	0.0026	0.0115	0.0347	0.1519	0.0002	0.0009	0.0291	0.1276	0.0000	0.0015	0.0000			0.0019	8.36E-03
Subtoal Support Systems		2.06		0.13		0.73		0.015		0.81		0.01					0.06
Operational Variability																	
Manufacturing Emissions	5.69E-03	0.025	5.69E-03	0.025										0.03	0.12	0.03	0.12
TPU 1	4.47E-04	1.96E-03	4.47E-04	1.96E-03	5.88E-03	2.58E-02	3.53E-05	1.55E-04	4.94E-03	2.16E-02	2.94E-08	2.58E-04	1.29E-07			3.24E-04	1.42E-03
TPU 2	4.47E-04	1.96E-03	4.47E-04	1.96E-03	5.88E-03	2.58E-02	3.53E-05	1.55E-04	4.94E-03	2.16E-02	2.94E-08	2.58E-04	1.29E-07			3.24E-04	1.42E-03
Boiler 1	5.99E-02	2.62E-01	5.99E-02	1.97E-01	8.59E-02	3.76E-01	1.34E-02	5.86E-02	5.82E-01	2.55E+00	3.86E-06	3.38E-02	1.69E-05			0.00E+00	1.90E-01
Boiler 2	5.99E-02	2.62E-01	5.99E-02	1.97E-01	8.59E-02	3.76E-01	1.34E-02	5.86E-02	5.82E-01	2.55E+00	3.86E-06	3.38E-02	1.69E-05			0.00E+00	1.90E-01
Boiler 4	5.99E-02	2.62E-01	5.99E-02	1.97E-01	8.59E-02	3.76E-01	1.34E-02	5.86E-02	5.82E-01	2.55E+00	3.86E-06	3.38E-02	1.69E-05			0.00E+00	1.90E-01
Boiler 3	5.55E-02	2.43E-01	5.55E-02	2.43E-01	8.56E-01	3.75E+00	4.33E-03	1.90E-02	5.55E-01	2.43E+00	3.77E-06	3.30E-02	1.65E-05			2.63E-02	1.15E-01
VOC Abatement Unit 1	1.49E-02	6.53E-02	1.49E-02	6.53E-02	1.96E-01	8.59E-01	1.18E-03	5.15E-03	1.65E-01	7.21E-01	9.80E-07	8.59E-03	4.29E-06			1.08E-02	4.72E-02
VOC Abatement Unit 2	1.49E-02	6.53E-02	1.49E-02	6.53E-02	1.96E-01	8.59E-01	1.18E-03	5.15E-03	1.65E-01	7.21E-01	9.80E-07	8.59E-03	4.29E-06			1.08E-02	4.72E-02
Water Heater	5.27E-04	2.31E-03	5.27E-04	2.31E-03	6.93E-03	3.03E-02	4.16E-05	1.82E-04	5.82E-03	2.55E-02	3.46E-08	3.03E-04	1.52E-07			3.81E-04	1.67E-03
Generator 2 Growth	0.33	1.49E-02	0.33	1.49E-02	22.01	9.97E-01	0.43	0.019350784	4.93	2.23E-01						0.99	4.47E-02
Generator 3 Growth	0.54	2.47E-02	0.54	2.47E-02	41.60	1.91E+00	0.02	0.001008586	6.36	2.92E-01						0.83	3.82E-02
MAU 5B	4.21E-02	1.84E-01	4.21E-02	1.84E-01	5.54E-01	2.42E+00	3.32E-03	1.45E-02	4.65E-01	2.04E+00	2.77E-06	0.02	1.21E-05			3.04E-02	1.33E-01
Subtoal Support Systems		1.42		1.27		12.01		0.241		14.14		0.18			0.00		1.00
Total PTE		**3.48**		**1.34**		**12.74**		**0.26**		**14.95**		**0.19**			**0.37**		**1.43**
Proposed Growth		**1.52**		**0.66**		**13.26**		**5.74**		**11.05**		**39.81**			**24.63**		**51.57**
Proposed FEC		**5**		**2**		**26**		**6**		**26**		**40**			**25**		**53**

ON Semiconductor
TAPs Summary

Pollutant	HAPs	Gen 1 (PTE) (lb/hr)	Gen 2 (PTE) (lb/hr)	Boiler 1 (PTE) (lb/hr)	Boiler 2 (PTE) (lb/hr)	Boiler 4 (PTE) (lb/hr)	Boiler 3 (PTE) (lb/hr)	Water Heater (PTE) (lb/hr)	2 VOC Abus (PTE) - Controlled (lb/hr)	2 TPUs (PTE) (lb/hr)	MAU/SB (PTE) (lb/hr)	Manufacturing Emissions (PTE) (lb/hr)	2 VOC Abus (PTE) - Uncontrolled	Facility-Wide Total[1] (PTE) (lb/hr)	IDAPA 58.01.01.585/586 EL (lb/hr)	Exceeds EL	
3-Methylchloranthrene	No			1.48E-08	1.48E-08	1.48E-08	1.44E-08	1.33E-10	7.06E-09	2.12E-10	1.06E-08			7.67E-08	2.50E-06	Below	
Benzene	Yes	8.74E-05	1.28E-04	1.72E-05	1.72E-05	1.72E-05	1.68E-05	1.55E-07	8.24E-06	2.47E-07	1.24E-05	2.81E-06		9.24E-05	8.00E-04	Below	
Benzo(a)pyrene	No	2.90E-08	4.26E-08	9.85E-09	9.85E-09	9.85E-09	9.61E-09	8.84E-11	4.71E-09	1.41E-10	7.06E-09			5.11E-08	2.00E-06	Below	
Butane	No			1.72E-02	1.72E-02	1.72E-02	1.68E-02	1.55E-04	8.24E-03	2.47E-04	1.24E-02			8.95E-02			
Ethane	No			2.54E-02	2.54E-02	2.54E-02	2.48E-02	2.28E-04	1.22E-02	3.66E-04	1.83E-02			1.32E-01			
Propane	No			1.31E-02	1.31E-02	1.31E-02	1.28E-02	1.18E-04	6.27E-03	1.88E-04	9.41E-03			6.82E-02			
Formaldehyde	Yes	8.89E-06	1.31E-05	6.15E-04	6.15E-04	6.15E-04	6.00E-04	5.52E-06	2.94E-04	8.82E-06	4.41E-04			3.20E-03	5.10E-04	Exceeds	Annual ave
Hexane	Yes			1.48E-02	1.48E-02	1.48E-02	1.44E-02	1.33E-04	7.06E-03	2.12E-04	1.06E-02			7.67E-02	12.00	Below	
Naphthalene	Yes	1.46E-05	2.15E-05	5.01E-06	5.01E-06	5.01E-06	4.88E-06	4.49E-08	2.39E-06	7.18E-08	3.58E-06			2.60E-05	9.10E-05	Below	
Pentane	No			2.13E-02	2.13E-02	2.13E-02	2.08E-02	1.91E-04	1.02E-02	3.06E-04	1.53E-02			1.11E-01	1.18E+02	Below	
Toluene	Yes	3.17E-05	4.65E-05	2.79E-05	2.79E-05	2.79E-05	2.72E-05	2.50E-07	1.33E-05	4.00E-07	2.00E-05			1.45E-04	2.50E+01	Below	
2-Methylnaphthalene	No			1.97E-07	1.97E-07	1.97E-07	1.92E-07	1.77E-09	9.41E-08	2.82E-09	1.41E-07			1.02E-06			
7,12-Dimethylbenz(a)anthracene	No			1.31E-07	1.31E-07	1.31E-07	1.28E-07	1.18E-09	6.27E-08	1.88E-09	9.41E-08			6.82E-07			
Acenaphthene	No	5.27E-07	7.75E-07	1.48E-08	1.48E-08	1.48E-08	1.44E-08	1.33E-10	7.06E-09	2.12E-10	1.06E-08			7.67E-08			
Acenaphthylene	No	1.04E-06	1.53E-06	1.48E-08	1.48E-08	1.48E-08	1.44E-08	1.33E-10	7.06E-09	2.12E-10	1.06E-08			7.67E-08			
Anthracene	No	1.39E-07	2.04E-07	1.97E-08	1.97E-08	1.97E-08	1.92E-08	1.77E-10	9.41E-09	2.82E-10	1.41E-08			1.02E-07			
Benzo(a)anthracene	No	7.01E-08	1.03E-07	1.48E-08	1.48E-08	1.48E-08	1.44E-08	1.33E-10	7.06E-09	2.12E-10	1.06E-08			7.67E-08			
Benzo(b)fluoranthene	No	1.25E-07	1.84E-07	1.48E-08	1.48E-08	1.48E-08	1.44E-08	1.33E-10	7.06E-09	2.12E-10	1.06E-08			7.67E-08			
Benzo(g,h,i)perylene	No	6.26E-08	9.21E-08	9.85E-09	9.85E-09	9.85E-09	9.61E-09	8.84E-11	4.71E-09	1.41E-10	7.06E-09			5.11E-08			
Benzo(k)fluoranthene	No	2.46E-08	3.61E-08	1.48E-08	1.48E-08	1.48E-08	1.44E-08	1.33E-10	7.06E-09	2.12E-10	1.06E-08			7.67E-08			
Chrysene	No	1.72E-07	2.53E-07	1.48E-08	1.48E-08	1.48E-08	1.44E-08	1.33E-10	7.06E-09	2.12E-10	1.06E-08			7.67E-08			
Dibenzo(a,h)anthracene	No	5.90E-08	8.73E-08	9.85E-09	9.85E-09	9.85E-09	9.61E-09	8.84E-11	4.71E-09	1.41E-10	7.06E-09			5.11E-08			
Dichlorobenzene	No			9.85E-06	9.85E-06	9.85E-06	9.61E-06	8.84E-08	4.71E-06	1.41E-07	7.06E-06			5.11E-05			
Fluoranthene	No	4.54E-07	6.67E-07	2.46E-08	2.46E-08	2.46E-08	2.40E-08	2.21E-10	1.18E-08	3.53E-10	1.76E-08			1.28E-07			
Fluorene	No	1.44E-06	2.12E-06	2.30E-08	2.30E-08	2.30E-08	2.24E-08	2.06E-10	1.10E-08	3.29E-10	1.65E-08			1.19E-07			
Indeno(1,2,3-cd)pyrene	No	4.66E-08	6.85E-08	1.48E-08	1.48E-08	1.48E-08	1.44E-08	1.33E-10	7.06E-09	2.12E-10	1.06E-08			7.67E-08			
Phenanthrene	No	4.60E-06	6.76E-06	1.40E-07	1.40E-07	1.40E-07	1.36E-07	1.25E-09	6.67E-08	2.00E-09	1.00E-07			7.25E-07			
Pyrene	No	4.18E-07	6.14E-07	4.10E-08	4.10E-08	4.10E-08	4.00E-08	3.68E-10	1.96E-08	5.88E-10	2.94E-08			2.13E-07			
POM	Yes	5.07E-07	7.45E-07	9.35E-08	9.35E-08	9.35E-08	9.13E-08	8.39E-10	4.47E-08	1.34E-09	6.71E-08			4.86E-07	2.00E-06	Below	
PAH	No	2.39E-05	3.51E-05											0.00E+00	9.10E-05	Below	
[redacted]	Yes	2.17E-05	3.20E-05									3.60E-03		3.60E-03	2.90E+01	Below	24 hr ave
Acetaldehyde	Yes	2.84E-06	4.17E-06											0.00E+00	3.00E-01	Below	
Acrolein	Yes	8.88E-07	1.30E-06											0.00E+00	1.70E-02	Below	
Propylene	No	3.14E-04	4.62E-04											0.00E+00			
[redacted]	YES											3.60E-03		3.60E-03	29	Below	24-hr ave
[redacted]	YES											5.79E-02		5.79E-02	0.846	Below	24 hr ave
[redacted]	No											5.62E-02		5.62E-02	24	Below	24 hr ave
[redacted]	No											1.39E+01		1.39E+01	24	Below	24-hr ave
[redacted]	No											1.82E-01		1.82E-01	6.67	Below	24-hr ave
[redacted]	YES											4.07E-01		4.07E-01	1	Below	24-hr ave
1,4-DIOXANE	YES											6.85E-03		6.85E-03	1.40E-03	Exceeds	Annual ave
[redacted]	No											9.30E-02		9.30E-02	0.23	Below	24-hr ave
[redacted]	No											1.96E-01		1.96E-01	125	Below	24-hr ave
[redacted]	No											[redacted]		3.23E-03	1.67	Below	24-hr ave
[redacted]	YES											9.83E-03		9.83E-03	17.3	Below	24-hr ave
[redacted]	No											1.54E+00		1.54E+00	65.3	Below	24-hr ave
[redacted]	No											3.24E+00		3.24E+00	119	Below	24-hr ave
[redacted]	YES											[redacted]		1.50E-07	0.05	Below	24-hr ave
[redacted]	No											[redacted]		5.03E-03	0.067	Below	24 hr ave
HYDROFLUORIC ACID	YES											[redacted]		5.35E-06			
[redacted]	No											[redacted]		1.73E-03	0.333	Below	24 hr ave
[redacted]	No							FALSE				[redacted]		1.96E-02	0.1	Below	24 hr ave
Ethyl silicate	No											8.17E-02		8.17E-02	567	Below	
Arsenic	Yes			1.64E-06	1.64E-06	1.64E-06	1.60E-06	1.47E-08	7.84E-07	2.35E-08	1.12E-06			8.52E-06	1.50E-06	Exceeds	Annual ave
Barium	No			3.61E-05	3.61E-05	3.61E-05	3.52E-05	3.24E-07	1.73E-05	5.18E-07	2.58E-05			1.88E-04	3.30E-02	Below	
Beryllium	Yes			9.85E-08	9.85E-08	9.85E-08	9.61E-08	8.84E-10	4.71E-08	1.41E-09	7.06E-08			5.11E-07	2.80E-05	Below	
Cadmium	Yes			9.03E-06	9.03E-06	9.03E-06	8.81E-06	8.10E-08	4.31E-06	1.29E-07	6.47E-06			4.69E-05	3.70E-06	Exceeds	Annual ave
Chromium	Yes			1.15E-05	1.15E-05	1.15E-05	1.12E-05	1.03E-07	5.49E-06	1.65E-07	8.24E-06			5.97E-05	3.30E-02	Below	
Cobalt	Yes			6.89E-07	6.89E-07	6.89E-07	6.72E-07	6.18E-09	3.29E-07	9.88E-09	4.94E-07			3.58E-06	3.30E-03	Below	
Copper	No			6.98E-06	6.98E-06	6.98E-06	6.80E-06	6.26E-08	3.33E-06	1.00E-07	5.00E-06			3.62E-05	1.30E-02	Below	
Manganese	Yes			3.12E-06	3.12E-06	3.12E-06	3.04E-06	2.80E-08	1.49E-06	4.47E-08	2.24E-06			1.62E-05	6.70E-02	Below	
Mercury	Yes			2.13E-06	2.13E-06	2.13E-06	2.08E-06	1.91E-08	1.02E-06	3.06E-08	1.53E-06			1.11E-05	1.00E-03	Below	
Molybdenum	No			9.03E-06	9.03E-06	9.03E-06	8.81E-06	8.10E-08	4.31E-06	1.29E-07	6.47E-06			4.69E-05	3.33E-01	Below	
Nickel	Yes			1.72E-05	1.72E-05	1.72E-05	1.68E-05	1.55E-07	8.24E-06	2.47E-07	1.24E-05			8.95E-05	2.75E-05	Exceeds	Annual ave
Selenium	Yes			1.97E-07	1.97E-07	1.97E-07	1.92E-07	1.77E-09	9.41E-08	2.82E-09	1.41E-07			1.02E-06	1.30E-02	Below	
Vanadium	No			1.89E-05	1.89E-05	1.89E-05	1.84E-05	1.69E-07	9.03E-06	2.71E-07	1.35E-05			9.80E-05	3.00E-03	Below	
Zinc	No			2.38E-04	2.38E-04	2.38E-04	2.32E-04	2.14E-06	1.13E-04	3.41E-06	1.71E-04			1.23E-03	3.33E-01	Below	

193.22
129.39

Notes
[1] Facility-Wide Total generator pound per hour emissions excluded for modeling purposes
TAP emissions from the emergency generators can be excluded from the modeling analysis because they will be addressed through 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ
Based on DEQ guidance memorandum dated July 25, 2013, C. Robinson, "*Per Idaho Air rules 210.20: Exclusion from Idaho TAPs Modeling for Stationary Engines subject to 40 CFR 60 Subparts IIII or JJJJ and/or 40 CFR 63 Subpart ZZZZ*"

ON Semiconductor
TAPs PTE

Emission Source	HAPs (tpy)
Manufacturing Emissions	0.9
Generator 2	0.0007
Generator 3	0.001
Boilers 1, 2, 4	0.20
Boiler 3	0.07
Water Heater	0.0006
VOC ABU 1-2	0.03
TPU 1-2	0.001
MAU5B	0.049
Total Emissions	1.25

On Semiconductor
MAU 5B

MAU 5B (MMBtu/hr)*	6.000
Fuel Type	Natural Gas
Maximum Operation Limit (hrs/yr)	8,760
Maximum SCF, 12 months	51,529,412
Maximum 10^6 SCF	51.53
SCF last 12 months	3,038,982
10^6 SCF	3.04
Difference in 10^6 SCF (Growth)	48.49
Heat Value of Fuel (Btu/scf)	1,020

Note: Based on ratio of facility wide BTU and total NG usage over last 12 months

Note: difference in SCF is based on actual NG usage versus maximum potential NG usage

		Actual Baseline (Individual)				Operational Variability (Individual)				
Criteria Pollutant[1]		Emission Factor (lb/10^6 scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)		
Total Particulate Matter (PM)[2]		7.6	2.64E-03	23.10	1.15E-02	4.21E-02	368.53	1.84E-01	4.47E-02	
Nitrogen Oxides (NOx)		100.0	3.47E-02	303.90	1.52E-01	5.54E-01	4,849.04	2.42E+00	2.58E+00	5.88E-01
Sulfur Oxides (SOx)		0.6	2.08E-04	1.82	9.12E-04	3.32E-03	29.09	1.45E-02	5.15E+03	5.15E+03
Carbon Monoxide (CO)		84.0	2.91E-02	255.27	1.28E-01	4.65E-01	4,073.20	2.04E+00		
Lead		0.0005	1.73E-07	0.002	7.60E-07	2.77E-06	0.02	1.21E-05		
VOC		5.5	1.91E-03	16.71	8.36E-03	3.04E-02	266.70	1.33E-01		

		Actual Baseline (Individual)				Operational Variability (Individual)		
Toxic Air Pollutants[3]	CAS No.	Emission Factor (lb/10^6 scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)
3-Methylchloranthrene	56-49-5	1.80E-06	6.24E-10	5.47E-06	2.74E-09	9.96E-09	8.73E-05	4.36E-08
Benzene	71-43-2	2.10E-03	7.29E-07	6.38E-03	3.19E-06	1.16E-05	1.02E-01	5.09E-05
Benzo(a)pyrene*	50-32-8	1.20E-06	4.16E-10	3.65E-06	1.82E-09	6.64E-09	5.82E-05	2.91E-08
Butane	106-97-8	2.10E+00	7.29E-04	6.38E+00	3.19E-03	1.16E-02	1.02E+02	5.09E-02
Ethane	74-84-0	3.10E+00	1.08E-03	9.42E+00	4.71E-03	1.72E-02	1.50E+02	7.52E-02
Propane	74-98-6	1.60E+00	5.55E-04	4.86E+00	2.43E-03	8.86E-03	7.76E+01	3.88E-02
Formaldehyde	50-00-0	7.50E-02	2.60E-05	2.28E-01	1.14E-04	4.15E-04	3.64E+00	1.82E-03
Hexane	110-54-3	1.80E+00	6.24E-04	5.47E+00	2.74E-03	9.96E-03	8.73E+01	4.36E-02
Naphthalene	91-20-3	6.10E-04	2.12E-07	1.85E-03	9.27E-07	3.38E-06	2.96E-02	1.48E-05
Pentane	109-66-0	2.60E+00	9.02E-04	7.90E+00	3.95E-03	1.44E-02	1.26E+02	6.30E-02
Toluene	108-88-3	3.40E-03	1.18E-06	1.03E-02	5.17E-06	1.88E-05	1.65E-01	8.24E-05
2-Methylnaphthalene	91-57-6	2.40E-05	8.33E-09	7.29E-05	3.65E-08	1.33E-07	1.16E-03	5.82E-07
7,12-Dimethylbenz(a)anthracene		1.60E-05	5.55E-09	4.86E-05	2.43E-08	8.86E-08	7.76E-04	3.88E-07
Acenaphthene	83-32-9	1.80E-06	6.24E-10	5.47E-06	2.74E-09	9.96E-09	8.73E-05	4.36E-08
Acenaphthylene	203-96-8	1.80E-06	6.24E-10	5.47E-06	2.74E-09	9.96E-09	8.73E-05	4.36E-08
Anthracene	120-12-7	2.40E-06	8.33E-10	7.29E-06	3.65E-09	1.33E-08	1.16E-04	5.82E-08
Benzo(a)anthracene*	56-55-3	1.80E-06	6.24E-10	5.47E-06	2.74E-09	9.96E-09	8.73E-05	4.36E-08
Benzo(b)fluoranthene*	205-82-3	1.80E-06	6.24E-10	5.47E-06	2.74E-09	9.96E-09	8.73E-05	4.36E-08
Benzo(g,h,l)perylene	191-24-2	1.20E-06	4.16E-10	3.65E-06	1.82E-09	6.64E-09	5.82E-05	2.91E-08
Benzo(k)fluoranthene*	205-82-3	1.80E-06	6.24E-10	5.47E-06	2.74E-09	9.96E-09	8.73E-05	4.36E-08
Chrysene*	218-01-9	1.80E-06	6.24E-10	5.47E-06	2.74E-09	9.96E-09	8.73E-05	4.36E-08
Dibenzo(a,h)anthracene*	53-70-3	1.20E-06	4.16E-10	3.65E-06	1.82E-09	6.64E-09	5.82E-05	2.91E-08
Dichlorobenzene	25321-22-6	1.20E-03	4.16E-07	3.65E-03	1.82E-06	6.64E-06	5.82E-02	2.91E-05
Fluoranthene	206-44-0	3.00E-06	1.04E-09	9.12E-06	4.56E-09	1.66E-08	1.45E-04	7.27E-08
Flourene	86-73-7	2.80E-06	9.71E-10	8.51E-06	4.25E-09	1.55E-08	1.36E-04	6.79E-08
Indeno(1,2,3-cd)pyrene*	193-39-5	1.80E-06	6.24E-10	5.47E-06	2.74E-09	9.96E-09	8.73E-05	4.36E-08
Phenanathrene	85-01-8	1.70E-05	5.90E-09	5.17E-05	2.58E-08	9.41E-08	8.24E-04	4.12E-07
Pyrene	129-00-0	5.00E-06	1.73E-09	1.52E-05	7.60E-09	2.77E-08	2.42E-04	1.21E-07
POM[4]			3.95E-09	3.46E-05	1.73E-08	6.31E-08	5.53E-04	2.76E-07

		Actual Baseline (Individual)				Operational Variability (Individual)		
Toxic Air Pollutants-Metals[5]	CAS Number	Emission Factor (lb/10^6 scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)
Arsenic	7440-38-2	2.00E-04	6.94E-08	6.08E-04	3.04E-07	1.11E-06	9.70E-03	4.85E-06
Barium	7440-39-3	4.40E-03	1.53E-06	1.34E-02	6.69E-06	2.44E-05	2.13E-01	1.07E-04
Beryllium	7440-41-7	1.20E-05	4.16E-09	3.65E-05	1.82E-08	6.64E-08	5.82E-04	2.91E-07
Cadmium	7440-43-9	1.10E-03	3.82E-07	3.34E-03	1.67E-06	6.09E-06	5.33E-02	2.67E-05
Chromium	7440-47-3	1.40E-03	4.86E-07	4.25E-03	2.13E-06	7.75E-06	6.79E-02	3.39E-05
Cobalt	7440-48-4	8.40E-05	2.91E-08	2.55E-04	1.28E-07	4.65E-07	4.07E-03	2.04E-06
Copper	7440-50-8	8.50E-04	2.95E-07	2.58E-03	1.29E-06	4.71E-06	4.12E-02	2.06E-05
Manganese	7439-96-5	3.80E-04	1.32E-07	1.15E-03	5.77E-07	2.10E-06	1.84E-02	9.21E-06
Mercury	7439-97-6	2.60E-04	9.02E-08	7.90E-04	3.95E-07	1.44E-06	1.26E-02	6.30E-06
Molybdenum	7439-98-7	1.10E-03	3.82E-07	3.34E-03	1.67E-06	6.09E-06	5.33E-02	2.67E-05
Nickel	7440-02-0	2.10E-03	7.29E-07	6.38E-03	3.19E-06	1.16E-05	1.02E-01	5.09E-05
Selenium	7782-49-2	2.40E-05	8.33E-09	7.29E-05	3.65E-08	1.33E-07	1.16E-03	5.82E-07
Vanadium	1314-62-1	2.30E-03	7.98E-07	6.99E-03	3.49E-06	1.27E-05	1.12E-01	5.58E-05
Zinc	7440-66-6	2.90E-02	1.01E-05	8.81E-02	4.41E-05	1.61E-04	1.41E+00	7.03E-04
Subtotal HAPs					2.87E-03			4.57E-02
Total HAPs								4.86E-02

Notes:

[1] Criteria Pollutants, small uncontrolled boilers (EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-1 and 1.4-2), dated 07/98.

[2] PM emission factor is assumed to equal PM_{10}.

[3] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

[4] Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. Designated by *

[5] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

ON Semiconductor
Water Heater

Water Heater (MMBtu/hr)*	0.0751
Fuel Type	Natural Gas
Maximum Operation Limit (hrs/yr)	8,760
Maximum SCF, 12 months	644,976
Maximum 10^6 SCF	0.64
SCF last 12 months	38,038
Actual Baseline 10^6 SCF	0.04
Operational Variability in 10^6 SCF	0.61
Heat Value of Fuel (Btu/scf)	1,020

Note: Based on ratio of facility wide BTU and total NG usage over last 12 months

Note: difference in SCF is based on actual NG usage versus maximum potential NG usage

		Actual Baseline (Individual)				Operational Variability (Individual)		
Criteria Pollutant[1]		Emission Factor ($lb/10^6$ scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)
Total Particulate Matter (PM)[2]		7.6	3.30E-05	0.29	1.45E-04	5.27E-04	4.61	2.31E-03
Nitrogen Oxides (NOx)		100.0	4.34E-04	3.80	1.90E-03	6.93E-03	60.69	3.03E-02
Sulfur Oxides (SOx)		0.6	2.61E-06	0.02	1.14E-05	4.16E-05	0.36	1.82E-04
Carbon Monoxide (CO)		84.0	3.65E-04	3.20	1.60E-03	5.82E-03	50.98	2.55E-02
Lead		0.0005	2.17E-09	0.00	9.51E-09	3.46E-08	0.00	1.52E-07
VOC		5.5	2.39E-05	0.21	1.05E-04	3.81E-04	3.34	1.67E-03

		Actual Baseline (Individual)				Operational Variability (Individual)			
Toxic Air Pollutants[3]	CAS No.	Emission Factor ($lb/10^6$ scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
3-Methylchloranthrene	56-49-5	1.80E-06	7.82E-12	6.85E-08	3.42E-11	1.25E-10	1.09E-06	5.46E-10	Non HAP
Benzene	71-43-2	2.10E-03	9.12E-09	7.99E-05	3.99E-08	1.45E-07	1.27E-03	6.37E-07	HAP
Benzo(a)pyrene*	50-32-8	1.20E-06	5.21E-12	4.56E-08	2.28E-11	8.31E-11	7.28E-07	3.64E-10	Non HAP
Butane	106-97-8	2.10E+00	9.12E-06	7.99E-02	3.99E-05	1.45E-04	1.27E+00	6.37E-04	Non HAP
Ethane	74-84-0	3.10E+00	1.35E-05	1.18E-01	5.90E-05	2.15E-04	1.88E+00	9.41E-04	Non HAP
Propane	74-98-6	1.60E+00	6.95E-06	6.09E-02	3.04E-05	1.11E-04	9.71E-01	4.86E-04	Non HAP
Formaldehyde	50-00-0	7.50E-02	3.26E-07	2.85E-03	1.43E-06	5.20E-06	4.55E-02	2.28E-05	HAP
Hexane	110-54-3	1.80E+00	7.82E-06	6.85E-02	3.42E-05	1.25E-04	1.09E+00	5.46E-04	HAP
Naphthalene	91-20-3	6.10E-04	2.65E-09	2.32E-05	1.16E-08	4.23E-08	3.70E-04	1.85E-07	HAP
Pentane	109-66-0	2.60E+00	1.13E-05	9.89E-02	4.94E-05	1.80E-04	1.58E+00	7.89E-04	Non HAP
Toluene	108-88-3	3.40E-03	1.48E-08	1.29E-04	6.47E-08	2.36E-07	2.06E-03	1.03E-06	HAP
2-Methylnaphthalene	91-57-6	2.40E-05	1.04E-10	9.13E-07	4.56E-10	1.66E-09	1.46E-05	7.28E-09	Non HAP
7,12-Dimethylbenz(a)anthracene		1.60E-05	6.95E-11	6.09E-07	3.04E-10	1.11E-09	9.71E-06	4.86E-09	Non HAP
Acenaphthene	83-32-9	1.80E-06	7.82E-12	6.85E-08	3.42E-11	1.25E-10	1.09E-06	5.46E-10	Non HAP
Acenaphthylene	203-96-8	1.80E-06	7.82E-12	6.85E-08	3.42E-11	1.25E-10	1.09E-06	5.46E-10	Non HAP
Anthracene	120-12-7	2.40E-06	1.04E-11	9.13E-08	4.56E-11	1.66E-10	1.46E-06	7.28E-10	Non HAP
Benzo(a)anthracene*	56-55-3	1.80E-06	7.82E-12	6.85E-08	3.42E-11	1.25E-10	1.09E-06	5.46E-10	Non HAP
Benzo(b)fluoranthene*	205-82-3	1.80E-06	7.82E-12	6.85E-08	3.42E-11	1.25E-10	1.09E-06	5.46E-10	Non HAP
Benzo(g,h,l)perylene	191-24-2	1.20E-06	5.21E-12	4.56E-08	2.28E-11	8.31E-11	7.28E-07	3.64E-10	Non HAP
Benzo(k)fluoranthene*	205-82-3	1.80E-06	7.82E-12	6.85E-08	3.42E-11	1.25E-10	1.09E-06	5.46E-10	Non HAP
Chrysene*	218-01-9	1.80E-06	7.82E-12	6.85E-08	3.42E-11	1.25E-10	1.09E-06	5.46E-10	Non HAP
Dibenzo(a,h)anthracene*	53-70-3	1.20E-06	5.21E-12	4.56E-08	2.28E-11	8.31E-11	7.28E-07	3.64E-10	Non HAP
Dichlorobenzene	25321-22-6	1.20E-03	5.21E-09	4.56E-05	2.28E-08	8.31E-08	7.28E-04	3.64E-07	Non HAP
Fluoranthene	206-44-0	3.00E-06	1.30E-11	1.14E-07	5.71E-11	2.08E-10	1.82E-06	9.10E-10	Non HAP
Flourene	86-73-7	2.80E-06	1.22E-11	1.07E-07	5.33E-11	1.94E-10	1.70E-06	8.50E-10	Non HAP
Indeno(1,2,3-cd)pyrene*	193-39-5	1.80E-06	7.82E-12	6.85E-08	3.42E-11	1.25E-10	1.09E-06	5.46E-10	Non HAP
Phenanathrene	85-01-8	1.70E-05	7.38E-11	6.47E-07	3.23E-10	1.18E-09	1.03E-05	5.16E-09	Non HAP
Pyrene	129-00-0	5.00E-06	2.17E-11	1.90E-07	9.51E-11	3.46E-10	3.03E-06	1.52E-09	Non HAP
POM[4]			4.95E-11	4.34E-07	2.17E-10	7.90E-10	6.92E-06	3.46E-09	HAP

		Actual Baseline (Individual)				Proposed Growth (Individual)			
Toxic Air Pollutants-Metals[5]	CAS Number	Emission Factor ($lb/10^6$ scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
Arsenic	7440-38-2	2.00E-04	8.68E-10	7.61E-06	3.80E-09	1.39E-08	1.21E-04	6.07E-08	HAP
Barium	7440-39-3	4.40E-03	1.91E-08	1.67E-04	8.37E-08	3.05E-07	2.67E-03	1.34E-06	Non HAP
Beryllium	7440-41-7	1.20E-05	5.21E-11	4.56E-07	2.28E-10	8.31E-10	7.28E-06	3.64E-09	HAP
Cadmium	7440-43-9	1.10E-03	4.78E-09	4.18E-05	2.09E-08	7.62E-08	6.68E-04	3.34E-07	HAP
Chromium	7440-47-3	1.40E-03	6.08E-09	5.33E-05	2.66E-08	9.70E-08	8.50E-04	4.25E-07	HAP
Cobalt	7440-48-4	8.40E-05	3.65E-10	3.20E-06	1.60E-09	5.82E-09	5.10E-05	2.55E-08	HAP
Copper	7440-50-8	8.50E-04	3.69E-09	3.23E-05	1.62E-08	5.89E-08	5.16E-04	2.58E-07	Non HAP
Manganese	7439-96-5	3.80E-04	1.65E-09	1.45E-05	7.23E-09	2.63E-08	2.31E-04	1.15E-07	HAP
Mercury	7439-97-6	2.60E-04	1.13E-09	9.89E-06	4.94E-09	1.80E-08	1.58E-04	7.89E-08	HAP
Molybdenum	7439-98-7	1.10E-03	4.78E-09	4.18E-05	2.09E-08	7.62E-08	6.68E-04	3.34E-07	Non HAP
Nickel	7440-02-0	2.10E-03	9.12E-09	7.99E-05	3.99E-08	1.45E-07	1.27E-03	6.37E-07	HAP
Selenium	7782-49-2	2.40E-05	1.04E-10	9.13E-07	4.56E-10	1.66E-09	1.46E-05	7.28E-09	HAP
Vanadium	1314-62-1	2.30E-03	9.99E-09	8.75E-05	4.37E-08	1.59E-07	1.40E-03	6.98E-07	Non HAP
Zinc	7440-66-6	2.90E-02	1.26E-07	1.10E-03	5.52E-07	2.01E-06	1.76E-02	8.80E-06	Non HAP
Subtotal HAPs					3.59E-05			5.73E-04	
Total HAPs								6.08E-04	

Notes:

[1] Criteria Pollutants, small uncontrolled boilers (EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-1 and 1.4-2), dated 07/98.

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

[3] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

[4] Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. Designated by *

[5] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

ON Semiconductor
Boilers 1, 2, and 4

Kewanee Boiler (MMBtu/hr)*	8.37
Low NOx burners rated at 9 PPM	
Fuel Type	Natural Gas
Maximum Operation Limit (hrs/yr)	8,760
Maximum SCF, 12 months	71,883,529
Maximum 10^6 SCF	71.88
SCF last 12 months	4,239,380
Actual Baseline 10^6 SCF	4.24
Operational Variability in 10^6 SCF	67.64
Heat Value of Fuel (Btu/scf)	1,020

* Note:
There are three identical units.
Therefore, emission calculations are presented for only one boiler.

Note: Based on ratio of facility wide BTU and total NG usage over last 12 months

Note: difference in SCF is based on actual NG usage versus maximum potential NG usage

		Actual Baseline (Individual)					Operational Variability (Individual)			
Criteria Pollutant		Emission Factor[1] ($lb/10^6$ scf)	Manufacturer EF[2] ($lb/10^6$ BTU)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
Particulate Matter less than 10 microns (PM_{10})[3]			0.0076	0.064	32.86	1.64E-02	0.060	524.38	2.62E-01	557.241
Particulate Matter less than 10 microns ($PM_{2.5}$)[4]			0.0057	0.048	24.65	1.23E-02	0.045	393.28	1.97E-01	
Nitrogen Oxides (NOx)			0.0109	0.091	47.13	2.36E-02	0.086	752.07	3.76E-01	
Sulfur Oxides (SOx)			0.0017	0.014	7.35	3.68E-03	0.013	117.29	5.86E-02	
Carbon Monoxide (CO)			0.0739	0.619	319.56	1.60E-01	0.582	5,098.88	2.55E+00	
Lead		0.0005		2.42E-07	0.00	1.06E-06	3.86E-06	0.03	1.69E-05	
VOC			0.0055	0.046	23.78	1.19E-02		379.48	1.90E-01	

		Actual Baseline (Individual)					Operational Variability (Individual)			
Toxic Air Pollutants[5]	CAS No.	Emission Factor ($lb/10^6$ scf)		Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
3-Methylchloranthrene	56-49-5	1.80E-06		8.71E-10	7.63E-06	3.82E-09	1.39E-08	1.22E-04	6.09E-08	Non HAP
Benzene	71-43-2	2.10E-03		1.02E-06	8.90E-03	4.45E-06	1.62E-05	1.42E-01	7.10E-05	HAP
Benzo(a)pyrene*	50-32-8	1.20E-06		5.81E-10	5.09E-06	2.54E-09	9.27E-09	8.12E-05	4.06E-08	Non HAP
Butane	106-97-8	2.10E+00		1.02E-03	8.90E+00	4.45E-03	1.62E-02	1.42E+02	7.10E-02	Non HAP
Ethane	74-84-0	3.10E+00		1.50E-03	1.31E+01	6.57E-03	2.39E-02	2.10E+02	1.05E-01	Non HAP
Propane	74-98-6	1.60E+00		7.74E-04	6.78E+00	3.39E-03	1.24E-02	1.08E+02	5.41E-02	Non HAP
Formaldehyde	50-00-0	7.50E-02		3.63E-05	3.18E-01	1.59E-04	5.79E-04	5.07E+00	2.54E-03	HAP
Hexane	110-54-3	1.80E+00		8.71E-04	7.63E+00	3.82E-03	1.39E-02	1.22E+02	6.09E-02	HAP
Naphthalene	91-20-3	6.10E-04		2.95E-07	2.59E-03	1.29E-06	4.71E-06	4.13E-02	2.06E-05	HAP
Pentane	109-66-0	2.60E+00		1.26E-03	1.10E+01	5.51E-03	2.01E-02	1.76E+02	8.79E-02	Non HAP
Toluene	108-88-3	3.40E-03		1.65E-06	1.44E-02	7.21E-06	2.63E-05	2.30E-01	1.15E-04	HAP
2-Methylnaphthalene	91-57-6	2.40E-05		1.16E-08	1.02E-04	5.09E-08	1.85E-07	1.62E-03	8.12E-07	Non HAP
7,12-Dimethylbenz(a)anthracene		1.60E-05		7.74E-09	6.78E-05	3.39E-08	1.24E-07	1.08E-03	5.41E-07	Non HAP
Acenaphthene	83-32-9	1.80E-06		8.71E-10	7.63E-06	3.82E-09	1.39E-08	1.22E-04	6.09E-08	Non HAP
Acenaphthylene	203-96-8	1.80E-06		8.71E-10	7.63E-06	3.82E-09	1.39E-08	1.22E-04	6.09E-08	Non HAP
Anthracene	120-12-7	2.40E-06		1.16E-09	1.02E-05	5.09E-09	1.85E-08	1.62E-04	8.12E-08	Non HAP
Benzo(a)anthracene*	56-55-3	1.80E-06		8.71E-10	7.63E-06	3.82E-09	1.39E-08	1.22E-04	6.09E-08	Non HAP
Benzo(b)fluoranthene*	205-82-3	1.80E-06		8.71E-10	7.63E-06	3.82E-09	1.39E-08	1.22E-04	6.09E-08	Non HAP
Benzo(g,h,l)perylene	191-24-2	1.20E-06		5.81E-10	5.09E-06	2.54E-09	9.27E-09	8.12E-05	4.06E-08	Non HAP
Benzo(k)fluoranthene*	205-82-3	1.80E-06		8.71E-10	7.63E-06	3.82E-09	1.39E-08	1.22E-04	6.09E-08	Non HAP
Chrysene*	218-01-9	1.80E-06		8.71E-10	7.63E-06	3.82E-09	1.39E-08	1.22E-04	6.09E-08	Non HAP
Dibenzo(a,h)anthracene*	53-70-3	1.20E-06		5.81E-10	5.09E-06	2.54E-09	9.27E-09	8.12E-05	4.06E-08	Non HAP
Dichlorobenzene	25321-22-6	1.20E-03		5.81E-07	5.09E-03	2.54E-06	9.27E-06	8.12E-02	4.06E-05	Non HAP
Fluoranthene	206-44-0	3.00E-06		1.45E-09	1.27E-05	6.36E-09	2.32E-08	2.03E-04	1.01E-07	Non HAP
Flourene	86-73-7	2.80E-06		1.36E-09	1.19E-05	5.94E-09	2.16E-08	1.89E-04	9.47E-08	Non HAP
Indeno(1,2,3-cd)pyrene*	193-39-5	1.80E-06		8.71E-10	7.63E-06	3.82E-09	1.39E-08	1.22E-04	6.09E-08	Non HAP
Phenanathrene	85-01-8	1.70E-05		8.23E-09	7.21E-05	3.60E-08	1.31E-07	1.15E-03	5.75E-07	Non HAP
Pyrene	129-00-0	5.00E-06		2.42E-09	2.12E-05	1.06E-08	3.86E-08	3.38E-04	1.69E-07	Non HAP
POM[6]				5.52E-09	4.83E-05	2.42E-08	8.80E-08	7.71E-04	3.86E-07	HAP

		Actual Baseline (Individual)					Operational Variability (Individual)			
Toxic Air Pollutants-Metals[7]	CAS Number	Emission Factor ($lb/10^6$ scf)		Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
Arsenic	7440-38-2	2.00E-04		9.68E-08	8.48E-04	4.24E-07	1.54E-06	1.35E-02	6.76E-06	HAP
Barium	7440-39-3	4.40E-03		2.13E-06	1.87E-02	9.33E-06	3.40E-05	2.98E-01	1.49E-04	Non HAP
Beryllium	7440-41-7	1.20E-05		5.81E-09	5.09E-05	2.54E-08	9.27E-08	8.12E-04	4.06E-07	HAP
Cadmium	7440-43-9	1.10E-03		5.32E-07	4.66E-03	2.33E-06	8.49E-06	7.44E-02	3.72E-05	HAP
Chromium	7440-47-3	1.40E-03		6.78E-07	5.94E-03	2.97E-06	1.08E-05	9.47E-02	4.74E-05	HAP
Cobalt	7440-48-4	8.40E-05		4.07E-08	3.56E-04	1.78E-07	6.49E-07	5.68E-03	2.84E-06	HAP
Copper	7440-50-8	8.50E-04		4.11E-07	3.60E-03	1.80E-06	6.56E-06	5.75E-02	2.87E-05	Non HAP
Manganese	7439-96-5	3.80E-04		1.84E-07	1.61E-03	8.05E-07	2.93E-06	2.57E-02	1.29E-05	HAP
Mercury	7439-97-6	2.60E-04		1.26E-07	1.10E-03	5.51E-07	2.01E-06	1.76E-02	8.79E-06	HAP
Molybdenum	7439-98-7	1.10E-03		5.32E-07	4.66E-03	2.33E-06	8.49E-06	7.44E-02	3.72E-05	Non HAP
Nickel	7440-02-0	2.10E-03		1.02E-06	8.90E-03	4.45E-06	1.62E-05	1.42E-01	7.10E-05	HAP
Selenium	7782-49-2	2.40E-05		1.16E-08	1.02E-04	5.09E-08	1.85E-07	1.62E-03	8.12E-07	HAP
Vanadium	1314-62-1	2.30E-03		1.11E-06	9.75E-03	4.88E-06	1.78E-05	1.56E-01	7.78E-05	Non HAP
Zinc	7440-66-6	2.90E-02		1.40E-05	1.23E-01	6.15E-05	2.24E-04	1.96E+00	9.81E-04	Non HAP
Subtotal HAPs						4.00E-03			6.38E-02	
Total HAPs									6.78E-02	

Notes:

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

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

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

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

[5] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

[6] Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. Designated by *

[7] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

ON Semiconductor
Boiler 3

Cleaver Brooks Boiler (MMBtu/hr)*	8.165
Fuel Type	Natural Gas
Maximum Operation Limit (hrs/yr)	8,760
Maximum SCF, 12 months	70,122,941
Maximum 10^6 SCF	70.12
SCF last 12 months	4,135,548
Actual Baseline 10^6 SCF	4.14
Operational Variability in 10^6 SCF	65.99
Heat Value of Fuel (Btu/scf)	1,020

Note: Based on ratio of facility wide BTU and total NG usage over last 12 months

Note: difference in SCF is based on actual NG usage versus maximum potential NG usage

Criteria Pollutant		Actual Baseline (Individual) Emission Factor[1] (lb/10^6 scf)	AP42 Emission Rate (lb/hr)	Manu Emission Rate[2] (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Operational Variability (Individual) Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)
Particulate Matter less than 10 microns (PM_{10})[3]				0.059	30.48	1.52E-02	0.06	486.36	2.43E-01
Particulate Matter less than 10 microns ($PM_{2.5}$)[4]				0.059	30.48	1.52E-02	0.06	486.36	2.43E-01
Nitrogen Oxides (NOx)				0.91	470.13	2.35E-01	0.86	7,501.47	3.75E+00
Sulfur Oxides (SOx)				0.0046	2.38	1.19E-03	0.00	37.92	1.90E-02
Carbon Monoxide (CO)				0.59	304.81	1.52E-01	5.6E-01	4,863.59	2.43E+00
Lead		0.0005	2.36E-07		0.0021	1.03E-06	3.77E-06	0.03	1.65E-05
VOC				0.028	14.47	7.23E-03	2.63E-02	230.81	1.15E-01

Toxic Air Pollutants[5]	CAS No.	Actual Baseline (Individual) Emission Factor (lb/10^6 scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Operational Variability (Individual) Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
3-Methylchloranthrene	56-49-5	1.80E-06	8.50E-10	7.44E-06	3.72E-09	1.36E-08	1.19E-04	5.94E-08	Non HAP
Benzene	71-43-2	2.10E-03	9.91E-07	8.68E-03	4.34E-06	1.58E-05	1.39E-01	6.93E-05	HAP
Benzo(a)pyrene*	50-32-8	1.20E-06	5.67E-10	4.96E-06	2.48E-09	9.04E-09	7.92E-05	3.96E-08	Non HAP
Butane	106-97-8	2.10E+00	9.91E-04	8.68E+00	4.34E-03	1.58E-02	1.39E+02	6.93E-02	Non HAP
Ethane	74-84-0	3.10E+00	1.46E-03	1.28E+01	6.41E-03	2.34E-02	2.05E+02	1.02E-01	Non HAP
Propane	74-98-6	1.60E+00	7.55E-04	6.62E+00	3.31E-03	1.21E-02	1.06E+02	5.28E-02	Non HAP
Formaldehyde	50-00-0	7.50E-02	3.54E-05	3.10E-01	1.55E-04	5.65E-04	4.95E+00	2.47E-03	HAP
Hexane	110-54-3	1.80E+00	8.50E-04	7.44E+00	3.72E-03	1.36E-02	1.19E+02	5.94E-02	HAP
Naphthalene	91-20-3	6.10E-04	2.88E-07	2.52E-03	1.26E-06	4.60E-06	4.03E-02	2.01E-05	HAP
Pentane	109-66-0	2.60E+00	1.23E-03	1.08E+01	5.38E-03	1.96E-02	1.72E+02	8.58E-02	Non HAP
Toluene	108-88-3	3.40E-03	1.61E-06	1.41E-02	7.03E-06	2.56E-05	2.24E-01	1.12E-04	HAP
2-Methylnaphthalene	91-57-6	2.40E-05	1.13E-08	9.93E-05	4.96E-08	1.81E-07	1.58E-03	7.92E-07	Non HAP
7,12-Dimethylbenz(a)anthracene		1.60E-05	7.55E-09	6.62E-05	3.31E-08	1.21E-07	1.06E-03	5.28E-07	Non HAP
Acenaphthene	83-32-9	1.80E-06	8.50E-10	7.44E-06	3.72E-09	1.36E-08	1.19E-04	5.94E-08	Non HAP
Acenaphthylene	203-96-8	1.80E-06	8.50E-10	7.44E-06	3.72E-09	1.36E-08	1.19E-04	5.94E-08	Non HAP
Anthracene	120-12-7	2.40E-06	1.13E-09	9.93E-06	4.96E-09	1.81E-08	1.58E-04	7.92E-08	Non HAP
Benzo(a)anthracene*	56-55-3	1.80E-06	8.50E-10	7.44E-06	3.72E-09	1.36E-08	1.19E-04	5.94E-08	Non HAP
Benzo(b)fluoranthene*	205-82-3	1.80E-06	8.50E-10	7.44E-06	3.72E-09	1.36E-08	1.19E-04	5.94E-08	Non HAP
Benzo(g,h,l)perylene	191-24-2	1.20E-06	5.67E-10	4.96E-06	2.48E-09	9.04E-09	7.92E-05	3.96E-08	Non HAP
Benzo(k)fluoranthene*	205-82-3	1.80E-06	8.50E-10	7.44E-06	3.72E-09	1.36E-08	1.19E-04	5.94E-08	Non HAP
Chrysene*	218-01-9	1.80E-06	8.50E-10	7.44E-06	3.72E-09	1.36E-08	1.19E-04	5.94E-08	Non HAP
Dibenzo(a,h)anthracene*	53-70-3	1.20E-06	5.67E-10	4.96E-06	2.48E-09	9.04E-09	7.92E-05	3.96E-08	Non HAP
Dichlorobenzene	25321-22-6	1.20E-03	5.67E-07	4.96E-03	2.48E-06	9.04E-06	7.92E-02	3.96E-05	Non HAP
Fluoranthene	206-44-0	3.00E-06	1.42E-09	1.24E-05	6.20E-09	2.26E-08	1.98E-04	9.90E-08	Non HAP
Flourene	86-73-7	2.80E-06	1.32E-09	1.16E-05	5.79E-09	2.11E-08	1.85E-04	9.24E-08	Non HAP
Indeno(1,2,3-cd)pyrene*	193-39-5	1.80E-06	8.50E-10	7.44E-06	3.72E-09	1.36E-08	1.19E-04	5.94E-08	Non HAP
Phenanathrene	85-01-8	1.70E-05	8.03E-09	7.03E-05	3.52E-08	1.28E-07	1.12E-03	5.61E-07	Non HAP
Pyrene	129-00-0	5.00E-06	2.36E-09	2.07E-05	1.03E-08	3.77E-08	3.30E-04	1.65E-07	Non HAP
POM[6]			5.38E-09	4.71E-05	2.36E-08	8.59E-08	7.52E-04	3.76E-07	HAP

Toxic Air Pollutants-Metals[7]	CAS Number	Actual Baseline (Individual) Emission Factor (lb/10^6 scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Operational Variability (Individual) Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
Arsenic	7440-38-2	2.00E-04	9.44E-08	8.27E-04	4.14E-07	1.51E-06	1.32E-02	6.60E-06	HAP
Barium	7440-39-3	4.40E-03	2.08E-06	1.82E-02	9.10E-06	3.31E-05	2.90E-01	1.45E-04	Non HAP
Beryllium	7440-41-7	1.20E-05	5.67E-09	4.96E-05	2.48E-08	9.04E-08	7.92E-04	3.96E-07	HAP
Cadmium	7440-43-9	1.10E-03	5.19E-07	4.55E-03	2.27E-06	8.29E-06	7.26E-02	3.63E-05	HAP
Chromium	7440-47-3	1.40E-03	6.61E-07	5.79E-03	2.89E-06	1.05E-05	9.24E-02	4.62E-05	HAP
Cobalt	7440-48-4	8.40E-05	3.97E-08	3.47E-04	1.74E-07	6.33E-07	5.54E-03	2.77E-06	HAP
Copper	7440-50-8	8.50E-04	4.01E-07	3.52E-03	1.76E-06	6.40E-06	5.61E-02	2.80E-05	Non HAP
Manganese	7439-96-5	3.80E-04	1.79E-07	1.57E-03	7.86E-07	2.86E-06	2.51E-02	1.25E-05	HAP
Mercury	7439-97-6	2.60E-04	1.23E-07	1.08E-03	5.38E-07	1.96E-06	1.72E-02	8.58E-06	HAP
Molybdenum	7439-98-7	1.10E-03	5.19E-07	4.55E-03	2.27E-06	8.29E-06	7.26E-02	3.63E-05	Non HAP
Nickel	7440-02-0	2.10E-03	9.91E-07	8.68E-03	4.34E-06	1.58E-05	1.39E-01	6.93E-05	HAP
Selenium	7782-49-2	2.40E-05	1.13E-08	9.93E-05	4.96E-08	1.81E-07	1.58E-03	7.92E-07	HAP
Vanadium	1314-62-1	2.30E-03	1.09E-06	9.51E-03	4.76E-06	1.73E-05	1.52E-01	7.59E-05	Non HAP
Zinc	7440-66-6	2.90E-02	1.37E-05	1.20E-01	6.00E-05	2.18E-04	1.91E+00	9.57E-04	Non HAP
Subtotal HAPs					3.90E-03			6.22E-02	
Total HAPs								**6.61E-02**	

Notes:

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

[2] Manufacturer provided emission rate based on 100-percent load for existing boiler

[3] Total PM_{10} is assumed to equla PM_{10} condensable plus PM_{10} filterable based on Cleaver Brooks manufacturer emissions data

[4] Total $PM_{2.5}$ is assumed to equal $PM_{2.5}$ condensable plus $PM_{2.5}$ filterable based on Cleaver Brooks manufacturer emissions data

[5] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

[6] Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. Designated by *

[7] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

ON Semiconductor
Generator 2 Baseline

Generator Name QST30-G4	**1112 kW**	
Manufacturer	**Cummins**	
Engine Power Rating (kW)	1,112	Standby
Engine Power Rating (hp)	1,490	
Fuel Type	Distillate #2	
- maximum sulfur content (%)	0.0015	
Maximum Firing Rate (gals/hr)*	70.50	
(MMBtu/hr)	9.87	
Actual hours of operation (12 month)	**9.4**	
Heat Value of Fuel (Btu/gal)	140,000	

		Uncontrolled Baseline			
Pollutant	**CAS No.**	**Emission Factor[1] (g/hp-hr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM)		0.10	0.33	3.1	0.002
PM_{10}[2]		0.10	0.33	3.1	0.002
$PM_{2.5}$[2]		0.10	0.33	3.1	0.002
Nitrogen Oxides (NOx)		6.7	22.01	206	0.10
Sulfur Oxides		0.13	0.43	4.0	0.002
Carbon Monoxide (CO)		1.50	4.93	46.2	0.02
HC[3]		0.30	0.99	9.2	0.005

			Uncontrolled Baseline			
Toxics[4]	**CAS Number**	**Emission Factor (lb/MMBtu)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	
Benzene	71-43-2	7.76E-04	8.19E-06	7.18E-02	3.59E-05	HAP
Formaldehyde	50-00-0	7.89E-05	8.33E-07	7.30E-03	3.65E-06	HAP
Naphthalene	91-20-3	1.30E-04	1.37E-06	1.20E-02	6.01E-06	HAP
Toluene	108-88-3	2.81E-04	2.97E-06	2.60E-02	1.30E-05	HAP
o-Xylenes	1330-20-7	1.93E-04	2.04E-06	1.78E-02	8.92E-06	HAP
Acetaldehyde	75-07-0	2.52E-05	2.66E-07	2.33E-03	1.17E-06	HAP
Acrolein	107-02-8	7.88E-06	8.32E-08	7.29E-04	3.64E-07	HAP
Propylene	115-07-1	2.79E-03	2.95E-05	2.58E-01	1.29E-04	Non-hap
Acenaphthalylene	203-96-8	9.23E-06	9.74E-08	8.54E-04	4.27E-07	Non-hap
Acenaphthene	83-32-9	4.68E-06	4.94E-08	4.33E-04	2.16E-07	Non-hap
Fluorene	86-73-7	1.28E-05	1.35E-07	1.18E-03	5.92E-07	Non-hap
Phenanthrene	85-01-8	4.08E-05	4.31E-07	3.77E-03	1.89E-06	Non-hap
Anthracene	120-12-7	1.23E-06	1.30E-08	1.14E-04	5.69E-08	Non-hap
Fluoranthene	206-44-0	4.03E-06	4.25E-08	3.73E-04	1.86E-07	Non-hap
Pyrene	129-00-0	3.71E-06	3.92E-08	3.43E-04	1.72E-07	Non-hap
Benzo(g,h,l)pyrlene	191-24-2	5.56E-07	5.87E-09	5.14E-05	2.57E-08	Non-hap
Benz(a)anthracene	56-55-3	6.22E-07	6.57E-09	5.75E-05	2.88E-08	Non-hap
Benzo(b)fluoranthene	205-99-2	1.11E-06	1.17E-08	1.03E-04	5.13E-08	Non-hap
Benzo(k)fluoranthene	205-82-3	2.18E-07	2.30E-09	2.02E-05	1.01E-08	Non-hap
Chrysene	218-01-9	1.53E-06	1.62E-08	1.41E-04	7.07E-08	Non-hap
Dibenzo(a,h)anthracene	53-70-3	3.46E-07	3.65E-09	3.20E-05	1.60E-08	Non-hap
Indeno(1,2,3-cd)pyrene	193-39-5	4.14E-07	4.37E-09	3.83E-05	1.91E-08	Non-hap
Benzo(a)pyrene	50-32-8	2.57E-07	2.71E-09	2.38E-05	1.19E-08	Non-hap
Total PAH		2.12E-04	2.24E-06	1.96E-02	9.80E-06	Non-hap
POM[5]			4.75E-08	4.16E-04	2.08E-07	HAP

[1] PM, NOx, CO, SO_2, and HC emission factors obtained from Cummins exhaust emissions data sheet.

[2] PM_{10} and $PM_{2.5}$ emission factors are equal to PM emission factor.

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

[4] Toxic emission factors are derived from EPA AP-41, Table 3.4-3 and Table 3.4-4.

[5] POM (polycyclic organic matter) is the sum of benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene

Note: Toxic emission factors derived from EPA AP-42 Tables 3.4-3 and 3.4-4.

ON Semiconductor
Generator 2 Proposed Growth

Generator Name QST30-G4	**1112 kW**	
Manufacturer	**Cummins**	
Engine Power Rating (kW)	1,112	Standby
Engine Power Rating (hp)	1,490	
Fuel Type	Distillate #2	
- maximum sulfur content (%)	0.0015	
Maximum Firing Rate (gals/hr)*	70.50	
(MMBtu/hr)	9.87	
Actual hours of operation (12 month)	9.4	
Proposed Growth Hours	**90.63**	
Annual Operation Limit (hrs/yr)	100	Proposed PTE, maintenance, and testing limit
Heat Value of Fuel (Btu/gal)	140,000	

			Operational Variability		
Pollutant	**CAS No.**	**Emission Factor[1] (g/hp-hr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM)		0.10	0.33	29.8	0.015
PM_{10}[2]		0.10	0.33	29.8	0.015
$PM_{2.5}$[2]		0.10	0.33	29.8	0.015
Nitrogen Oxides (NOx)		6.7	22.01	1,995	1.00
Sulfur Oxides		0.13	0.43	38.7	0.019
Carbon Monoxide (CO)		1.50	4.93	447	0.22
HC[3]		0.30	0.99	89.3	0.045

			Operational Variability			PTE			
Toxics[4]	**CAS Number**	**Emission Factor (lb/MMBtu)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	
Benzene	71-43-2	7.76E-04	7.92E-05	6.94E-01	3.47E-04	8.74E-05	7.66E-01	3.83E-04	HAP
Formaldehyde	50-00-0	7.89E-05	8.06E-06	7.06E-02	3.53E-05	8.89E-06	7.79E-02	3.89E-05	HAP
Naphthalene	91-20-3	1.30E-04	1.33E-05	1.16E-01	5.81E-05	1.46E-05	1.28E-01	6.42E-05	HAP
Toluene	108-88-3	2.81E-04	2.87E-05	2.51E-01	1.26E-04	3.17E-05	2.77E-01	1.39E-04	HAP
o-Xylenes	1330-20-7	1.93E-04	1.97E-05	1.73E-01	8.63E-05	2.17E-05	1.90E-01	9.52E-05	HAP
Acetaldehyde	75-07-0	2.52E-05	2.57E-06	2.25E-02	1.13E-05	2.84E-06	2.49E-02	1.24E-05	HAP
Acrolein	107-02-8	7.88E-06	8.05E-07	7.05E-03	3.52E-06	8.88E-07	7.78E-03	3.89E-06	HAP
Propylene	115-07-1	2.79E-03	2.85E-04	2.50E+00	1.25E-03	3.14E-04	2.75E+00	1.38E-03	Non-hap
Acenaphthalylene	203-96-8	9.23E-06	9.43E-07	8.26E-03	4.13E-06	1.04E-06	9.11E-03	4.56E-06	Non-hap
Acenaphthene	83-32-9	4.68E-06	4.78E-07	4.19E-03	2.09E-06	5.27E-07	4.62E-03	2.31E-06	Non-hap
Fluorene	86-73-7	1.28E-05	1.31E-06	1.14E-02	5.72E-06	1.44E-06	1.26E-02	6.32E-06	Non-hap
Phenanthrene	85-01-8	4.08E-05	4.17E-06	3.65E-02	1.82E-05	4.60E-06	4.03E-02	2.01E-05	Non-hap
Anthracene	120-12-7	1.23E-06	1.26E-07	1.10E-03	5.50E-07	1.39E-07	1.21E-03	6.07E-07	Non-hap
Fluoranthene	206-44-0	4.03E-06	4.12E-07	3.60E-03	1.80E-06	4.54E-07	3.98E-03	1.99E-06	Non-hap
Pyrene	129-00-0	3.71E-06	3.79E-07	3.32E-03	1.66E-06	4.18E-07	3.66E-03	1.83E-06	Non-hap
Benzo(g,h,l)pyrlene	191-24-2	5.56E-07	5.68E-08	4.97E-04	2.49E-07	6.26E-08	5.49E-04	2.74E-07	Non-hap
Benz(a)anthracene	56-55-3	6.22E-07	6.35E-08	5.56E-04	2.78E-07	7.01E-08	6.14E-04	3.07E-07	Non-hap
Benzo(b)fluoranthene	205-99-2	1.11E-06	1.13E-07	9.93E-04	4.96E-07	1.25E-07	1.10E-03	5.48E-07	Non-hap
Benzo(k)fluoranthene	205-82-3	2.18E-07	2.23E-08	1.95E-04	9.75E-08	2.46E-08	2.15E-04	1.08E-07	Non-hap
Chrysene	218-01-9	1.53E-06	1.56E-07	1.37E-03	6.84E-07	1.72E-07	1.51E-03	7.55E-07	Non-hap
Dibenzo(a,h)anthracene	53-70-3	3.46E-07	3.53E-08	3.10E-04	1.55E-07	3.90E-08	3.42E-04	1.71E-07	Non-hap
Indeno(1,2,3-cd)pyrene	193-39-5	4.14E-07	4.23E-08	3.70E-04	1.85E-07	4.66E-08	4.09E-04	2.04E-07	Non-hap
Benzo(a)pyrene	50-32-8	2.57E-07	2.62E-08	2.30E-04	1.15E-07	2.90E-08	2.54E-04	1.27E-07	Non-hap
Total PAH		2.12E-04	2.16E-05	1.90E-01	9.48E-05	2.39E-05	2.09E-01	1.05E-04	Non-hap
POM[5]			4.59E-07	4.02E-03	2.01E-06	5.07E-07	4.44E-03	2.22E-06	HAP
Total HAPS								7.39E-04	

[1] PM, NOx, CO, SO_2, and HC emission factors obtained from Cummins exhaust emissions data sheet.

[2] PM_{10} and $PM_{2.5}$ emission factors are equal to PM emission factor.

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

[4] Toxic emission factors are derived from EPA AP-41, Table 3.4-3 and Table 3.4-4.

[5] POM (polycyclic organic matter) is the sum of benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene

Note: Toxic emission factors derived from EPA AP-42 Tables 3.4-3 and 3.4-4.

ON Semiconductor
Generator 3 Baseline

Generator Name KTA50-G9	**1655 kW**
Manufacturer	**Cummins**
Engine Power Rating (kW)	1,655
Engine Power Rating (hp)	2,220
Fuel Type	Distillate #2
- maximum sulfur content (%)	0.0015
Maximum Firing Rate (gals/hr)*	103.60
(MMBtu/hr)	14.50
Actual hours of operaton (12 month)	8.2
Heat Value of Fuel (Btu/gal)	140,000

		Uncontrolled Baseline				
Pollutant	**CAS No.**	**Emission Factor[1] (lb/MMBtu)**	**Emission Factor[2] (gram/hp-hr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM)[3]			0.11	0.54	4	0.002
PM_{10}			0.11	0.54	4	0.002
$PM_{2.5}$			0.11	0.54	4	0.002
Nitrogen Oxides (NOx)			8.5	41.60	341	0.17
Sulfur Oxides		0.0015		0.022	0.2	0.000
Carbon Monoxide (CO)			1.30	6.36	52	0.03
HC[4]			0.17	0.83	7	0.003

			Uncontrolled Baseline			
Toxics[5]	**CAS Number**	**Emission Factor (lb/MMBtu)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	
Benzene	71-43-2	7.76E-04	1.05E-05	9.23E-02	4.61E-05	HAP
Formaldehyde	50-00-0	7.89E-05	1.07E-06	9.38E-03	4.69E-06	HAP
Naphthalene	91-20-3	1.30E-04	1.76E-06	1.55E-02	7.73E-06	HAP
Toluene	108-88-3	2.81E-04	3.82E-06	3.34E-02	1.67E-05	HAP
o-Xylenes	1330-20-7	1.93E-04	2.62E-06	2.30E-02	1.15E-05	HAP
Acetaldehyde	75-07-0	2.52E-05	3.42E-07	3.00E-03	1.50E-06	HAP
Acrolein	107-02-8	7.88E-06	1.07E-07	9.37E-04	4.69E-07	HAP
Propylene	115-07-1	2.79E-03	3.79E-05	3.32E-01	1.66E-04	Non-hap
Acenaphthalylene	203-96-8	9.23E-06	1.25E-07	1.10E-03	5.49E-07	Non-hap
Acenaphthene	83-32-9	4.68E-06	6.35E-08	5.57E-04	2.78E-07	Non-hap
Fluorene	86-73-7	1.28E-05	1.74E-07	1.52E-03	7.61E-07	Non-hap
Phenanthrene	85-01-8	4.08E-05	5.54E-07	4.85E-03	2.43E-06	Non-hap
Anthracene	120-12-7	1.23E-06	1.67E-08	1.46E-04	7.31E-08	Non-hap
Fluoranthene	206-44-0	4.03E-06	5.47E-08	4.79E-04	2.40E-07	Non-hap
Pyrene	129-00-0	3.71E-06	5.04E-08	4.41E-04	2.21E-07	Non-hap
Benzo(g,h,l)pyrlene	191-24-2	5.56E-07	7.55E-09	6.61E-05	3.31E-08	Non-hap
Benz(a)anthracene	56-55-3	6.22E-07	8.44E-09	7.40E-05	3.70E-08	Non-hap
Benzo(b)fluoranthene	205-99-2	1.11E-06	1.51E-08	1.32E-04	6.60E-08	Non-hap
Benzo(k)fluoranthene	205-82-3	2.18E-07	2.96E-09	2.59E-05	1.30E-08	Non-hap
Chrysene	218-01-9	1.53E-06	2.08E-08	1.82E-04	9.10E-08	Non-hap
Dibenzo(a,h)anthracene	53-70-3	3.46E-07	4.70E-09	4.12E-05	2.06E-08	Non-hap
Indeno(1,2,3-cd)pyrene	193-39-5	4.14E-07	5.62E-09	4.92E-05	2.46E-08	Non-hap
Benzo(a)pyrene	50-32-8	2.57E-07	3.49E-09	3.06E-05	1.53E-08	Non-hap
Total PAH		2.12E-04	2.88E-06	2.52E-02	1.26E-05	Non-hap
POM [6]			6.11E-08	5.35E-04	2.67E-07	HAP

[1] SO_2 emission factor multiplied by percent sulfur content of fuel (EPA AP-42 Table 3.4-1) EF = 1.01 x 0.0015 = 0.0015

[2] PM, NOx, CO, and HC emission factors are provided by Cummins engine manufacturer

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

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

[5] Toxic emission factors are derived from EPA AP-41, Table 3.4-3 and Table 3.4-4.

[6] POM (polycyclic organic matter) is the sum of benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene

Note: Toxic emission factors derived from EPA AP-42 Tables 3.4-3 and 3.4-4.

ON Semiconductor
Generator 3 Proposed Growth

Generator Name KTA50-G9	**1655 kW**	
Manufacturer	**Cummins**	
Engine Power Rating (kW)	1,655	
Engine Power Rating (hp)	2,220	
Fuel Type	Distillate #2	
- maximum sulfur content (%)	0.0015	
Maximum Firing Rate (gals/hr)*	103.60	
(MMBtu/hr)	14.50	
Actual hours of operaiton (12 month)	8.2	
Annual hours of operation	100.0	Proposed PTE, maintenance, and testing limit
Operational Variability	**91.8**	
Heat Value of Fuel (Btu/gal)	140,000	

				Operational Variability		
Pollutant	**CAS No.**	**Emission Factor[1] (lb/MMBtu)**	**Emission Factor[2] (gram/hp-hr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM)[3]			0.11	0.54	49	0.025
PM_{10}			0.11	0.54	49	0.025
$PM_{2.5}$			0.11	0.54	49	0.025
Nitrogen Oxides (NOx)			8.5	41.60	3,819	1.91
Sulfur Oxides		0.0015		0.022	2.0	0.001
Carbon Monoxide (CO)			1.30	6.36	584	0.29
HC[4]			0.17	0.83	76	0.038

			Operational Variability			PTE			
Toxics[5]	**CAS Number**	**Emission Factor (lb/MMBtu)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	
Benzene	71-43-2	7.76E-04	1.18E-04	1.03E+00	5.17E-04	1.28E-04	1.13E+00	5.63E-04	HAP
Formaldehyde	50-00-0	7.89E-05	1.20E-05	1.05E-01	5.25E-05	1.31E-05	1.14E-01	5.72E-05	HAP
Naphthalene	91-20-3	1.30E-04	1.98E-05	1.73E-01	8.65E-05	2.15E-05	1.89E-01	9.43E-05	HAP
Toluene	108-88-3	2.81E-04	4.27E-05	3.74E-01	1.87E-04	4.65E-05	4.08E-01	2.04E-04	HAP
o-Xylenes	1330-20-7	1.93E-04	2.93E-05	2.57E-01	1.28E-04	3.20E-05	2.80E-01	1.40E-04	HAP
Acetaldehyde	75-07-0	2.52E-05	3.83E-06	3.36E-02	1.68E-05	4.17E-06	3.66E-02	1.83E-05	HAP
Acrolein	107-02-8	7.88E-06	1.20E-06	1.05E-02	5.25E-06	1.30E-06	1.14E-02	5.71E-06	HAP
Propylene	115-07-1	2.79E-03	4.24E-04	3.71E+00	1.86E-03	4.62E-04	4.05E+00	2.02E-03	Non-hap
Acenaphthalylene	203-96-8	9.23E-06	1.40E-06	1.23E-02	6.14E-06	1.53E-06	1.34E-02	6.69E-06	Non-hap
Acenaphthene	83-32-9	4.68E-06	7.11E-07	6.23E-03	3.12E-06	7.75E-07	6.79E-03	3.39E-06	Non-hap
Fluorene	86-73-7	1.28E-05	1.95E-06	1.70E-02	8.52E-06	2.12E-06	1.86E-02	9.28E-06	Non-hap
Phenanthrene	85-01-8	4.08E-05	6.20E-06	5.43E-02	2.72E-05	6.76E-06	5.92E-02	2.96E-05	Non-hap
Anthracene	120-12-7	1.23E-06	1.87E-07	1.64E-03	8.19E-07	2.04E-07	1.78E-03	8.92E-07	Non-hap
Fluoranthene	206-44-0	4.03E-06	6.13E-07	5.37E-03	2.68E-06	6.67E-07	5.85E-03	2.92E-06	Non-hap
Pyrene	129-00-0	3.71E-06	5.64E-07	4.94E-03	2.47E-06	6.14E-07	5.38E-03	2.69E-06	Non-hap
Benzo(g,h,l)pyrlene	191-24-2	5.56E-07	8.45E-08	7.40E-04	3.70E-07	9.21E-08	8.06E-04	4.03E-07	Non-hap
Benz(a)anthracene	56-55-3	6.22E-07	9.45E-08	8.28E-04	4.14E-07	1.03E-07	9.02E-04	4.51E-07	Non-hap
Benzo(b)fluoranthene	205-99-2	1.11E-06	1.69E-07	1.48E-03	7.39E-07	1.84E-07	1.61E-03	8.05E-07	Non-hap
Benzo(k)fluoranthene	205-82-3	2.18E-07	3.31E-08	2.90E-04	1.45E-07	3.61E-08	3.16E-04	1.58E-07	Non-hap
Chrysene	218-01-9	1.53E-06	2.33E-07	2.04E-03	1.02E-06	2.53E-07	2.22E-03	1.11E-06	Non-hap
Dibenzo(a,h)anthracene	53-70-3	3.46E-07	5.26E-08	4.61E-04	2.30E-07	5.73E-08	5.02E-04	2.51E-07	Non-hap
Indeno(1,2,3-cd)pyrene	193-39-5	4.14E-07	6.29E-08	5.51E-04	2.76E-07	6.85E-08	6.00E-04	3.00E-07	Non-hap
Benzo(a)pyrene	50-32-8	2.57E-07	3.91E-08	3.42E-04	1.71E-07	4.26E-08	3.73E-04	1.86E-07	Non-hap
Total PAH		2.12E-04	3.22E-05	2.82E-01	1.41E-04	3.51E-05	3.07E-01	1.54E-04	Non-hap
POM [6]			6.84E-07	5.99E-03	2.99E-06	7.45E-07	6.52E-03	3.26E-06	HAP
Total HAPS								1.09E-03	

[1] SO_2 emission factor multiplied by percent sulfur content of fuel (EPA AP-42 Table 3.4-1) EF = 1.01 x 0.0015 = 0.0015

[2] PM, NOx, CO, and HC emission factors are provided by Cummins engine manufacturer

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

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

[5] Toxic emission factors are derived from EPA AP-41, Table 3.4-3 and Table 3.4-4.

[6] POM (polycyclic organic matter) is the sum of benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene

Note: Toxic emission factors derived from EPA AP-42 Tables 3.4-3 and 3.4-4.

ON Semiconductor
VOC Abatement Units (Controlled)

Water Heater (MMBtu/hr)*	2.0000	two identical unit, 2 MMBtu/hr each
Fuel Type	Natural Gas	
Maximum Operation Limit (hrs/yr)	8,760	
Maximum SCF,12 months	17,176,471	
Maximum 10^6 SCF	17.18	
SCF last 12 months	0	Note: Based on ratio of facility wide BTU and total NG usage over last 12 months
Actual Baseline 10^6 SCF	0.00	
Operational Variability in 10^6 SCF	17.18	Note: difference in SCF is based on actual NG usage versus maximum potential NG usage
Heat Value of Fuel (Btu/scf)	1,020	

		Actual Baseline (Individual)				Operational Variability (Individual)		
Criteria Pollutant[1]		Emission Factor (lb/10^6 scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)
Total Particulate Matter (PM)[2]		7.6	0.00E+00	-	0.00E+00	1.49E-02	130.54	6.53E-02
Nitrogen Oxides (NOx)		100.0	0.00E+00	-	0.00E+00	1.96E-01	1,717.65	8.59E-01
Sulfur Oxides (SOx)		0.6	0.00E+00	-	0.00E+00	1.18E-03	10.31	5.15E-03
Carbon Monoxide (CO)		84.0	0.00E+00	-	0.00E+00	1.65E-01	1,442.82	7.21E-01
Lead		0.0005	0.00E+00	-	0.00E+00	9.80E-07	0.0086	4.29E-06
VOC		5.5	0.00E+00	-	0.00E+00	1.08E-02	94.47	4.72E-02

		Actual Baseline (Individual)				Operational Variability (Individual)			
Toxic Air Pollutants[3]	CAS No.	Emission Factor (lb/10^6 scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
3-Methylchloranthrene	56-49-5	1.80E-06	0.00E+00	0.00E+00	0.00E+00	3.53E-09	3.09E-05	1.55E-08	Non HAP
Benzene	71-43-2	2.10E-03	0.00E+00	0.00E+00	0.00E+00	4.12E-06	3.61E-02	1.80E-05	HAP
Benzo(a)pyrene*	50-32-8	1.20E-06	0.00E+00	0.00E+00	0.00E+00	2.35E-09	2.06E-05	1.03E-08	Non HAP
Butane	106-97-8	2.10E+00	0.00E+00	0.00E+00	0.00E+00	4.12E-03	3.61E+01	1.80E-02	Non HAP
Ethane	74-84-0	3.10E+00	0.00E+00	0.00E+00	0.00E+00	6.08E-03	5.32E+01	2.66E-02	Non HAP
Propane	74-98-6	1.60E+00	0.00E+00	0.00E+00	0.00E+00	3.14E-03	2.75E+01	1.37E-02	Non HAP
Formaldehyde	50-00-0	7.50E-02	0.00E+00	0.00E+00	0.00E+00	1.47E-04	1.29E+00	6.44E-04	HAP
Hexane	110-54-3	1.80E+00	0.00E+00	0.00E+00	0.00E+00	3.53E-03	3.09E+01	1.55E-02	HAP
Naphthalene	91-20-3	6.10E-04	0.00E+00	0.00E+00	0.00E+00	1.20E-06	1.05E-02	5.24E-06	HAP
Pentane	109-66-0	2.60E+00	0.00E+00	0.00E+00	0.00E+00	5.10E-03	4.47E+01	2.23E-02	Non HAP
Toluene	108-88-3	3.40E-03	0.00E+00	0.00E+00	0.00E+00	6.67E-06	5.84E-02	2.92E-05	HAP
2-Methylnaphthalene	91-57-6	2.40E-05	0.00E+00	0.00E+00	0.00E+00	4.71E-08	4.12E-04	2.06E-07	Non HAP
7,12-Dimethylbenz(a)anthracene		1.60E-05	0.00E+00	0.00E+00	0.00E+00	3.14E-08	2.75E-04	1.37E-07	Non HAP
Acenaphthene	83-32-9	1.80E-06	0.00E+00	0.00E+00	0.00E+00	3.53E-09	3.09E-05	1.55E-08	Non HAP
Acenaphthylene	203-96-8	1.80E-06	0.00E+00	0.00E+00	0.00E+00	3.53E-09	3.09E-05	1.55E-08	Non HAP
Anthracene	120-12-7	2.40E-06	0.00E+00	0.00E+00	0.00E+00	4.71E-09	4.12E-05	2.06E-08	Non HAP
Benzo(a)anthracene*	56-55-3	1.80E-06	0.00E+00	0.00E+00	0.00E+00	3.53E-09	3.09E-05	1.55E-08	Non HAP
Benzo(b)fluoranthene*	205-82-3	1.80E-06	0.00E+00	0.00E+00	0.00E+00	3.53E-09	3.09E-05	1.55E-08	Non HAP
Benzo(g,h,l)perylene	191-24-2	1.20E-06	0.00E+00	0.00E+00	0.00E+00	2.35E-09	2.06E-05	1.03E-08	Non HAP
Benzo(k)fluoranthene*	205-82-3	1.80E-06	0.00E+00	0.00E+00	0.00E+00	3.53E-09	3.09E-05	1.55E-08	Non HAP
Chrysene*	218-01-9	1.80E-06	0.00E+00	0.00E+00	0.00E+00	3.53E-09	3.09E-05	1.55E-08	Non HAP
Dibenzo(a,h)anthracene*	53-70-3	1.20E-06	0.00E+00	0.00E+00	0.00E+00	2.35E-09	2.06E-05	1.03E-08	Non HAP
Dichlorobenzene	25321-22-6	1.20E-03	0.00E+00	0.00E+00	0.00E+00	2.35E-06	2.06E-02	1.03E-05	Non HAP
Fluoranthene	206-44-0	3.00E-06	0.00E+00	0.00E+00	0.00E+00	5.88E-09	5.15E-05	2.58E-08	Non HAP
Flourene	86-73-7	2.80E-06	0.00E+00	0.00E+00	0.00E+00	5.49E-09	4.81E-05	2.40E-08	Non HAP
Indeno(1,2,3-cd)pyrene*	193-39-5	1.80E-06	0.00E+00	0.00E+00	0.00E+00	3.53E-09	3.09E-05	1.55E-08	Non HAP
Phenanathrene	85-01-8	1.70E-05	0.00E+00	0.00E+00	0.00E+00	3.33E-08	2.92E-04	1.46E-07	Non HAP
Pyrene	129-00-0	5.00E-06	0.00E+00	0.00E+00	0.00E+00	9.80E-09	8.59E-05	4.29E-08	Non HAP
POM[4]			0.00E+00	0.00E+00	0.00E+00	2.24E-08	1.96E-04	9.79E-08	HAP

		Actual Baseline (Individual)				Operational Variability (Individual)			
Toxic Air Pollutants-Metals[5]	CAS Number	Emission Factor (lb/10^6 scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
Arsenic	7440-38-2	2.00E-04	0.00E+00	0.00E+00	0.00E+00	3.92E-07	3.44E-03	1.72E-06	HAP
Barium	7440-39-3	4.40E-03	0.00E+00	0.00E+00	0.00E+00	8.63E-06	7.56E-02	3.78E-05	Non HAP
Beryllium	7440-41-7	1.20E-05	0.00E+00	0.00E+00	0.00E+00	2.35E-08	2.06E-04	1.03E-07	HAP
Cadmium	7440-43-9	1.10E-03	0.00E+00	0.00E+00	0.00E+00	2.16E-06	1.89E-02	9.45E-06	HAP
Chromium	7440-47-3	1.40E-03	0.00E+00	0.00E+00	0.00E+00	2.75E-06	2.40E-02	1.20E-05	HAP
Cobalt	7440-48-4	8.40E-05	0.00E+00	0.00E+00	0.00E+00	1.65E-07	1.44E-03	7.21E-07	HAP
Copper	7440-50-8	8.50E-04	0.00E+00	0.00E+00	0.00E+00	1.67E-06	1.46E-02	7.30E-06	Non HAP
Manganese	7439-96-5	3.80E-04	0.00E+00	0.00E+00	0.00E+00	7.45E-07	6.53E-03	3.26E-06	HAP
Mercury	7439-97-6	2.60E-04	0.00E+00	0.00E+00	0.00E+00	5.10E-07	4.47E-03	2.23E-06	HAP
Molybdenum	7439-98-7	1.10E-03	0.00E+00	0.00E+00	0.00E+00	2.16E-06	1.89E-02	9.45E-06	Non HAP
Nickel	7440-02-0	2.10E-03	0.00E+00	0.00E+00	0.00E+00	4.12E-06	3.61E-02	1.80E-05	HAP
Selenium	7782-49-2	2.40E-05	0.00E+00	0.00E+00	0.00E+00	4.71E-08	4.12E-04	2.06E-07	HAP
Vanadium	1314-62-1	2.30E-03	0.00E+00	0.00E+00	0.00E+00	4.51E-06	3.95E-02	1.98E-05	Non HAP
Zinc	7440-66-6	2.90E-02	0.00E+00	0.00E+00	0.00E+00	5.69E-05	4.98E-01	2.49E-04	Non HAP
Total TAPs								1.62E-02	

Notes:

[1] Criteria Pollutants, small uncontrolled boilers (EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-1 and 1.4-2), dated 07/98.

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

[3] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

[4] Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. Designated by *

[5] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

VOC ABU Controlled Emissions: BOTH UNITS REPRESENTED HERE

Note: VOC units are operational in this scenario so it includes fuel combustion and manufacturing emissions

Note: 98.5% control applied to manufacturing VOC emissions only

Note: Acetic Acid, HCl, hydrofluoric acid, nitric acid, and **hydrogen peroxide** pass through scrubber, all others pass through VOC ABU

Idaho TAP (58.01.01)

CAS	Chemical	Manufacturing Only VOC	Controlled			IDAHO TAP	IDAPA 58.01.01.585/586		Exceeds EL	
			Manufacturing	Fuel Combustion	Total		585 EL (lb/hr)	586 EL (lb/hr)		
100-41-4	ETHYLBENZENE	YES	5.40E-05		5.40E-05	YES	29		Below	
100-66-3	BENZENE, METHOXY-	YES	1.51E-04		1.51E-04					
106-97-8	Butane			8.24E-03	8.24E-03					
107-21-1	ETHYLENE GLYCOL	YES	8.68E-04		8.68E-04	YES	0.846		Below	
107-98-2	2-PROPANOL, 1-METHOXY-	YES	8.43E-04		8.43E-04	YES	24		Below	
108-65-6	1-METHOXY-2-PROPANOL ACETATE	YES	2.09E-01		2.09E-01	YES	24		Below	
108-88-3	Toluene			1.33E-05	1.33E-05		25		Below	
108-94-1	CYCLOHEXANONE	YES	2.73E-03		2.73E-03	YES	6.67		Below	
109-66-0	Pentane			1.02E-02	1.02E-02		118		Below	
110-54-3	Hexane			7.06E-03	7.06E-03		12		Below	
111-42-2	DIETHANOLAMINE	YES	6.11E-03		6.11E-03	YES	1		Below	
1314-62-1	Vanadium			9.02E-06	9.02E-06		0.003		Below	
115-25-3	OCTAFLUOROCYCLOBUTANE		7.11E-02		7.11E-02					
1186043-92-4	HYDROLYZED BIS(TRIETHOXYSILYL)ETHANE		8.21E-05		8.21E-05					
120-12-7	Anthracene			9.41E-09	9.41E-09					
191-24-2	Benzo(g,h,I)perylene			4.71E-09	4.71E-09					
12001-85-3	ZINC NAPTHENATE		0.00E+00		0.00E+00					
123-42-2	DIACETONE ALCOHOL	YES	0.00E+00		0.00E+00	YES	16		Below	
123-91-1	1,4-DIOXANE	YES	1.03E-04		1.03E-04	YES		4.80E-03	Below	
124-38-9	CARBON DIOXIDE		2.05E-02		2.05E-02					
129-00-0	Pyrene			1.96E-08	1.96E-08					
1330-20-7	XYLENE	YES	5.40E-05		5.40E-05	YES	29		Below	
1333-74-0	HYDROGEN		2.54E-02		2.54E-02					
1333-86-4	CARBON BLACK		9.30E-02		9.30E-02	YES	0.23		Below	
1336-21-6	AMMONIUM HYDROXIDE		1.55E-01		1.55E-01					
1343-98-2	SILICA GEL		4.22E-01		4.22E-01					
193-39-5	Indeno(1,2,3-cd)pyrene*			7.06E-09	7.06E-09					
203-96-8	Acenaphthylene			7.06E-09	7.06E-09					
205-82-3	Benzo(b)fluoranthene*			7.06E-09	7.06E-09					
206-44-0	Fluoranthene			1.18E-08	1.18E-08					
218-01-9	Chrysene*			7.06E-09	7.06E-09					
25321-22-6	Dichlorobenzene			4.71E-06	4.71E-06					
2551-62-4	SULFUR HEXAFLUORIDE		1.71E-02		1.71E-02					
29570-58-9	MULTI FUNCTIONAL ACRYLIC MONOMER		4.73E-05		4.73E-05					
36888-99-0	C.I. PIGMENT YELLOW 139		4.73E-05		4.73E-05					
50-00-0	Formaldehyde			2.94E-04	2.94E-04			5.10E-04	Below	VOC
50-32-8	Benzo(a)pyrene*			4.71E-09	4.71E-09			2.00E-06	Below	
51728-26-8	POLY(OXY-1,2-ETHANEDIYL), A-HYDRO-W-[(1-OXO-2-PROPEN-1-YL)OXY]-, ETHER WITH 2,2-BIS(HYDROXYMETHYL)-1,3-PROPANEDIOL		1.20E-02		1.20E-02					
53-70-3	Dibenzo(a,h)anthracene*			4.71E-09	4.71E-09					
56-49-5	3-Methylchloranthrene			7.06E-09	7.06E-09			2.50E-06	Below	
56-55-3	Benzo(a)anthracene*			7.06E-09	7.06E-09					
64-17-5	ETHANOL	YES	2.94E-03		2.94E-03	YES	125		Below	
64-19-7	ACETIC ACID	YES	4.81E-08		4.81E-08	YES	1.67		Below	
65697-21-4	ACRYLIC-RESIN		2.58E-05		2.58E-05					
67-56-1	METHANOL	YES	1.48E-04		1.48E-04	YES	17.3		Below	
67-63-0	ISOPROPANOL	YES	2.30E-02		2.30E-02	YES	65.3		Below	
67-64-1	ACETONE		3.24E+00		3.24E+00	YES	119		Below	
70657-70-4	2-METHOXY-1-PROPANOL ACETATE	YES	1.79E-03		1.79E-03					
71-43-2	BENZENE	YES	4.28E-08	8.24E-06	8.28E-06	YES		8.00E-04	Below	
7439-96-5	Manganese			1.49E-06	1.49E-06			6.70E-02	Below	
7439-97-6	Mercury			1.02E-06	1.02E-06					
7439-98-7	Molybdenum			4.31E-06	4.31E-06		3.33E-01		Below	
74-84-0	Ethane			1.22E-02	1.22E-02					
74-98-6	Propane			6.27E-03	6.27E-03					
7440-02-0	Nickel			8.24E-06	8.24E-06			2.70E-05	Below	VOC
7440-38-2	Arsenic			7.84E-07	7.84E-07			1.50E-06	Below	VOC
7440-39-3	Barium			1.73E-05	1.73E-05		0.033		Below	
7440-41-7	Beryllium			4.71E-08	4.71E-08			2.80E-05	Below	
7440-43-9	Cadmium			4.31E-06	4.31E-06			3.70E-06	Exceeds	VOC
7440-47-3	Chromium			5.49E-06	5.49E-06		0.033		Below	
7440-48-4	Cobalt			3.29E-07	3.29E-07		0.0033		Below	
7440-50-8	Copper			3.33E-06	3.33E-06		0.013		Below	
7440-59-7	HELIUM		1.13E-03		1.13E-03					
7440-66-6	Zinc			1.14E-04	1.14E-04		0.667		Below	
75-59-2	TETRAMETHYLAMMONIUM HYDROXIDE		1.05E+00		1.05E+00					
763-69-9	PROPANOIC ACID, 3-ETHOXY-, ETHYL ESTER	YES	2.03E-03		2.03E-03					
7647-01-0	HYDROCHLORIC ACID		1.50E-05		1.50E-05	YES	0.05		Below	
7664-38-2	PHOSPHORIC ACID		5.03E-01		5.03E-01	YES	0.067		**Exceeds**	VOC
7664-39-3	HYDROFLUORIC ACID		5.35E-03		5.35E-03					
7681-52-9	SODIUM HYPOCHLORITE		8.48E-02		8.48E-02					
7697-37-2	NITRIC ACID		8.64E-02		8.64E-02	YES	0.333		Below	
7722-84-1	HYDROGEN PEROXIDE		1.96E-01		1.96E-01	YES	0.1		**Exceeds**	Scrubber
7727-37-9	NITROGEN		7.82E+02		7.82E+02					
7727-54-0	AMMONIUM PERSULFATE		3.72E-01		3.72E-01					
7732-18-5	WATER		3.03E+01		3.03E+01					
7782-49-2	Selenium			9.41E-08	9.41E-08		0.013		Below	
78-10-4	Ethyl silicate		8.17E-02		8.17E-02	YES	5.67		Below	
83-32-9	Acenaphthene			7.06E-09	7.06E-09					
84632-65-5	C.I. PIGMENT RED254		2.58E-05		2.58E-05					
85-01-8	Phenanathrene			6.67E-08	6.67E-08					
86-73-7	Flourene			1.10E-08	1.10E-08					
872-50-4	N-METHYL-2-PYRROLIDONE	YES	2.29E-03		2.29E-03					
91-20-3	Naphthalene			2.39E-06	2.39E-06		3.33		Below	
91-57-6	2-Methylnaphthalene			9.41E-08	9.41E-08					
96-48-0	BUTYROLACTONE	YES	2.03E-04		2.03E-04					
97-64-3	ETHYL LACTATE	YES	5.32E-04		5.32E-04					
98516-30-4	PROPYLENEGLYCOL MONOETHYLETHER ACETATE (PGEEA)	YES	6.58E-04		6.58E-04					
999-97-3	HEXAMETHYLDISILIZANE	YES	2.47E-04		2.47E-04					
	7,12-Dimethylbenz(a)anthracene			6.27E-08	6.27E-08					
	POM			4.47E-08	4.47E-08			2.00E-06	Below	

VOC ABU Uncontrolled Emissions: BOTH UNITS REPRESENTED HERE

Note: VOC unit is not operational in this scenario so no fuel combustion emissions

Note: Acetic Acid, HCl, hydrofluoric acid, nitric acid, and **hydrogen peroxide** pass through scrubber, all others pass through VOC ABU

			Uncontrolled				IDAPA 58.01.01.585/586		Exceeds EL	
CAS	Chemical	Manufacturing Only VOC	Manufacturing		Total	IDAHO TAP	585 EL (lb/hr)	586 EL (lb/hr)		
100-41-4	ETHYLBENZENE	YES	3.60E-03		3.60E-03	YES	29		Below	
100-66-3	BENZENE, METHOXY-	YES	1.01E-02		1.01E-02					
107-21-1	ETHYLENE GLYCOL	YES	5.79E-02		5.79E-02	YES	0.846		Below	
107-98-2	2-PROPANOL, 1-METHOXY-	YES	5.62E-02		5.62E-02	YES	24		Below	
108-65-6	1-METHOXY-2-PROPANOL ACETATE	YES	1.39E+01		1.39E+01	YES	24		Below	
108-94-1	CYCLOHEXANONE	YES	1.82E-01		1.82E-01	YES	6.67		Below	
111-42-2	DIETHANOLAMINE	YES	4.07E-01		4.07E-01	YES	1		Below	
115-25-3	OCTAFLUOROCYCLOBUTANE		7.11E-02		7.11E-02					
1186043-92-4	HYDROLYZED BIS(TRIETHOXYSILYL)ETHANE		8.21E-05		8.21E-05					
12001-85-3	ZINC NAPTHENATE		0.00E+00		0.00E+00					
123-42-2	DIACETONE ALCOHOL	YES	0.00E+00		0.00E+00	YES	16		Below	
123-91-1	1,4-DIOXANE	YES	6.85E-03		6.85E-03	YES		4.80E-03	**Exceeds**	VOC_UNC
124-38-9	CARBON DIOXIDE		2.05E-02		2.05E-02					
1330-20-7	XYLENE	YES	3.60E-03		3.60E-03	YES	29		Below	
1333-74-0	HYDROGEN		2.54E-02		2.54E-02					
1333-86-4	CARBON BLACK		9.30E-02		9.30E-02	YES	0.23		Below	
1336-21-6	AMMONIUM HYDROXIDE		1.55E-01		1.55E-01					
1343-98-2	SILICA GEL		4.22E-01		4.22E-01					
2551-62-4	SULFUR HEXAFLUORIDE		1.71E-02		1.71E-02					
29570-58-9	MULTI FUNCTIONAL ACRYLIC MONOMER		4.73E-05		4.73E-05					
36888-99-0	C.I. PIGMENT YELLOW 139		4.73E-05		4.73E-05					
51728-26-8	POLY(OXY-1,2-ETHANEDIYL), A-HYDRO-W-[(1-OXO-2-PROPEN-1-YL)OXY]-, ETHER WITH 2,2-BIS(HYDROXYMETHYL)-1,3-PROPANEDIOL		1.20E-02		1.20E-02					
64-17-5	ETHANOL	YES	1.96E-01		1.96E-01	YES	125		Below	
64-19-7	ACETIC ACID	YES	3.21E-06		3.21E-06	YES	1.67		Below	
65697-21-4	ACRYLIC-RESIN		2.58E-05		2.58E-05					
67-56-1	METHANOL	YES	9.83E-03		9.83E-03	YES	17.3		Below	
67-63-0	ISOPROPANOL	YES	1.54E+00		1.54E+00	YES	65.3		Below	
67-64-1	ACETONE		3.24E+00		3.24E+00	YES	119		Below	
70657-70-4	2-METHOXY-1-PROPANOL ACETATE	YES	1.19E-01		1.19E-01					
71-43-2	BENZENE	YES	2.85E-06		1.11E-05	YES		8.00E-04	Below	
7440-59-7	HELIUM		1.13E-03		1.13E-03					
75-59-2	TETRAMETHYLAMMONIUM HYDROXIDE		1.05E+00		1.05E+00					
763-69-9	PROPANOIC ACID, 3-ETHOXY-, ETHYL ESTER	YES	1.35E-01		1.35E-01					
7647-01-0	HYDROCHLORIC ACID		1.50E-05		1.50E-05	YES	0.05		Below	
7664-38-2	PHOSPHORIC ACID		5.03E-01		5.03E-01	YES	0.067		**Exceeds**	VOC_UNC
7664-39-3	HYDROFLUORIC ACID		5.35E-03		5.35E-03					
7681-52-9	SODIUM HYPOCHLORITE		8.48E-02		8.48E-02					
7697-37-2	NITRIC ACID		8.64E-02		8.64E-02	YES	0.333		Below	
7722-84-1	HYDROGEN PEROXIDE		1.96E-01		1.96E-01	YES	0.1		Exceeds	SCRUBBER
7727-37-9	NITROGEN		7.82E+02		7.82E+02					
7727-54-0	AMMONIUM PERSULFATE		3.72E-01		3.72E-01					
7732-18-5	WATER		3.03E+01		3.03E+01					
78-10-4	Ethyl silicate		8.17E-02		8.17E-02	YES	5.67		Below	
84632-65-5	C.I. PIGMENT RED254		2.58E-05		2.58E-05					
872-50-4	N-METHYL-2-PYRROLIDONE	YES	1.53E-01		1.53E-01					
96-48-0	BUTYROLACTONE	YES	1.35E-02		1.35E-02					
97-64-3	ETHYL LACTATE	YES	3.54E-02		3.54E-02					
98516-30-4	PROPYLENEGLYCOL MONOETHYLETHER ACETATE (PGEEA)	YES	4.39E-02		4.39E-02					
999-97-3	HEXAMETHYLDISILIZANE	YES	1.65E-02		1.65E-02					

ON Semiconductor
TPU - New Unit (Op Var Only)

TPU (MMBtu/hr)*	0.060
Fuel Type	Natural Gas
Maximum Operation Limit (hrs/yr)	8,760
Heat Value of Fuel (Btu/scf)	1,020

Emissions based on BTU rating of unit, 2 identical units

		Operational Variability (New Unit)			
Criteria Pollutant[1]		Emission Factor ($lb/10^6$ scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)
Total Particulate Matter (PM)[2]		7.6	4.47E-04	3.92	0.002
Nitrogen Oxides (NOx)		100.0	5.88E-03	51.53	0.03
Sulfur Oxides (SOx)		0.6	3.53E-05	0.31	0.00
Carbon Monoxide (CO)		84.0	4.94E-03	43.28	0.02
Lead		0.0005	2.94E-08	2.58E-04	1.29E-07
VOC		5.5	3.24E-04	2.83	0.00

		Operational Variability (New Unit)				
Toxic Air Pollutants[3]	CAS No.	Emission Factor ($lb/10^6$ scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
3-Methylchloranthrene	56-49-5	1.80E-06	1.06E-10	9.28E-07	4.64E-10	Non HAP
Benzene	71-43-2	2.10E-03	1.24E-07	1.08E-03	5.41E-07	HAP
Benzo(a)pyrene*	50-32-8	1.20E-06	7.06E-11	6.18E-07	3.09E-10	Non HAP
Butane	106-97-8	2.10E+00	1.24E-04	1.08E+00	5.41E-04	Non HAP
Ethane	74-84-0	3.10E+00	1.82E-04	1.60E+00	7.99E-04	Non HAP
Propane	74-98-6	1.60E+00	9.41E-05	8.24E-01	4.12E-04	Non HAP
Formaldehyde	50-00-0	7.50E-02	4.41E-06	3.86E-02	1.93E-05	HAP
Hexane	110-54-3	1.80E+00	1.06E-04	9.28E-01	4.64E-04	HAP
Naphthalene	91-20-3	6.10E-04	3.59E-08	3.14E-04	1.57E-07	HAP
Pentane	109-66-0	2.60E+00	1.53E-04	1.34E+00	6.70E-04	Non HAP
Toluene	108-88-3	3.40E-03	2.00E-07	1.75E-03	8.76E-07	HAP
2-Methylnaphthalene	91-57-6	2.40E-05	1.41E-09	1.24E-05	6.18E-09	Non HAP
7,12-Dimethylbenz(a)anthracene		1.60E-05	9.41E-10	8.24E-06	4.12E-09	Non HAP
Acenaphthene	83-32-9	1.80E-06	1.06E-10	9.28E-07	4.64E-10	Non HAP
Acenaphthylene	203-96-8	1.80E-06	1.06E-10	9.28E-07	4.64E-10	Non HAP
Anthracene	120-12-7	2.40E-06	1.41E-10	1.24E-06	6.18E-10	Non HAP
Benzo(a)anthracene*	56-55-3	1.80E-06	1.06E-10	9.28E-07	4.64E-10	Non HAP
Benzo(b)fluoranthene*	205-82-3	1.80E-06	1.06E-10	9.28E-07	4.64E-10	Non HAP
Benzo(g,h,l)perylene	191-24-2	1.20E-06	7.06E-11	6.18E-07	3.09E-10	Non HAP
Benzo(k)fluoranthene*	205-82-3	1.80E-06	1.06E-10	9.28E-07	4.64E-10	Non HAP
Chrysene*	218-01-9	1.80E-06	1.06E-10	9.28E-07	4.64E-10	Non HAP
Dibenzo(a,h)anthracene*	53-70-3	1.20E-06	7.06E-11	6.18E-07	3.09E-10	Non HAP
Dichlorobenzene	25321-22-6	1.20E-03	7.06E-08	6.18E-04	3.09E-07	Non HAP
Fluoranthene	206-44-0	3.00E-06	1.76E-10	1.55E-06	7.73E-10	Non HAP
Flourene	86-73-7	2.80E-06	1.65E-10	1.44E-06	7.21E-10	Non HAP
Indeno(1,2,3-cd)pyrene*	193-39-5	1.80E-06	1.06E-10	9.28E-07	4.64E-10	Non HAP
Phenanathrene	85-01-8	1.70E-05	1.00E-09	8.76E-06	4.38E-09	Non HAP
Pyrene	129-00-0	5.00E-06	2.94E-10	2.58E-06	1.29E-09	Non HAP
POM[4]			6.71E-10	5.87E-06	2.94E-09	HAP

		Operational Variability (New Unit)				
Toxic Air Pollutants-Metals[5]	CAS Number	Emission Factor ($lb/10^6$ scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	
Arsenic	7440-38-2	2.00E-04	1.18E-08	1.03E-04	5.15E-08	HAP
Barium	7440-39-3	4.40E-03	2.59E-07	2.27E-03	1.13E-06	Non HAP
Beryllium	7440-41-7	1.20E-05	7.06E-10	6.18E-06	3.09E-09	HAP
Cadmium	7440-43-9	1.10E-03	6.47E-08	5.67E-04	2.83E-07	HAP
Chromium	7440-47-3	1.40E-03	8.24E-08	7.21E-04	3.61E-07	HAP
Cobalt	7440-48-4	8.40E-05	4.94E-09	4.33E-05	2.16E-08	HAP
Copper	7440-50-8	8.50E-04	5.00E-08	4.38E-04	2.19E-07	Non HAP
Manganese	7439-96-5	3.80E-04	2.24E-08	1.96E-04	9.79E-08	HAP
Mercury	7439-97-6	2.60E-04	1.53E-08	1.34E-04	6.70E-08	HAP
Molybdenum	7439-98-7	1.10E-03	6.47E-08	5.67E-04	2.83E-07	Non HAP
Nickel	7440-02-0	2.10E-03	1.24E-07	1.08E-03	5.41E-07	HAP
Selenium	7782-49-2	2.40E-05	1.41E-09	1.24E-05	6.18E-09	HAP
Vanadium	1314-62-1	2.30E-03	1.35E-07	1.19E-03	5.93E-07	Non HAP
Zinc	7440-66-6	2.90E-02	1.71E-06	1.49E-02	7.47E-06	Non HAP
Total HAPs					4.86E-04	

Notes:

[1] Criteria Pollutants, small uncontrolled boilers (EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-1 and 1.4-2), dated 07/98.

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

[3] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

[4] Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. Designated by *

[5] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

ON Semiconductor
Manufacturing Emissions

CAS	CHEMICAL ID	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Actual Total (lb/yr)	Emissions for PTE Calculation	PTE Total[1] (lb/hr)	HAP	PM10 Forming	VOC	Scrubber Controlled
		Monthly Emission Rate (lb/month)																		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15.0	2.40E-03	3.60E-03	YES		YES	
100-66-3	BENZENE, METHOXY-	8.36342	3.18171	22.27197	0	3.18171	1.846259	3.18171	3.18171	2.776174	8.36342	8.36342		58.7	6.70E-03	1.01E-02			YES	
107-21-1	[illegible]						9.2574			[illegible]	0		[illegible]	40.9	3.86E-02	5.79E-02	YES		YES	
107-98-2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	14.7046	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	212.1	3.75E-02	5.02E-02			YES	
108-65-6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	21490.2	9.29E+00	1.39E+01			YES	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	730.9	1.21E-01	1.82E-01			YES	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1654.5	2.71E-01	4.07E-01	YES		YES	
115-25-3	OCTAFLUOROCYCLOBUTANE								105	310				415.0	4.74E-02	7.11E-02				
1186043-92-4	HYDROLYZED BISTRIETHOXYSILYLETHANE		0.038373					0.441287						0.5	5.48E-05	8.21E-05				
123-91-1	1,4-DIOXANE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	40.0	4.56E-03	6.85E-03	YES		YES	
124-38-9	CARBON DIOXIDE			60			60							120.0	1.37E-02	2.05E-02				
1330-20-7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15.0	2.40E-03	3.60E-03	YES		YES	
1333-74-0	HYDROGEN	14.53265	14.53265	14.53265	14.53265	8.719587	14.53265	14.53265	17.43917	14.53265	20.3457			148.2	1.69E-02	2.54E-02				
1333-86-4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	337.1	6.20E-02	9.30E-02				
1336-21-6	AMMONIUM HYDROXIDE	73.1835	78.813	78.92559	79.03818	73.1835	78.813	73.1835	73.1835	78.813	56.295	84.4425	78.813	906.7	1.04E-01	1.55E-01				
1343-98-2	SILICA GEL	189.3936	173.6108	173.6108	126.2624	252.5248	220.9592	173.6108	205.1764	189.3936	220.9592	284.0904	252.5248	2462.1	2.81E-01	4.22E-01				
2551-62-4	SULFUR HEXAFLUORIDE									100				100.0	1.14E-02	1.71E-02				
29670-58-8	MULTI FUNCTIONAL ACRYLIC MONOMER	0.015071	0.015071	0.030143	0.040191	0.030143	0.015071	0.020095	0.025119	0.020095	0.030143	0.020095	0.015071483	0.3	3.15E-05	4.73E-05				
36888-99-0	C.I. PIGMENT YELLOW 139	0.015071	0.015071	0.030143	0.040191	0.030143	0.015071	0.020095	0.025119	0.020095	0.030143	0.020095	0.015071483	0.3	3.15E-05	4.73E-05				
51728-26-8	POLY(OXY-1,2-ETHANEDIYL), A-HYDRO-W-[(1-OXO-2-PROPEN-1-YL)OXY]-, ETHER WITH 2,2-BIS(HYDROXYMETHYL)-1,3-PROPANEDIOL	5.349058	5.349058	5.094341	5.349058	4.075473	5.858492	4.584907	7.641511	6.622643	6.367926	7.896228	6.113208960	70.3	8.03E-03	1.20E-02				
64-17-5	[illegible]		[illegible]					[illegible]						102.2	1.31E-01	1.96E-01			YES	
64-19-7	[illegible]		[illegible]					[illegible]						0.0	2.14E-06	3.21E-06			YES	YES**
65997-21-4	ACRYLIC RESIN	0.010048	0.010048	0.015071	0.020095	0.010048	0.010048	0.010048	0.015071	0.015071	0.015071	0.010048	0.010047662	0.2	1.72E-05	2.58E-05				
67-56-1	[illegible]		[illegible]					[illegible]						5.1	6.56E-03	9.83E-03	YES		YES	
67-63-0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5874.8	1.02E+00	1.54E+00			YES	
67-64-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13675.3	2.16E+00	3.24E+00				
70657-70-4	2-METHOXY-1-PROPANOL ACETATE	61.35413	61.44019	0.995767	59.39448	56.88611	63.42996	56.95882	70.371	59.13518	63.78486	74.29795	67.77904038	695.8	7.94E-02	1.19E-01			YES	
71-43-2	BENZENE		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	1.90E-06	2.85E-06	YES		YES	
7440-59-7	HELIUM								2.208304	4.416608				6.6	7.56E-04	1.13E-03				
75-59-2	TETRAMETHYLAMMONIUM HYDROXIDE	825.9741	706.2029	755.2838	557.6328	849.6198	307.8711	274.4089	356.952	345.0282	339.1044	435.0353	372.56865	6128.7	7.00E-01	1.05E+00				
763-69-9	PROPANOIC ACID, 3-ETHOXY-, ETHYL ESTER	73.94085	67.87946	89.95772	105.8883	71.8147	57.23578	48.54958	41.54575	40.30022	44.81686	78.76111	88.33787371	788.8	9.00E-02	1.35E-01			YES	
7647-01-0	[illegible]										[illegible]		[illegible]	0.0144	1.00E-05	1.50E-05	YES	YES		YES**
7664-38-2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	993.7	3.36E-01	[illegible]		[illegible]		[illegible]
7664-39-3	HYDROFLUORIC ACID	5.20416	5.20416					5.20416			5.20416	10.40832		31.2	3.56E-03	5.35E-03	YES	YES		YES**
7681-52-9	SODIUM HYPOCHLORITE					165.132	165.132		165.132					495.4	5.66E-02	8.48E-02				
7697-37-2	[illegible]	41.4498	41.4498					20.7249			20.7249	41.4498		165.8	5.76E-02	8.64E-02				YES**
7722-84-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	863.5	1.31E-01	[illegible]				YES**
7727-37-9	NITROGEN	464952.7	464960.6	425240.9	360026.2	486183	486206.5	424727.8	504084.5	438293	170775.4	170644.7	170644.6797	4567719.9	5.21E+02	7.82E+02				
7727-54-0	AMMONIUM PERSULFATE	167.112	153.186	153.186	111.408	222.816	194.964	153.186	181.038	167.112	194.964	250.668	222.816	2172.5	2.48E-01	3.72E-01				
7732-18-5	WATER	15140.71	12901.77	13902.43	11827.01	15324.28	15950.09	13443.86	15076.59	14658.45	13637.19	17818.11	17093.24521	176803.7	2.02E+01	3.03E+01				
78-93-3	[illegible]								[illegible]	[illegible]				39.6	5.44E-02	8.17E-02				
84632-65-5	C.I. PIGMENT RED254	0.010048	0.010048	0.015071	0.020095	0.010048	0.010048	0.010048	0.015071	0.015071	0.015071	0.010048	0.010047662	0.2	1.72E-05	2.58E-05				
872-50-4	N-METHYL-2-PYRROLIDONE	23.80446	58.36804	131.5299		117.2486	12.86122	53.14577	255.8516	13.48158	158.8773	34.22736	34.22736	893.4	1.02E-01	1.53E-01			YES	
96-48-0	BUTYROLACTONE	1.174587	6.272514	36.1998		2.503503	2.198126	0.171192	8.272514	6.42691	5.110849	12.54503		78.9	9.00E-03	1.35E-02			YES	
97-64-3	ETHYL LACTATE	17.85722	29.30475	16.73941	17.86042	0	22.4801	7.74357	7.995057	0	26.54152	35.63337	25.06314325	207.0	2.36E-02	3.54E-02			YES	
98516-30-4	PROPYLENEGLYCOL MONOETHYLETHER ACETATE (PGEEA)	17.85722	21.89883	22.24422	31.07283	13.41561	30.72745	17.65722	21.89883	17.85722	31.07283	13.41561	17.85722325	256.4	2.93E-02	4.39E-02			YES	
999-97-3	HEXAMETHYLDISILIZANE		32.109				32.109				32.109			96.3	1.10E-02	1.65E-02			YES	

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

	Uncontrolled (lb/yr)	Uncontrolled (lb/hr)	Uncontrolled (ton/yr)	Controlled (lb/yr)	Controlled (lb/hr)
Total VOC*	33256	3.80	16.63	499	0.06
Total Non Tap	4760626	543.45	2380.31	4760626	543.45
Total Tap	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PM10 Forming Baseline	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total HAP	1802	0.2057	0.901	1802	0.2057

*VOC Abatement Units apply a 98.5% control only on VOCs
** Emissions provided are controlled by scrubbers

	VOC Controlled/ VOC Uncontrolled	Scrubber control efficiency from the application and 5/1/2018 submittal	lb/hr, annual average Assume emitted as PM-10/PM-2.6	lb/hr, 24 hr average Assume emitted as PM-10/PM-2.5
38	HYDROCHLORIC ACID	99%	1.64E-08	1.50E-07
39	PHOSPHORIC ACID	99%	1.13E-03	5.03E-03
40	HYDROFLUORIC ACID	99.9%	3.56E-06	5.35E-06
28	ACETIC ACID	99%	1.91E-09	3.21E-08
42	NITRIC ACID	98%	3.79E-04	1.73E-03
43	HYDROGEN PEROXIDE	90%	9.86E-03	1.96E-02
	total		1.14E-02	2.64E-02

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Wet Cooling Towers 1-3

Water Flow Rate (gal/min)	1,150	Design
Flow of cooling water (lbs/hr)	575,460	Calculated
TDS of blowdown (mg/l or ppmw) - Maximum ppm at blowdown	750	Design (Note 1)
Flow of dissolved solids (lbs/hr)	432	Calculated
Fraction of flow producing PM_{10} drift	0.86	Note 2
Fraction of flow producing $PM_{2.5}$ drift	0.004	Note 2
Control efficiency of drift eliminators (gal drift/gal flow)	0.0002	Note 3
PM emissions from tower (lb/hr)	0.08632	Calculated
PM_{10} emissions from tower (lb/hr)	0.07420	Calculated
$PM_{2.5}$ emissions from tower (lb/hr)	0.00034	Calculated
PM emissions from tower (tpy)	0.37808	Calculated
PM_{10} emissions from tower (tpy)	0.32500	Calculated
$PM_{2.5}$ emissions from tower (tpy)	0.00148	Calculated

Other Parameters

Number of cells per tower (outlet fans)	6	3 Cooling Towers 1-3
Height at cell release (ft):	16.0	
Height at cell release (m):	4.88	
Discharge flow per cooling tower (ACFM):	239,500	
Discharge flow per cell (ACFM):	39,917	
Diameter of each cell (ft):	5.5	
Diameter of each cell (m):	1.68	
Area of cell discharge (ft^2):	24	
Average Temperature of cell discharge (degF):	75	
Average Temperature of cell discharge (K):	297.05	
Exit Velocity (ft/s):	28.0	
Exit Velocity (m/s):	8.53	

Notes:

(1) Cooling Tower TDS design data based on historic dat 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.

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Wet Cooling Towers 4-5

Water Flow Rate (gal/min)	1,694	Design
Flow of cooling water (lbs/hr)	847,678	Calculated
TDS of blowdown (mg/l or ppmw) - Maximum ppm at blowdown	750	Design (Note 1)
Flow of dissolved solids (lbs/hr)	636	Calculated
Fraction of flow producing PM_{10} drift	0.86	Note 2
Fraction of flow producing $PM_{2.5}$ drift	0.004	Note 2
Control efficiency of drift eliminators (gal drift/gal flow)	0.0002	Note 3
PM emissions from tower (lb/hr)	0.127	Calculated
PM_{10} emissions from tower (lb/hr)	0.109	Calculated
$PM_{2.5}$ emissions from tower (lb/hr)	0.0005	Calculated
PM emissions from tower (tpy)	0.557	Calculated
PM_{10} emissions from tower (tpy)	0.479	Calculated
$PM_{2.5}$ emissions from tower (tpy)	0.002	Calculated

Other Parameters

Number of cells per tower (outlet fans)	2	2 Cooling Towers 4-5
Height at cell release (ft):	22.0	
Height at cell release (m):	6.71	
Discharge flow per cooling tower (ACFM):	418,800	
Discharge flow per cell (ACFM)	209,400	
Diameter of each cell (ft):	11.1	
Diameter of each cell (m):	3.38	
Area of cell discharge (ft^2):	96	
Average Temperature of cell discharge (degF):	72	
Average Temperature of cell discharge (K):	295.38	
Exit Velocity (ft/s):	36.2	
Exit Velocity (m/s):	11.03	

Notes:

(1) Cooling Tower TDS design data based on historic dat 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 design manufacturer, Marley MH Fluid Cooler, AP-42, drift emission factor percentage.

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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"

ON Semiconductor
Green House Gas Total Potential Emissions

Source	Emission Rate							
	CO2		N2O		CH4		Total CO2e	
	Metric Tons	Short Tons	Metric Tons	Short Tons	Metric Tons	Short Tons	Metric Tons	Short Tons
Generator 2	143.9	158.6	1.17E-03	1.29E-03	5.84E-03	6.43E-03	144	159
Generator 3	211.5	233.1	1.72E-03	1.89E-03	8.58E-03	9.46E-03	212	234
Boiler 1	3,890.4	4,288.4	7.33E-03	8.08E-03	7.33E-02	8.08E-02	3,894	4,293
Boiler 2	3,890.4	4,288.4	7.33E-03	8.08E-03	7.33E-02	8.08E-02	3,894	4,293
Boiler 4	3,890.4	4,288.4	7.33E-03	8.08E-03	7.33E-02	8.08E-02	3,894	4,293
Boiler 3	3,797.5	4,185.9	7.16E-03	7.89E-03	7.16E-02	7.89E-02	3,801	4,190
VOC	1,859.2	2,049.4	3.50E-03	3.86E-03	3.50E-02	3.86E-02	1,861	2,052
TPU	27.9	30.8	5.26E-05	5.80E-05	5.26E-04	5.80E-04	28	31
Water Heater	34.9	38.5	6.58E-05	7.25E-05	6.58E-04	7.25E-04	35	39
MAU5B	2,788.8	3,074.1	5.26E-03	5.79E-03	5.26E-02	5.79E-02	2,792	3,077
Total Emissions	20,535	22,636	4.09E-02	4.51E-02	3.95E-01	4.35E-01	20,557	22,660

Annual Totals

	NG Pipeline (ft3)	Gen 2 hours	Gen 3 hours
Aug-14	669,561	0.5	0.6
Sep-14	675,842	0.5	0.8
Oct-14	796,082	0.9	0.8
Nov-14	1,268,866	0.717	0.6
Dec-14	2,955,074	1.95	1.3
Jan-15	2,999,486	0.71	0.5
Feb-15	3,340,805	0.51	0.6
Mar-15	2,073,712	0.62	0.6
Apr-15	1,825,552	0.83	0.5
May-15	1,707,176	0.65	0.7
Jun-15	941,038	0.67	0.6
Jul-15	677,516	0.82	0.6
Annual Total	**19,930,710**	**9.4**	**8.2**

Natural Gas Sources Existing Sources)

ID	MMBtu	% of Total MMBtu	Annual ft3 Actual	
Boiler 1	8.37	21.27%	4,239,380	
Boiler 2	8.37	21.27%	4,239,380	
Boiler 4	8.37	21.27%	4,239,380	
Boiler 3	8.165	20.75%	4,135,548	
MAU 5B	6	15.25%	3,038,982	
VOC Unit	0	0.00%	0	VOC units were not in operation last 12-months
VOC Unit	0	0.00%	0	VOC units were not in operation last 12-months
water heater	0.0751	0.19%	38,038	
Total MMBTU	39.3501			

Generator 2	Cummins QST30-G4					
BHP	1,490	Check BHP. Note that in prime BHP is 1350 and standby is 1490 BHP.				
Maximum Operating Hours	200	permit limit				
Fuel Usage (gal/hr)	70.5	Cummins manufacturer spec				
Fuel Usage (gal/yr)	14100					
Green House Gases	**EF (Diesel) kg/MMBtu**	**HHV**	**Reference**	**Input (gal/yr)**	**Emission Rate (metric ton/yr)**	**(ton/year)**
CO_2	73.96	0.138	40 CFR 98 Subpart C Equation C-1	14,100	143.91	158.63
N_2O	6.0E-04	0.138	40 CFR 98 Subpart C Equation C-8	14,100	1.17E-03	1.29E-03
CH_4	3.0E-03	0.138	40 CFR 98 Subpart C Equation C-8	14,100	5.84E-03	6.43E-03
CO2e			40 CFR 98 Part A, Equation A-1		144.41	159.18

Generator 3 -	Cummins KTA50-G9					
BHP	2,220					
Maximum Operating Hours	200	permit limit				
Fuel Usage (gal/hr)	103.60	Cummins manufacturer spec				
Fuel Usage (gal/yr)	20720					
Green House Gases	**EF (Diesel) kg/MMBtu**	**HHV**	**Reference**	**Input (gal/yr)**	**Emission Rate (metric ton/yr)**	**(ton/year)**
CO_2	73.96	0.138	40 CFR 98 Subpart C Equation C-1 Tier 1	20,720	211.48	233.11
N_2O	6.0E-04	0.138	40 CFR 98 Subpart C Equation C-8	20,720	1.72E-03	1.89E-03
CH_4	3.0E-03	0.138	40 CFR 98 Subpart C Equation C-8	20,720	8.58E-03	9.46E-03
CO2e			40 CFR 98 Part A, Equation A-1		212.20	233.91

40 CFR 298 Table A-1

Global warming potentials	CO2	1
	N2O	298
	CH4	25

Boiler 1

Maximum Operating Hours 8760 permit limit
Fuel Usage (MMBtu/hr) 8.37 manufacturer spec
Fuel Usage (MMBtu/yr) 73321.2

Green House Gases	EF (NG) kg/MMBtu		Reference	Input (MMBTU/yr)	Emission Rate (metric ton/yr)	(ton/year)
CO_2	53.06		40 CFR 98 Subpart C Equation C-1b	73,321	3,890.42	4,288.41
N_2O	1.0E-04		40 CFR 98 Subpart C Equation C-8b	73,321	7.33E-03	8.08E-03
CH_4	1.0E-03		40 CFR 98 Subpart C Equation C-8b	73,321	7.33E-02	8.08E-02
CO2e			40 CFR 98 Part A, Equation A-1		3,894.44	4,292.84

Boiler 2

Maximum Operating Hours 8760 permit limit
Fuel Usage (MMBtu/hr) 8.37 manufacturer spec
Fuel Usage (MMBtu/yr) 73321.2

Green House Gases	EF (NG) kg/MMBtu		Reference	Input (MMBTU/yr)	Emission Rate (metric ton/yr)	(ton/year)
CO_2	53.06		40 CFR 98 Subpart C Equation C-1b	73,321	3,890.42	4,288.41
N_2O	1.0E-04		40 CFR 98 Subpart C Equation C-8b	73,321	7.33E-03	8.08E-03
CH_4	1.0E-03		40 CFR 98 Subpart C Equation C-8b	73,321	7.33E-02	8.08E-02
CO2e			40 CFR 98 Part A, Equation A-1		3,894.44	4,292.84

Boiler 4

Maximum Operating Hours 8760 permit limit
Fuel Usage (MMBtu/hr) 8.37 manufacturer spec
Fuel Usage (MMBtu/yr) 73321.2

Green House Gases	EF (NG) kg/MMBtu		Reference	Input (MMBTU/yr)	Emission Rate (metric ton/yr)	(ton/year)
CO_2	53.06		40 CFR 98 Subpart C Equation C-1b	73,321	3,890.42	4,288.41
N_2O	1.0E-04		40 CFR 98 Subpart C Equation C-8b	73,321	7.33E-03	8.08E-03
CH_4	1.0E-03		40 CFR 98 Subpart C Equation C-8b	73,321	7.33E-02	8.08E-02
CO2e			40 CFR 98 Part A, Equation A-1		3,894.44	4,292.84

Boiler 3

Maximum Operating Hours 8760 permit limit
Fuel Usage (MMBtu/hr) 8.17 manufacturer spec
Fuel Usage (MMBtu/yr) 71569.2

Green House Gases	EF (NG) kg/MMBtu		Reference	Input (MMBTU/yr)	Emission Rate (metric ton/yr)	(ton/year)
CO_2	53.06		40 CFR 98 Subpart C Equation C-1b	71,569	3,797.46	4,185.94
N_2O	1.0E-04		40 CFR 98 Subpart C Equation C-8b	71,569	7.16E-03	7.89E-03
CH_4	1.0E-03		40 CFR 98 Subpart C Equation C-8b	71,569	7.16E-02	7.89E-02
CO2e			40 CFR 98 Part A, Equation A-1		3,801.38	4,190.27

TPU

Maximum Operating Hours 8760 New in Feb 2015
Fuel Usage (MMBtu/hr) 0.060 Check in cube across from Ryan Hood -TPU Manual
Fuel Usage (MMBtu/yr) 526.213

Green House Gases	EF (NG) kg/MMBtu		Reference	Input (MMBTU/yr)	Emission Rate (metric ton/yr)	(ton/year)
CO_2	53.06		40 CFR 98 Subpart C Equation C-1b	526	27.92	30.78
N_2O	1.0E-04		40 CFR 98 Subpart C Equation C-8b	526	5.26E-05	5.80E-05
CH_4	1.0E-03		40 CFR 98 Subpart C Equation C-8b	526	5.26E-04	5.80E-04
CO2e			40 CFR 98 Part A, Equation A-1		27.95	30.81

VOC Scrubber

Maximum Operating Hours 8760
Fuel Usage (MMBtu/hr) 4 2 units with 2.0 MMBtu/hr (source: Tier II Operating Permit Application by Micron Dec 2010)
Fuel Usage (MMBtu/yr) 35040

Green House Gases	EF (NG) kg/MMBtu		Reference	Input (MMBTU/yr)	Emission Rate (metric ton/yr)	(ton/year)
CO_2	53.06		40 CFR 98 Subpart C Equation C-1b	35,040	1,859.22	2,049.43
N_2O	1.0E-04		40 CFR 98 Subpart C Equation C-8b	35,040	3.50E-03	3.86E-03
CH_4	1.0E-03		40 CFR 98 Subpart C Equation C-8b	35,040	3.50E-02	3.86E-02
CO2e			40 CFR 98 Part A, Equation A-1		1,861.14	2,051.54

Hot Water Boiler - AO Smith, Model # BT 100 300, Installed 1/7/14

Maximum Operating Hours 8760
Fuel Usage (MMBtu/hr) 0.0751
Fuel Usage (MMBtu/yr) 657.876

Green House Gases	EF (NG) kg/MMBtu		Reference	Input (MMBTU/yr)	Emission Rate (metric ton/yr)	(ton/year)
CO_2	53.06		40 CFR 98 Subpart C Equation C-1b	658	34.91	38.48
N_2O	1.0E-04		40 CFR 98 Subpart C Equation C-8b	658	6.58E-05	7.25E-05
CH_4	1.0E-03		40 CFR 98 Subpart C Equation C-8b	658	6.58E-04	7.25E-04
CO2e			40 CFR 98 Part A, Equation A-1		34.94	38.52

MAU 58

Maximum Operating Hours 8760
Fuel Usage (MMBtu/hr) 6
Fuel Usage (MMBtu/yr) 52560

Green House Gases	EF (NG) kg/MMBtu		Reference	Input (MMBTU/yr)	Emission Rate (metric ton/yr)	(ton/year)
CO_2	53.06		40 CFR 98 Subpart C Equation C-1b	52,560	2,788.83	3,074.13
N_2O	1.0E-04		40 CFR 98 Subpart C Equation C-8b	52,560	5.26E-03	5.79E-03
CH_4	1.0E-03		40 CFR 98 Subpart C Equation C-8b	52,560	5.26E-02	5.79E-02
CO2e			40 CFR 98 Part A, Equation A-1		2,791.71	3,077.31

40 CFR 298 Table A-1

Global warming potentials	CO2	1
	N2O	298
	CH4	25

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: June 21, 2018

TO: Shawnee Chen, P.E., Permit Writer, Air Program

FROM: Darrin Mehr, Analyst, Air Program

PROJECT: T2-2016.0064 PROJ 61813 – Tier II Permit for the ON Semiconductor/Aptina LLC Facility's Facility Emission Cap (FEC) Tier II Permit Renewal Project at the Existing Facility in Nampa, Idaho

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.403.02 (NAAQS) and 403.03 (TAPs) for a FEC Tier II Issued Pursuant to IDAPA 58.01.01.401.05

Contents

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
ARM	Ambient Ratio Method
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
Btu/hr	British Thermal Units per hour
CFR	Code of Federal Regulations
CH2M	CH2M (ON Semiconductor's permitting and modeling consultant)
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
DEQ	Idaho Department of Environmental Quality
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
FEC	Facility Emissions Cap
fps	Feet per second
GEP	Good Engineering Practice
hr	Hours
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/s	Meters per second
MMBtu	Million British Thermal Units
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NEI	National Emissions Inventory
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NWS	National Weather Service
ON Semiconductor	ON Semiconductor (ON Semiconductor Group/Aptina, LLC)
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 Billion
PRIME	Plume Rise Model Enhancement
PTC	Permit to Construct
PTE	Potential to Emit

Q	Emissions rate factor
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TAP	Toxic Air Pollutant
TASCO	The Amalgamated Sugar Company
tons/year	Ton(s) per year
T/yr	Tons per year
Trinity	Trinity Consultants (the permittee's modeling and permit consultant during facility draft review)
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VCU	Vapor Control Unit
VOCs	Volatile Organic Compounds
WGS	World Geodetic System
$\mu g/m^3$	Micrograms per cubic meter
χ	Chi - an ambient impact factor

1.0 Summary

1.1 General Project Summary

On March 18, 2016, Aptina, LLC (Aptina), an ON Semiconductor Group (ON Semiconductor) company, submitted an application for the renewal of a Tier II operating permit (T2) and permit to construct (PTC) combination permit for the facility located in Nampa, Idaho. This project is a renewal of the expired combination Tier II Operating Permit and Permit to Construct (T2/PTC) establishing a permittee-requested Facility Emissions Cap (FEC) that was transferred from Micron Technology, Inc., to Aptina, LLC on June 24, 2014. ON Semiconductor owns Aptina, LLC and is the permittee for the project.

Project-specific air quality impact analyses involving atmospheric dispersion modeling of estimated emissions associated with the facility were submitted to DEQ to demonstrate that the facility would not cause or significantly contribute to a violation of any ambient air quality standard as required by IDAPA 58.01.01.203.02 and 203.03 for Permits to Construct (Idaho Air Rules Section 203.02 and 203.03) and Idaho Air Rules Section 403.02 for Tier II Operating Permits.

CH2M, ON Semiconductor's permitting and modeling consultant, performed the ambient air impact analyses for this project on behalf of ON Semiconductor. The analyses were performed to demonstrate compliance with applicable air quality standards. The DEQ review summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that the estimated emissions from the facility, as allowed by the T2/PTC FEC permit, will not cause or significantly contribute to a violation of any applicable air quality standard or TAP increment. This review did not evaluate compliance with other rules or analyses that do not pertain to the air impact analyses. Evaluation of emissions estimates is the responsibility of the permit writer and is addressed in the main body of the Statement of Basis. The accuracy of emissions estimates was not evaluated as part of DEQ's review of the air impact analyses submitted and described in this modeling review memorandum.

The submitted air quality impact analyses: 1) utilized appropriate methods and models according to established DEQ/EPA rules, policies, guidance, and procedures; 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 either a) that predicted pollutant concentrations from emissions associated with the facility as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or b) that predicted pollutant concentrations from applicable emissions associated with the project as modeled, when appropriately combined with co-contributing sources and background concentrations, were below applicable National Ambient Air Quality Standards (NAAQS) at ambient air locations where and when the project has a significant impact; 5) showed that Toxic Air Pollutant (TAP) emissions increases associated with the project do not result in increased emissions and modeling was not required to demonstrate compliance with any TAPs increments. Table 1 presents key assumptions and results to be considered in the development of the permit.

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Appendix W Requirements Modeled emissions rates must represent those associated with design capacity or as limited by a permit restriction corresponding to the applicable averaging period of the NAAQS, as required by 40 CFR 51, Appendix W - *Guideline on Air Quality Models* (Appendix W).	Although a FEC permit allows certain facility changes to be made, provided the annual FEC limit is not exceeded, modeled rates must still meet the requirements of Appendix W.
Modeling for Changes Any operating scenarios, additional emission points, emissions rates greater than modeled, altered release point location, or altered physical release parameters not accurately represented in the air impact analyses must be evaluated for compliance with any applicable significant impact level (SIL); and if a SIL is exceeded by the change, compliance with the applicable NAAQS must be demonstrated.	As required by Idaho Air Rules Section 181, the air impact modeling analysis must be modified for changes from the originally submitted analyses. Notification must be provided to DEQ for changes in impacts exceeding the SIL. For those changes that are less than the SIL, the applicant must maintain documentation on-site.
Operational Scenarios There are two operating scenarios that have been evaluated for this project: a Controlled Scenario and an Uncontrolled Scenario for manufacturing emissions. The controlled scenario will be used when the level of VOCs is unacceptably high and VOCs will be reduced by 98.5% in either or both VOC abatement units. Emission controls will not be used during other times, and this condition was represented by the Uncontrolled Scenario where VOC emissions will not be reduced by any amount. The controlled emissions scenario resulted in the greater criteria air pollutant impacts because criteria pollutant emissions rates are maximized due to the use of VOC abatement units in the manufacturing process. Combustion byproducts from natural gas combustion are emitted from the VOC abatement units.	Each operational scenario produces a unique ambient impact. This results because of differences in emissions rates as well as differences in how emissions are released to the atmosphere. Modeled rates must reflect design capacity of the units/system or be limited by an enforceable permit limit.
SO_2 Annual Facility Emissions Cap (FEC) SO_2 emissions were not modeled for the FEC. Operational variability and baseline actual emissions represent the facility's current potential to emit (PTE).	The facility requested a FEC of 6 tons per year (T/yr) of SO_2. The SO_2 FEC cap consists of the following: • Baseline actual emissions: 0.01 T/yr • Operational variability emissions: 0.22 T/yr • Proposed growth emissions: 5.77 T/yr. The project was exempted from modeling based on the BRC regulatory interpretation policy for NAAQS compliance demonstration requirements[1]. Because SO_2 impact analyses were not conducted for this project, ON Semiconductor must conduct an ambient impact assessment if future projects increase the facility-wide PTE to a value above the BRC level of 4 T/yr.
New and Existing Thermal Processing Units (TPUs) TPU 1 – Existing TPU 2 – Proposed for Operational Variability Both TPUs will vent TPU-controlled emissions to either one or more wet scrubbers (FS01, FS02, and/or FS03) for the controlled emissions scenario or will vent TPU-controlled emissions to the VOC abatement unit stacks (model IDs VOC01 or VOC02).	The TPUs produce exhaust streams containing controlled emissions from targeted manufacturing process units where each TPU has an incinerator immediately followed by a wet scrubber and each TPU's exhaust stream is emitted from a wet scrubber or a VOC abatement unit stack.

FEC Limits FECs are annual limitations in units of T/yr, which are specifically requested by the applicant. The three components to the FEC limitation are: • Baseline actual emissions, • Operational variability emissions; and • Future growth. CH2M modeled emissions that were the sum of baseline actual emissions and operational variability to demonstrate compliance with the NAAQS. For some pollutants, this results in a major fraction of the requested FECs not reflected in the impact analyses.	The following compares requested FECs to modeled rates: • NOx FEC = 26 T/yr; modeled annual rate = 12.8 T/yr; modeled 1-hour rate 2.2 lb/hr (equal to 9.5 T/yr if continuously emitted). • $PM_{2.5}$ FEC = 2 T/yr; modeled annual rate = 1.3 T/yr; modeled 24-hour rate = 0.58 lb/hr (equal to 2.5 T/yr if continuously emitted). • PM_{10} FEC = 5 T/yr; modeled 24-hour rate = 1.06 lb/hr (equal to 4.7 T/yr if continuously emitted). • CO FEC = 26 T/yr; modeled 1-hour rate = 14.6 lb/hr (equal to 64 T/yr if continuously emitted). • SO_2 FEC = 6 T/yr; no modeling because current PTE is less than BRC. Modeling analyses submitted with the application did not utilize the full extent of the requested FEC for various criteria pollutants. Modeling analyses must be revised if any future changes result in emission increases beyond what was used in the model or result in a substantial change in release characteristics from what was used in the model (such that resulting modeled concentrations could be affected). Idaho Air Rules Section 181 specifies how facility changes are handled under a FEC. This memo's model setup and meteorological data form the basis for the ambient impact analyses used to evaluate the ambient impacts due to the change. If the change in modeled impacts (from what was submitted in the application and approved by this memorandum) does not cause exceedance of the annual FEC limit and the change in the modeled design value is less than the SIL, ON Semiconductor may make the process and/or equipment change without notifying DEQ. If the change in AERMOD model output design concentrations exceeds any SIL (but does not cause or contribute to a NAAQS violation), notice must be provided to DEQ as per Idaho Air Rules Section 181.b. Ambient background concentrations, AERMOD model version, and the meteorological data files for the effective term of this permit will be the same as those used for the application's final ambient impact analyses.
Lead (Pb) FEC ON Semiconductor has requested an annual FEC limitation of 40 pounds per year of lead emissions. An air impact analysis for lead was not required because facility-wide emissions are below that identified as BRC.	Modeling requirements were not triggered for lead emissions. Per DEQ policy[1], if facility-wide emission quantities would qualify for a BRC exemption, then NAAQS compliance demonstration requirements are not applicable for that pollutant.
Emergency Generator Engines 2 and 3 (GEN02_S1, GEN02_S2) and GEN03_S1, and GEN03_S2) • 100 hours per year based on actual baseline hours + operational variability hours = requested annual hours of operation. • 8 hours per day any day of the year for testing and maintenance operations.	Emissions modeled accounted for intermittent operation of emergency generators. Only emissions from testing and maintenance are required to be included in the analyses for emergency internal combustion engines. NOx emissions from emergency engines were exempted by policy for the 1-hour NO_2 demonstrations.

Chi /Q (or *X/Q*) *TAPs* Maximum 24-hour averaged emissions rates of Idaho Air Rules Section 585 applicable TAPs must be less than a pound/hour value equal to the following: $$AAC_i\ (in\ mg/m^3)\ \left(\frac{10^3\ \mu g/m^3}{mg/m^3}\right)\left(\frac{1}{X/Q}\right)$$ Where: *AACi* = Acceptable Ambient Concentration of TAP "i" in Idaho Air Rules Section 585. *X/Q* = 585 TAP dispersion factor = ($\mu g/m^3$) / (lb/hr) Maximum annual averaged emissions rates of Idaho Air Rules Section 586 TAPs must be less than a pound/hour value equal to the following: $$AAC_i\ (in\ \mu g/m^3)\ \left(\frac{1}{X/Q}\right)$$ Where: *AACi* = Acceptable Ambient Concentration of TAP "i" in Idaho Air Rules Section 586. *X/Q* = 586 TAP dispersion factor = ($\mu g/m^3$) / (lb/hr)	Demonstration of compliance with AACs for TAPs in Idaho Air Rules Section 585 are made on a 24-hour averaging period. Demonstration of compliance with AACCs for TAPs in Idaho Air Rules Section 586 are made on an annual averaging period. Table 27 of this memorandum lists *X/Q* TAPs ambient impact factors for the source groups used in this permitting project.
Control Device Assumptions for Specific TAPs Manufacturing process emissions of hydrogen peroxide and acid gases--specifically acetic acid, hydrochloric acid, hydrofluoric acid, phosphoric acid, and nitric acid will be routed to acid gas scrubbers (model IDs FS-01, FS-02, and FS-03), and these pollutants will be emitted as controlled emissions for both controlled and uncontrolled operating scenarios. All other pollutants will be routed through either or both of the VOC abatement units and emitted from either a controlled exhaust stack or, if uncontrolled through a bypass stack.	ON Semiconductor utilizes scrubber units to reduce emissions of reactive acid gases and hydrogen peroxide TAPs. Control efficiencies are specific for each individual TAP. Hydrofluoric acid is not regulated as a TAP.
TAPs Compliance Demonstration Assumptions – Support Role Sources Boilers, Water Heater, Makeup Air Unit 5B Unrestricted hours of operation at maximum rated heat input capacity emissions for all four boilers, the water heater, and Makeup Air Unit 5B were used to evaluate compliance with TAPs. Emergency engines were exempted from TAPs compliance per Section 210.20 of the *Air Rules*.	Maximum emissions were used to demonstrate compliance with TAPs increments for these sources in both the uncontrolled and controlled manufacturing operating scenarios.
Manufacturing Emissions TAPs Compliance The hourly emissions rate for the manufacturing process for TAPs compliance was determined by: • Quantifying the actual amount of emissions of each TAP on a calendar month basis based on actual records for August 2014 through July 2015. • For non-carcinogenic TAPs the individual month with the highest quantity of emissions was selected for the representative month. An hourly emission rate to compare against the TAPs Rules screening emission rate limit, specified in units of pounds per hour (lb/hr),	Manufacturing emissions were multiplied by the worst-case Chi/Q ambient impact for the appropriate exhaust stack under both the controlled and uncontrolled operating scenarios. Compliance with Section 585 TAPs is based on maximum daily modeled impacts. Emissions modeled must be representative of maximum emissions averaged over a period of 24 hours or less to the effectively capture short-term ambient impacts.

was calculated using the conversion factors of 24 hours per day and 30 days per month. This historical baseline-actual emissions-based rate was increased by 150% to include the operational variability component. • For carcinogenic TAPs, the actual emissions inventoried during the entire baseline year were summed and divided by 8,760 hours per to establish the average hourly emissions rate. An operational variability component of 150% was applied to this rate for TAPs compliance.	

Air impact analyses are required by Idaho Air Rules to be conducted according to methods outlined in 40 CFR 51, Appendix W – *Guideline on Air Quality Models* (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. The submitted information and analyses demonstrated to the satisfaction of the Department, using DEQ/EPA established guidance, policies, and procedures, that operation of the proposed facility or modification will not cause or significantly contribute to a violation of any ambient air quality standard, provided the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition.

1.2 Summary of Submittals and Actions

June 26, 2014: FEC Tier II Operating Permit/PTC No. T2-2010.0185, initially issued on April 1, 2011 to Micron Technology, Inc, was transferred to Aptina LLC.

September 22, 2015: ON Semiconductor/Aptina, CH2M (ON Semiconductor's consultant), and DEQ representatives attended a pre-application meeting for the renewal of T2-2010.0185.

October 6, 2015: CH2M submitted a public records request (PRR) for ambient monitoring data for the facility's Nampa, Idaho location and co-contributing source emissions release parameter and emissions rate data.

October 7, 2015: CH2M submit submitted a modeling protocol via email on behalf of ON Semiconductor.

November 10, 2015: DEQ issued a modeling protocol approval letter, with comments, to CH2M, for the FEC renewal project.

December 11, 2015: CH2M submitted a modeling protocol addendum requesting the use of alternative 1-hour average NO_2 ambient background concentrations. The backgrounds would vary diurnally and seasonally and would be based on DEQ's hourly NO_2 monitoring data from the Meridian near-road monitor. This alternative background would affect the St. Luke's Nampa and ON Semiconductor Nampa permitting projects.

November 19, 2015 and January 8, 2016: CH2M requested extensions to the deadlines to submit the T2 FEC renewal permit application due to the need to use alternative ambient background concentrations for the ambient impact analyses, and time constraints for DEQ to respond to the information requests.

March 18, 2016:	DEQ received a permit application for the renewal of the expired T2/PTC FEC permit. This application was processed under the project ID T2-2016.0010 Project 61679, with a regulatory start date of March 23, 2016.
April 21, 2016:	DEQ declared the application incomplete.
April 25, 2016:	DEQ provided an AERMOD-ready meteorological dataset based on Boise surface and upper air data covering 2011 through 2015 calendar years.
May 20, 2016:	DEQ received an incompleteness response from CH2M and ON Semiconductor with application and ambient impact analyses.
June 17, 2017:	DEQ declared the PTC/T2 FEC permit application for Project 61679 complete. The final seasonal and diurnally-varying 1-hour NO_2 ambient background concentrations and DEQ recommended meteorological dataset were incorporated in this submittal.
September 29, 2016:	DEQ issued a denial letter for the Project 61679 PTC/T2 FEC application. A revised modeling demonstration was required to correct the stack release height for a VOC abatement unit bypass stack.
November 10, 2016:	DEQ received a revised permit application and ambient impact analyses from CH2M on behalf of ON Semiconductor. This submittal was processed under Project ID T2-2016.0064 Project 61813.
December 9, 2016:	DEQ declared the application incomplete.
December 21, 2016:	DEQ received an incompleteness response consisting of revised ambient impact analyses and a revised modeling report.
January 20, 2017:	DEQ declared the application complete.
March 16, 2017:	DEQ received an addendum to the permit application incorporating a 6 MMBtu/hr natural gas-fired makeup air unit.
June 20, 2017:	CH2M submitted an addendum to the permit application finalizing modeling demonstration including makeup air unit 5B (MAU 5B).
October 5 and 6, 2017:	CH2M submitted AERMAP and NED terrain files to DEQ via email.
October 5, 2017:	DEQ requested revised modeling files including the nearby TASCO facility's carbonation vent.
November 9, 2017:	CH2M submitted revised modeling files for the controlled operating scenario via email.
December 1, 2017:	CH2M submitted a disc with revised ambient impact tables and final modeling runs for both controlled and uncontrolled operating scenarios. These files included criteria pollutants only. The Chi/Q TAPs modeling runs did not

	require revisions and were based on the June 2017 submittal.
April 24, 2018:	DEQ issued a facility draft permit package to ON Semiconductor.
May 1, 2018:	ON Semiconductor submitted facility draft permit comments addressing additional particulate matter emissions resulting from acids exhausted from wet scrubbers and revisions to emissions rates of acids and hydrogen peroxide TAPs used in the manufacturing process.
May 9, 2018:	ON Semiconductor and Trinity submitted an updated revised emissions inventory and comments on the facility draft permit.
May 14 and 18, 2018:	DEQ requested additional information from ON Semiconductor regarding emissions rates and compliance for TAPs and particulate matter emissions.
June 5, 2018:	ON Semiconductor submitted facility draft review comments containing a final revision to the compliance demonstration for 24-hour and annual $PM_{2.5}$ and 24-hour PM_{10} NAAQS to establish the FEC permit baseline ambient impacts for the project and future modeling analyses. Acid and hydrogen peroxide scrubber control efficiencies and emission rates were presented in the document.

2.0 Background Information

2.1 Permit Requirements for Permits to Construct and Tier II Operating Permits

PTCs are issued to authorize the construction of a new source or modification of an existing source or permit. Idaho Air Rules Section 203.02 requires that emissions from the new source or modification not cause or significantly contribute to a violation of any air quality standard, and Idaho Air Rules Section 203.03 requires that emissions from a new source or modification comply with applicable toxic air pollutant (TAP) increments of Idaho Air Rules Sections 585 and 586.

Tier II operating permits issued to sources requesting a FEC pursuant to Section 401.05 of the Idaho Air Rules must demonstrate that the stationary source will not cause or significantly contribute to a violation of any air quality standard as required by Section 403.02 of the Idaho Air Rules.

2.2 Project Location and Area Classification

The facility is located in Nampa, Idaho, in Canyon County. The facility's approximate coordinates are 43.5965° latitude and -116.5346° longitude (or UTM coordinates 537,580 meters Easting, 4,827,170 meters Northing, WGS84 datum, Zone 11). The area is designated as attainment or unclassifiable for all pollutants.

2.3 Modeling Applicability for Criteria Pollutants

2.3.1 Below Regulatory Concern and DEQ Modeling Guideline Level I and II Thresholds

Idaho Air Rules Section 203.02 state that a PTC cannot be issued unless the application demonstrates to the satisfaction of DEQ that the new source or modification will not cause or significantly contribute to a NAAQS violation. Atmospheric dispersion modeling is used to evaluate the potential impact of a proposed project to ambient air and demonstrate NAAQS compliance. However, if the emissions associated with a project are very small, project-specific modeling analyses may not be necessary.

If project-wide potential to emit (PTE) values for criteria pollutants would qualify for a below regulatory concern (BRC) permit exemption as per Idaho Air Rules Section 221 if it were not for potential emissions of one or more criteria pollutants exceeding the BRC threshold of 10% of emissions defined by Idaho Air Rules as significant, then an air impact analysis may not be required for those pollutants. DEQ's regulatory interpretation policy[1] of exemption provisions of Idaho Air Rules Section 221 is that: "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." 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 analyses 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. This permitting project cannot qualify for a BRC exemption from Idaho Air Rules Section 203.02 because there are existing permit conditions that require changes; however, because facility-wide emissions of some criteria pollutants are below BRC levels, a NAAQS compliance demonstration is not required for those pollutants.

Site-specific air impact analyses may not be required for a project, even when the project cannot use the BRC exemption from the NAAQS demonstration requirements. If the emissions increases associated with a project are below modeling applicability thresholds established in the *Idaho Air Modeling Guideline* ("State of Idaho Guideline for Performing Air Quality Impact Analyses[2]," available at http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf), then a project-specific analysis is not required. Modeling applicability emissions thresholds were developed by DEQ based on modeling of a hypothetical source and were designed to reasonably ensure that impacts are below the applicable SIL. DEQ has established two threshold levels: Level 1 thresholds are unconditional thresholds, requiring no DEQ approval for use; Level 2 thresholds are conditional upon DEQ approval, which depends on evaluation of the project and the site, including emissions quantities, stack parameters, number of sources emissions are distributed amongst, distance between the sources and the ambient air boundary, and the presence of sensitive receptors near the ambient air boundary.

As shown below in Table 2, non-fugitive facility-wide emissions of PM_{10}, $PM_{2.5}$, NO_x, and CO exceeded the BRC thresholds, and a NAAQS compliance demonstration was required for these pollutants. NAAQS compliance demonstrations were not required for SO_2, lead, and ozone.
The emission values listed in Table 2 represent the higher of the two operating scenarios presented in the application - either a VOC-controlled emissions scenario or a VOC-uncontrolled scenario. For this FEC permit, the quantity of annual emissions, consisting of the baseline emissions rate plus the rate associated with operational variability, was compared to BRC levels to evaluate NAAQS compliance demonstration requirement applicability. Future modeling of SO_2 and lead will be required if the requested PTE of processes and emissions units installed and operated as part of future changes under the FEC permit exceed any annual BRC modeling threshold.

Table 2. CRITERIA POLLUTANT NAAQS COMPLIANCE DEMONSTRATION APPLICABILITY			
Criteria Pollutant	**Below Regulatory Concern Level (ton/year)**	**Applicable Facility-Wide Potential Emissions (ton/year)**	**NAAQS Compliance Exempted per BRC Policy?**
PM_{10}[a]	1.5	3.4	No
$PM_{2.5}$[b]	1.0	1.3	No
Carbon Monoxide (CO)	10.0	15.0	No
Sulfur Dioxide (SO_2)	4.0	0.26	Yes
Nitrogen Oxides (NOx)	4.0	12.7	No
Lead (Pb)	0.06 (120 lb/year)	0.2 lb/year	Yes
Ozone as VOC or NOx	4.0	25.9 T/yr of VOCs	No[c]

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
c. Ozone modeling applicability is addressed in Section 2.3.2 of this memorandum

2.3.2 Ozone Modeling Applicability

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, NO_x, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses (see Section 3.3.3) 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.

Addressing secondary formation of O_3 has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

> *. . . footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."*
>
> *The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."*

Allowable emissions estimates of baseline actual plus the operational variability component of the facility's requested PTE (which were used to evaluate NAAQS compliance) placed VOCs at 25.9 tons/year and NOx at 12.7 tons/year, well below the 100 tons/year threshold. The annual requested FEC limits for VOCs at 53 tons/year and NOx at 26 tons per year were also considered, and DEQ determined it was not appropriate or necessary to require a quantitative source specific O_3 impact analysis.

2.3.3 Secondary Particulate Formation Modeling Applicability

The impact from secondary particulate formation resulting from emissions of NOx, SO_2, and/or VOCs was assumed by DEQ to be negligible on the basis of the magnitude of emissions and the short distance from emissions sources to modeled receptors where maximum PM_{10} and $PM_{2.5}$ impacts would be anticipated.

2.4 Significant and Cumulative NAAQS Impact Analyses

If maximum modeled pollutant impacts to ambient air from emissions sources associated with a new facility or the emissions increase associated with a modification exceed the SILs of 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, 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 may also be required for permit revisions driven by compliance/enforcement actions, any correction of emissions limits or other operational parameters that may affect pollutant impacts to ambient air, or other cases where DEQ believes NAAQS may be threatened by the emissions associated with the facility or proposed project.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts, according to established DEQ/EPA guidance, policies, and procedures, from applicable facility-wide emissions and emissions from any nearby co-contributing sources. A DEQ-approved background concentration value is then added to the modeled result that is appropriate for the criteria pollutant/averaging-time 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 3. Table 3 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.

Table 3. 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 6[th] highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8[th] highest[j]
	Annual	0.3	12[k]	Mean of maximum 1st highest[l]
Carbon monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2[nd] highest[n]
	8-hour	500	10,000[m]	Maximum 2[nd] highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	Mean of maximum 4[th] highest[q]
	3-hour	25	1,300[m]	Maximum 2[nd] highest[n]
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 8[th] highest[t]
	Annual	1.0	100[r]	Maximum 1[st] highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1[st] highest[n]
	Quarterly	NA	1.5[r]	Maximum 1[st] highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	70 ppb[w]	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. 3-year mean of annual concentration.
l. 5-year mean of annual averages at the modeled receptor.
m. Not to be exceeded more than once per year.
n. Concentration at any modeled receptor.
o. Interim SIL established by EPA policy memorandum.
p. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. 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.
r. Not to be exceeded in any calendar year.
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. 3-month rolling average.
v. An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.
w. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

If the cumulative NAAQS impact analysis shows a violation of the standard, the permit cannot be issued if the proposed project or facility has a significant contribution (exceeding the SIL) to the modeled violation. This evaluation is made specific to both time and space. The facility or project does not have a significant contribution to a violation if impacts are below the SIL at all specific receptors showing violations during the time periods when modeled violations occurred.

Compliance with Idaho Air Rules Section 203.02 is demonstrated if: a) specific applicable criteria pollutant emissions increases are at a level defined as Below Regulatory Concern (BRC), using the criteria established by DEQ regulatory interpretation[1]; or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling applicable 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 toxic air pollutants (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 impact of the emissions increase must be estimated. If ambient 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 regulated 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. The DEQ permit writer evaluates the applicability of specific TAPs to the Section 210.20 exclusion. TAPs modeling was required for this project.

3.0 Analytical Methods and Data

3.1 Modeling Methodology

This section describes the modeling methods used by the applicant's consultant, CH2M, to demonstrate compliance with applicable air quality standards.

3.1.1 Overview of Analyses

CH2M performed project-specific air impact analyses that were determined by DEQ to be reasonably representative of the facility, using established DEQ policies, guidance, and procedures. Results of the submitted analyses, in combination with DEQ's analyses, demonstrated 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.

This project's analyses included two distinct operating scenarios for the control of emissions created by the manufacturing processes. Up to three independantly-operational scrubber units control specifically-targeted acid gases and hydrogen peroxide emissions, and are operated continuously. Two independently operational VOC abatement units control the manufacturing exhaust streams for the primary purpose of reducing VOCs. Certain VOCs also qualify as TAPs and HAPs and must be controlled if emissions rates exceed a desired threshold. Each VOC abatement unit is equipped with three stacks—a stack exhausting the controlled emissions, a primary bypass stack, and a secondary backup bypass stack. Only one bypass stack is operational at any time and this project was limited to consideration of the primary bypass stack and the controlled abatement stacks. The exhaust stacks for each VOC abatement unit have unique release parameters. Stack locations, as well as release height, exit diameter, and flow rates differ to some degree between the four stacks, and so, a different ambient impact dispersion pattern and magnitude is attributed to each stack. The differences in ambient impacts created a need to verify NAAQS and TAPs compliance for both the controlled and uncontrolled operating scenarios. Table 4 provides a brief description of parameters used in the modeling analyses.

Table 4. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Nampa, Idaho	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 16126r. DEQ requested that the project modeling be completed with the current version of AERMOD due to the FEC type of permit.
Meteorological Data	Boise	2012-2016—See Section 3.3 of this memorandum. Surface data from the Boise airport and upper air data from Boise, Idaho. This dataset used the Adjust_Ustar option for AERMET processing.
Terrain	Considered	Receptor, building, and emissions source stack base elevations were determined using USGS 1 arc second National Elevation Dataset (NED) files based on the NAD83 datum. The facility is located within Zone 11.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility structures.
Receptor Grid	**Criteria Air Pollutants and Toxic Air Pollutants**	
	SIL Analyses	
	Grid 1	10-meter spacing at the facility's ambient air boundary.
	Grid 2	25-meter spacing in a 475-meter (x) by 500-meter (y) rectangular grid roughly centered on the facility.
	Grid 3	50-meter spacing in a 1,300-meter (x) by 1,350-meter (y) rectangular grid centered on Grid 2.
	Grid 4	100-meter spacing in a 2,300-meter (x) by 2,400-meter (y) rectangular grid centered on Grid 3.
	Grid 5	500-meter spacing in a 11.0 kilometer (x) by 10.5 kilometer (y) rectangular grid centered on Grid 4.
	Grid 6	1,000-meter spacing in a 21.0 kilometer (x) by 17.0 kilometer (y) rectangular grid centered on Grid 5.
	Grid 7	1,500-meter spacing in a 31.5 kilometer (x) by 30.0 kilometer (y) grid centered on Grid 6.
	NAAQS Analyses	
	Varied	The SIL receptor grid was used to establish receptors with impacts above the SIL. Only receptors where maximum impacts were above the SIL were evaluated for NAAQS compliance.

3.1.2 Modeling Protocol

A modeling protocol was submitted to DEQ on November 9, 2015. On December 11, 2015, CH2M submitted a protocol addendum to request the use of alternative 1-hour NO_2 ambient background values. DEQ issued a modeling protocol approval, with comments, on February 3, 2016. A tentative approval of the alternative 1-hour NO_2 background concentrations was provided via email on February 9, 2016, with final approval withheld pending review of the permit application's air impact analyses.

Project-specific modeling was conducted using data and methods described in the modeling protocol and the *Idaho Air Modeling Guideline*[2].

3.1.3 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in 40 CFR 51, Appendix W (Guideline on Air Quality Models). 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 16216r (the current version when the last revisions of analyses were received by DEQ) was used by CH2M for the modeling analyses to evaluate impacts of the facility. An earlier version of AERMOD was used in analyses submitted with the initial application in 2015. DEQ determined it was critical that analyses use the current version of the model because FEC permits allow considerable flexibility for reassessing impacts during the duration of the permit. Therefore, CH2M re-ran the entire ambient impact analyses using this current version of AERMOD at DEQ's request.

NO_2 1-hour impacts can be assessed using a tiered approach to account for $NO/NO_2/O_3$ chemistry. Tier 1 assumes full conversion of NO to NO_2. Tier 2 Ambient Ratio Method (ARM) assumes a 0.80 default ambient ratio of NO_2/NOx. Tier 2 ARM2[3] was recently developed and replaces the previous ARM. Recent EPA guidance[4] on compliance methods for NO_2 states the following for ARM2:

> "This method is based on an evaluation of the ratios of NO_2/NO_x from the EPA's Air Quality System (AQS) record of ambient air quality data. The ARM2 development report (API, 2013) specifies that ARM2 was developed by binning all the AQS data into bins of 10 ppb increments for NO_x values less than 200 ppb and into bins of 20 ppb for NO_x in the range of 200-600 ppb. From each bin, the 98th percentile NO_2/NO_x ratio was determined and finally, a sixth-order polynomial regression was generated based on the 98th percentile ratios from each bin to obtain the ARM2 equation, which is used to compute a NO_2/NO_x ratio based on the total NO_x levels."

Tier 3 methods account for more refined assessment of the NO to NO_2 conversion, using a supplemental modeling program with AERMOD to better account for $NO/NO_2/O_3$ atmospheric chemistry. Either the Plume Volume Molar Ratio Method (PVMRM) or the Ozone Limiting Method (OLM) can be specified within the AERMOD input file for the Tier 3 approach. EPA guidance (Memorandum: from Tyler Fox, Leader, Air Quality Modeling Group, C439-01, Office of Air Quality Planning and Standards, USEPA; to Regional Air Division Directors. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard.* March 01, 2011) has not indicated a preference for one option over the other (PVMRM vs OLM) for particular applications.

The Tier 2 ARM2 and Tier 3 PVMRM and OLM methods are now regulatory options following the publication of final changes to EPA's Guideline on Air Quality Models on January 17, 2017. CH2M used the Tier 2 ARM2 method with regulatory default minimum and maximum ARM values of 0.5 and 0.9, respectively. ARM2 with the default minimum and maximum ratios is a regulatory default method and is considered reasonably conservative for estimating NO_2 impacts. Substantial justification and documentation for its use in permit applications is not typically necessary and was not required by DEQ for this project.

The Beta algorithms for treatment of point sources with horizontal release orientation or equipped with a rain cap that impedes the vertical momentum of exhaust plumes were adopted as guideline techniques with the revisions to Appendix W (Guideline on Air Quality Models). The Appendix W final rule was signed by the Administrator on December 2016, and published in the January 17, 2017 in the Federal Register, with a delayed final effective date of May 22, 2017. This method eliminated momentum induced plume rise while still accounting for thermal buoyancy induced plume rise. CH2M applied the algorithms for capped stacks to several of the modeled stacks.

3.2 Background Concentrations

A background concentration tool was used to establish ambient background concentrations for this project. A beta version of the background concentration tool was developed by the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST) and provided through Washington State University (located at http://lar.wsu.edu/nw-AIRQUEST/lookup.html). The tool uses regional scale modeling of pollutants in Washington, Oregon, and Idaho, with modeling results adjusted according to available monitoring data. The background concentration is added to the design value for each pollutant and averaging period. The modeling protocol approval letter for this project was issued by DEQ on November 10, 2015, under permitting project number P-61679. The DEQ-recommended ambient background values are listed in Table 5.

Table 5. DEQ-RECOMMENDED AMBIENT BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[a, b]
PM_{10}[g]	24-hour	77[c]
$PM_{2.5}$[h]	24-hour	24[d]
	Annual	9.8
Ozone[e]	Annualized value	60 ppb[f]
NO_2[i]	1-hour	73.3 (39 ppb)
	Annual	11.7 (6.2 ppb)
SO_2[j]	1-hour	12.6 (4.8 ppb)
Lead	Rolling 3-month	0.03[l]
CO[k]	1-hour	1,603 (1,400 ppb)
	8-hour	962 (840 ppb)

a. Micrograms per cubic meter, except where noted otherwise.
b. NW AIRQUEST ambient background lookup tool, October 29, 2015 lookup date. See http://lar.wsu.edu/nw-airquest/lookup.html, except where noted otherwise.
c. Without extreme values.
d. NW AIRQUEST design value used a 3-year median value instead of a 3-year average of annual 98th percentile values to take into account high modeled values during modeled wildfires episodes.
e. Ozone for use in 1-hour nitrogen dioxide modeling using Tier 3 Ozone Limiting Method or Tier 3 Plume Volume Molar Ratio Method.
f. Parts per billion by volume.
g. Particulate matter with an aerodynamic diameter of 10 microns.
h. Particulate matter with an aerodynamic diameter of 2.5 microns.
i. Nitrogen dioxide.
j. Sulfur dioxide.
k. Carbon monoxide.
l. Default value for small town/suburban areas. The lead background was obtained from the following DEQ source: *Background Concentrations for Use in New Source Review Dispersion Modeling.* Memorandum from Hardy, Rick and Schilling, Kevin to Anderson, Mary, dated March 14, 2003.

CH2M formally requested that DEQ approve use of an alternative 1-hour NO_2 ambient background concentration dataset. The dataset was developed from available hourly monitoring data collected at the Meridian, Idaho, near-road monitor. The EPA Air Quality System (AQS) site ID number is 160010023, and the address for the site is 1311 East Central Drive, Meridian, Idaho. There are two co-located NO_2 monitors at this location. Both are approved monitors for NAAQS compliance evaluation. The valid data collected by DEQ for these two monitors were provided to CH2M in a February 2, 2016, email.

CH2M developed seasonal background values that were calculated as the arithmetic mean of three individual years of data. An hourly (diurnal) approach was applied to accurately characterize the variation in NO_2 background concentrations over the course of each day. The seasonal approach further enhanced the background to more accurately reflect the variation that exists over each season within the year. The seasons were assigned the following months:

Winter: December, January, and February
Spring: March, April, and May
Summer: June, July, and August
Fall: September, October, and November.

DEQ requested that CH2M use complete seasons for each of the three years of data to be included in the ambient background population of data. Monitoring at the Meridian Near-Road site for calendar year 2012 began on April 1 rather than January 1. DEQ requested that CH2M use the 98th percentile value as the design value for each season of each year. The average of the three individual annual 98th percentile values established the design value for each hour of the day. Where data completeness for an individual season fell below 90.0%, DEQ requested that the individual year seasonal design value be based on the 2nd rank value. CH2M accommodated this request for the following: June, July, and August 2013; December 2013, January 2014, and February 2014. The Winter 2014 season design values already used the 2nd rank value.

The May 13, 2016 submitted air impact analyses contained a spreadsheet titled "ON-Semi AQDM Season-Hour v8.xlsx." This spreadsheet included CH2M's final version of the alternative 1-hour NO_2 ambient background values varying seasonally and diurnally. Version 8 of the spreadsheet was adopted as the final dataset of background concentrations used in the 1-hour NO_2 analysis for this project, and the background values are listed in Table 6.

Table 6. SEASONAL DIURNAL 1-HOUR NO_2[a] BACKGROUND CONCENTRATIONS

	1-hour NO_2, units of ppb[b]			
Hour of Day	**Winter**	**Spring**	**Summer**	**Autumn**
1 (12 am to 1 am)	30.6	26.3	23.7	24.3
2	28.6	21.8	18.5	21.6
3	26.7	20.6	17.5	21.0
4	25.8	23.9	21.3	22.3
5	26.9	26.2	24.2	22.1
6	28.2	27.2	27.3	25.3
7	29.1	31.8	30.0	28.4
8	29.8	32.4	26.0	30.3
9	31.1	27.1	23.7	26.5
10	26.9	22.2	20.0	24.3
11	25.9	18.5	19.7	21.5
12	24.6	16.6	15.5	17.9
13	20.0	15.7	14.3	17.1
14	18.0	16.6	13.6	16.3
15	20.9	15.7	16.0	18.0
16	22.5	15.7	16.6	21.0
17	23.7	17.1	17.7	23.3
18	28.0	18.4	17.4	28.6
19	32.6	24.3	20.6	34.6
20	35.1	32.5	30.9	41.4
21	34.4	40.1	41.4	39.6
22	33.7	39.2	40.0	34.6
23	32.4	35.3	35.7	31.5
24	32.0	31.5	31.1	26.5

a. Nitrogen oxides.
b. Parts per billion.

3.3 Meteorological Data

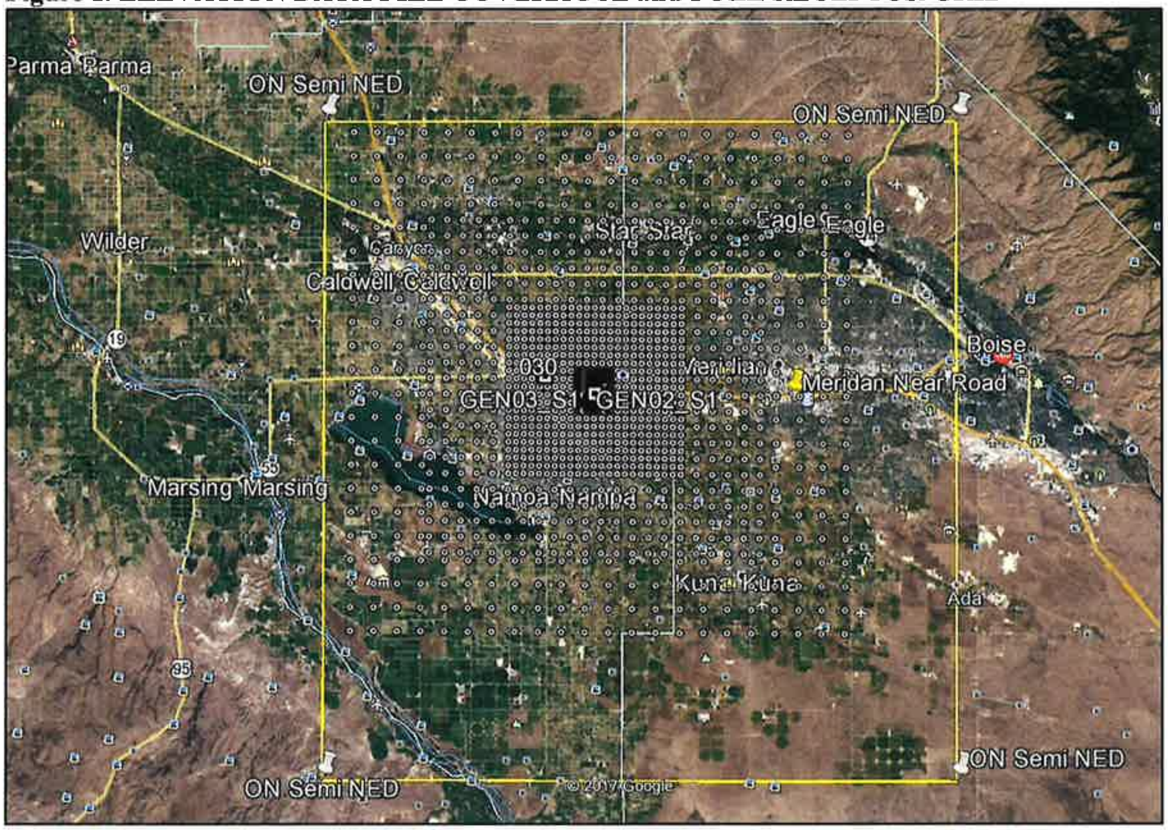
DEQ provided CH2M with a model-ready meteorological dataset processed from Boise airport surface and Boise upper air meteorological data covering the years 2012-2016. The model-ready dataset for this project was generated from monitored data collected at the Boise airport (FAA airport code KBOI) for surface and Automated Surface Observing System (ASOS) data and upper air data from the National Weather Service (NWS) Station site (site ID 726810-24131). Surface characteristics were determined by DEQ staff using AERSURFACE version 13016. DEQ modeling staff evaluated annual moisture conditions for the AERSURFACE runs based on thirty years of Boise airport precipitation data. Conditions were determined to be "wet" for 2015 only. 2012-2014 and 2016 were determined to be "average" years for precipitation. Continuous snow cover at the Boise airport site was determined to have existed during 2016. Calms were relatively low at 0.7%, and less than 1% of the data were missing from the 5-year record. AERMINUTE version 15271 was used to process ASOS wind data for use in AERMET. AERMET Version 16216 was used to process surface and upper air data and to generate a model-ready meteorological data input file. The "adjust u star" (ADJ_U*) option was applied in AERMET to enhance model performance during low wind speeds under stable conditions. This treatment method was adopted as a regulatory method using NWS surface data.

DEQ determined these data were representative for ON Semiconductor's Nampa site and approved use of this dataset for the project.

3.4 Terrain Effects

CH2M used a National Elevation Dataset (NED) file, in "tif" format and in the NAD83 datum, to calculate elevations of receptors. A 1 arc second file provided 30-meter resolution of elevation data. The terrain preprocessor AERMAP version 11103 was used to extract the elevations from the NED file 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 emissions plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain. Figure 1 depicts the NED file coverage (yellow outline which encompasses the full receptor grid used in the analyses. DEQ concluded that CH2M appropriately addressed terrain for the analyses.

Figure 1. ELEVATION DATA FILE COVERAGTE and FULL RECEPTOR GRID



3.5 Building Downwash Effects on Modeled Impacts

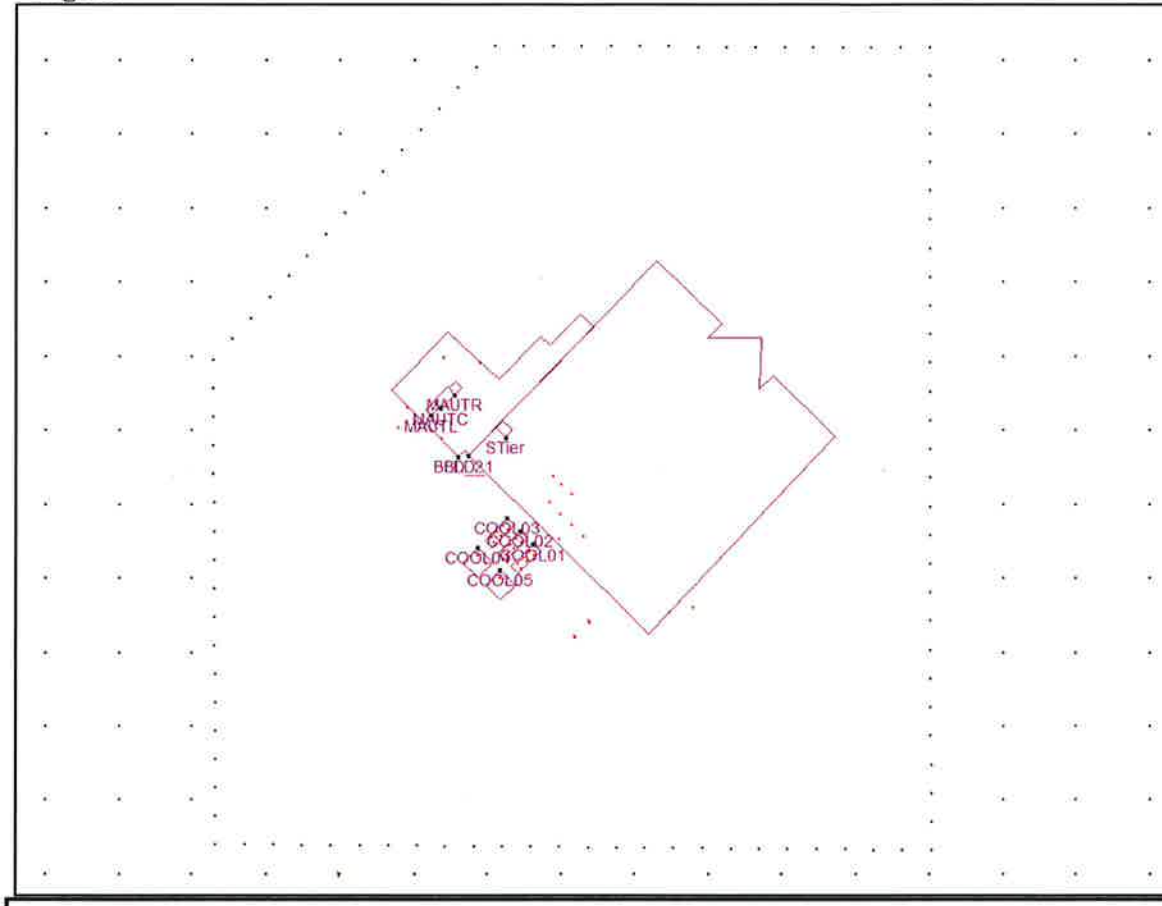
Potential downwash effects on the emissions plume were accounted for in the model by using building parameters as described by CH2M in the submitted application. The Building Profile Input Program for the PRIME downwash algorithm (BPIP-PRIME) was used to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and release parameters for input to AERMOD.

DEQ review concluded that buildings were reasonably characterized in the analyses and building downwash was appropriately evaluated.

3.6 Facility Layout

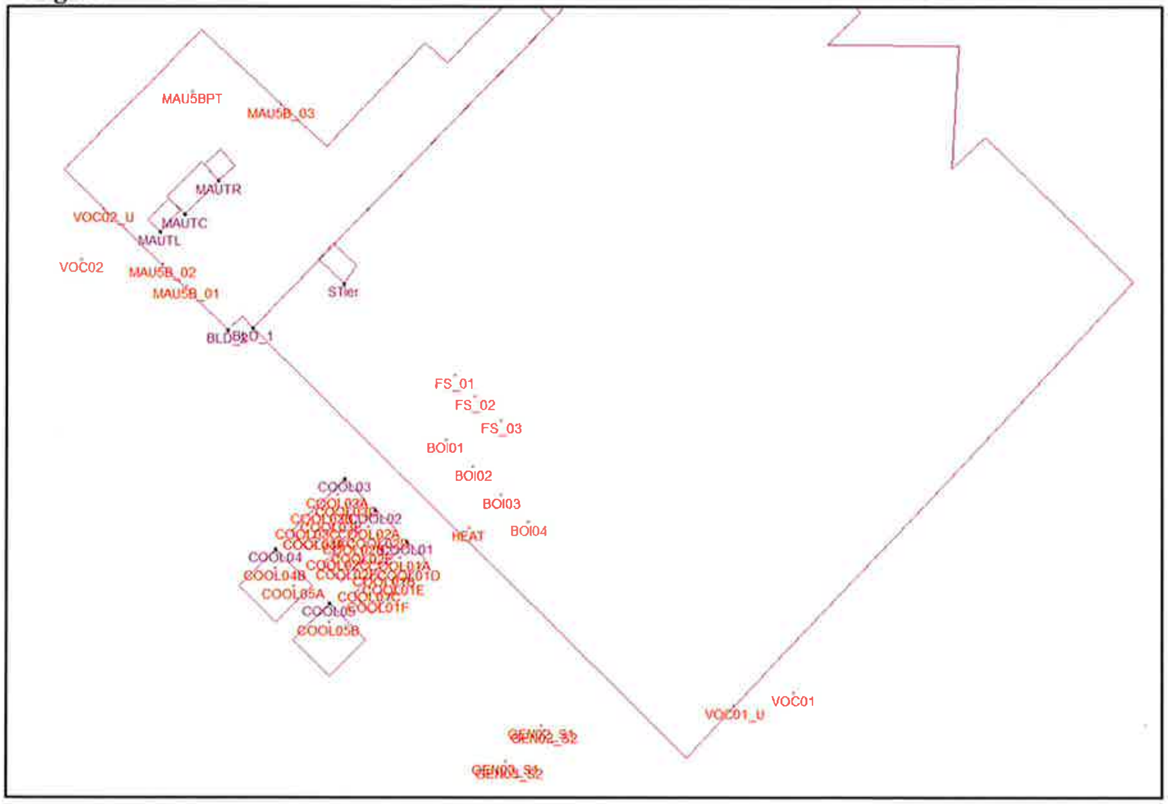
Figures 2 and 3 below show the facility's emission sources and all structures in the modeling analyses. The ambient air boundary was established by ON Semiconductor at the initial line of receptors shown in the figures below. ON Semiconductor and CH2M conducted extensive rooftop inspections to verify stack locations, physical stack release heights above roofline and exit diameters. DEQ concludes that the model setup reflects an accurate layout of structures, emissions points, and ambient air boundary.

Figure 2. FACILITY LAYOUT – STRUCTURES LABELED



Volume and point sources are each represented by a red dot.

Figure 3. OVERHEAD VIEW OF ON SEMICONDUCTOR EMISSION SOURCES

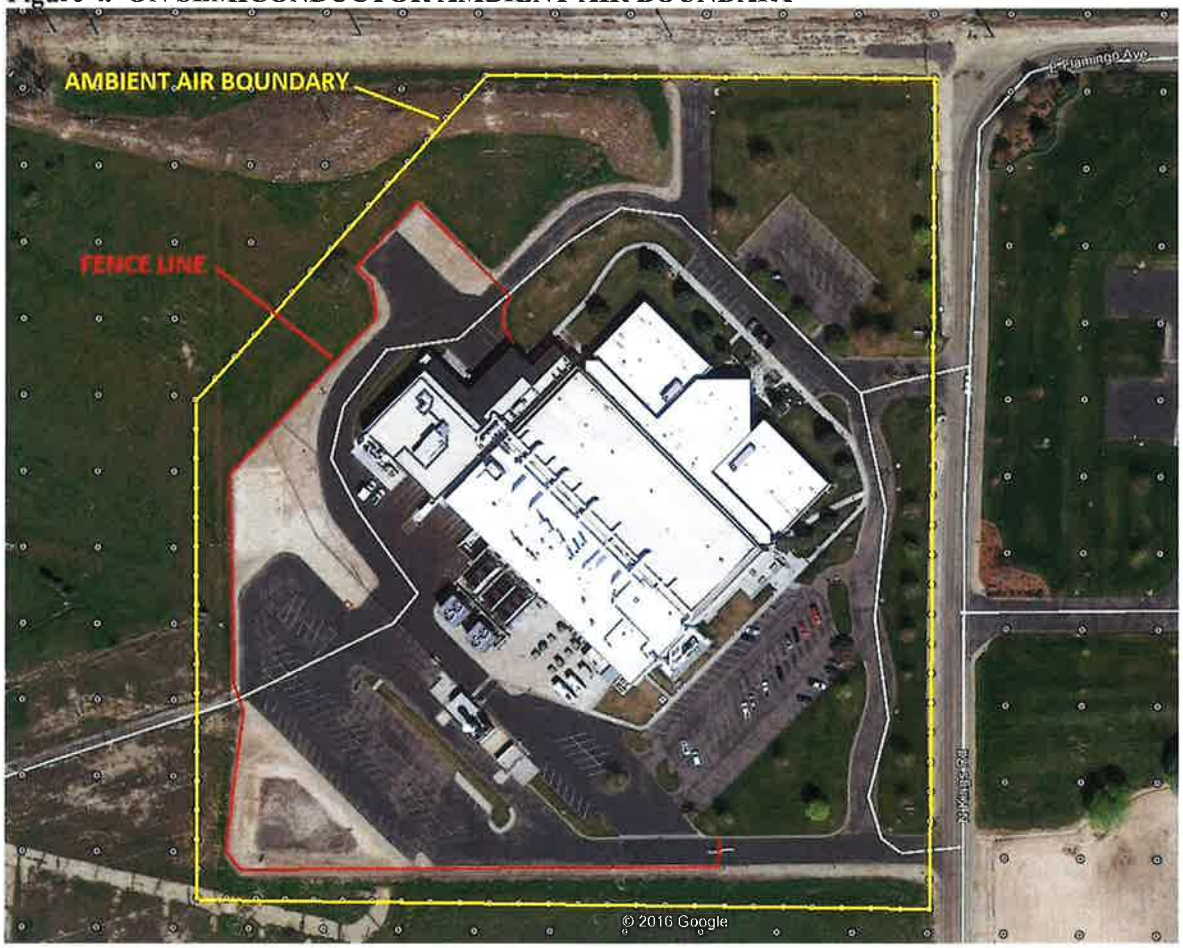


3.7 Ambient Air Boundary

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.

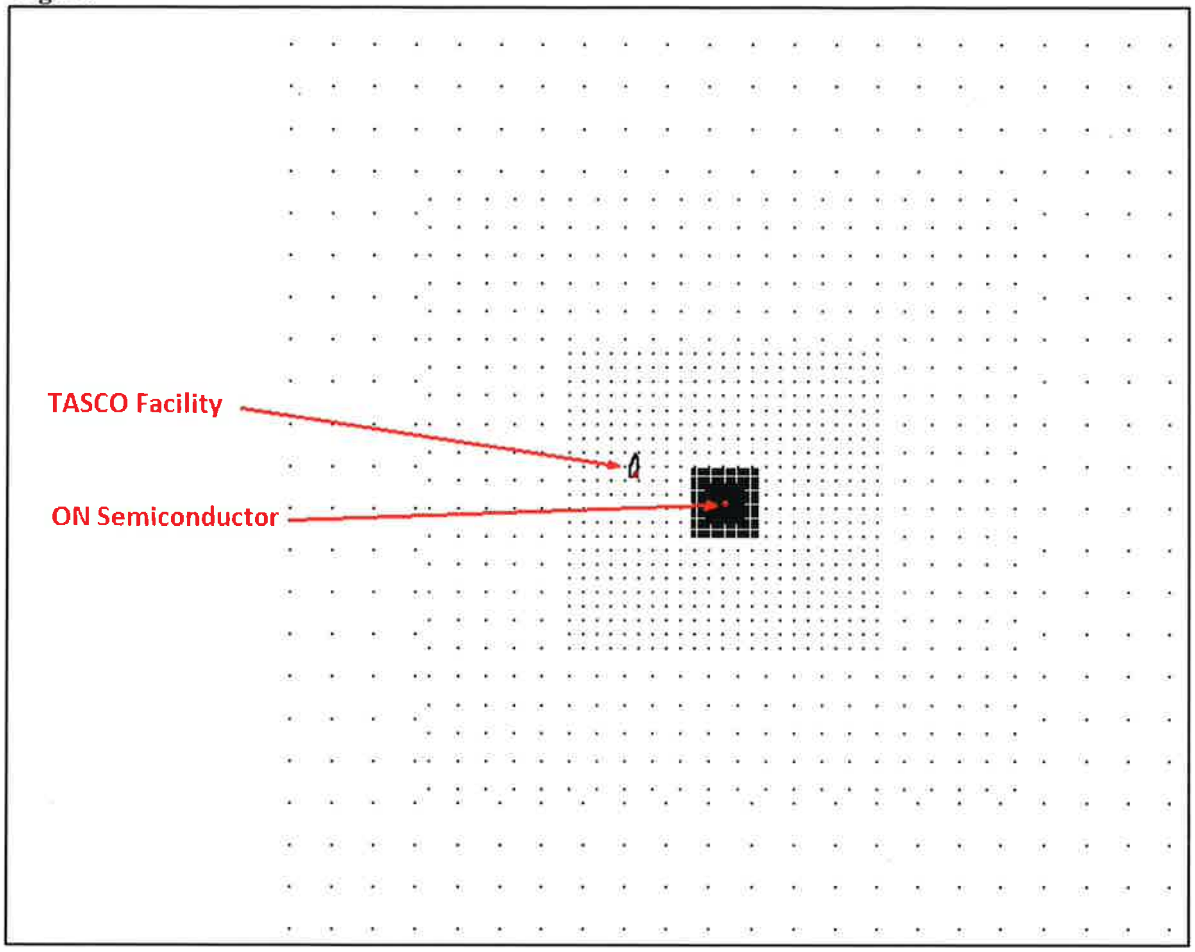
Figure 4. ON SEMICONDUCTOR AMBIENT AIR BOUNDARY



3.8 Receptor Network

Table 3 describes the receptor network used in the submitted modeling analyses. The receptor grids used in the model provided good resolution of the maximum design concentrations for the project and provided extensive coverage. The full receptor grid was used for SIL, NAAQS, and TAPs ambient air impact analyses. Where ambient impacts for NAAQS compliance demonstrations, including ambient background and modeled impacts from co-contributing sources that are not adequately addressed by the background value, exceeded the allowable NAAQS, CH2M evaluated compliance based only on the receptors where the ON Semiconductor impacts were predicted to exceed the applicable SIL. This approach is appropriate for the NAAQS compliance demonstration because Idaho Air Rules Section 203.02 require that the permitted facility not significantly contribute to a violation. DEQ determined that the receptor network was effective in reasonably assuring compliance with applicable air quality standards at all ambient air locations. The complete extent of the receptor grid is depicted below in Figure 5. The full receptor grid is also depicted in the terrain image in Figure 1.

Figure 5. FULL RECEPTOR GRID



3.9 Emission Rates

Review and approval of estimated emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emissions estimates is not addressed in this modeling review memorandum. DEQ air impact analyses review included verification that the potential emissions rates provided in the emissions inventory were properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emissions rates used for the ON Semiconductor facility in the dispersion modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emissions inventory. All modeled criteria air pollutant and TAP emissions rates must be equal to or greater than the facility's potential emissions calculated in the PTC emissions inventory or proposed permit allowable emissions rates. There are three distinct emissions inventories that apply to this FEC permit. The first is the SIL and NAAQS analyses, which were based on a PTE estimate by ON Semiconductor and created by adding the baseline actual emissions of the facility to the operational variability component. The operational variability component was intended to provide a measure of operational flexibility for the facility above the baseline actual emissions.

The second inventory is the FEC limit, which is an annual facility-wide emission limit in tons rounded to the nearest integer. The FEC is established at some level greater than the quantity of emissions consisting of baseline actual emissions and operational variability emissions. It is intended to account for future growth. ON requested FEC limits for all criteria pollutants.

The FEC permit provides the permittee the option to make future changes that increase emissions of criteria air pollutants. ON Semiconductor performed modeling for the criteria pollutant FEC limits for those pollutants with an applicable annual averaging period—namely NO_2 and $PM_{2.5}$. These analyses are primarily "place-holder" analyses, as the additional emissions (the difference between the FEC and the level representative of baseline plus operational variability) were assigned to sources that are already modeled at levels defined as PTE. Revised modeling would be necessary to implement the full extent of the FEC. PM_{10}, NO_x, SO_2, CO, and lead FEC limits were requested on an annual basis above emissions rates established as the sum of baseline actual emissions and operational variability components of the FEC permitting program, but no modeling was conducted for these FEC limitations. The FEC-affected modeled sources are noted in Table 11 and the difference between the annual quantities of emissions in Table 11 and Table 8 for those sources represents the quantity of emissions modeled for the FEC growth component.

The third inventory is the TAPs emission inventory. The inventory of applicable TAP emissions seems very conservative. This facility has been permitted in the past, and for any project where the facility has appropriately demonstrated compliance with a TAP, those emissions are not generally required to be included in the future TAPs compliance demonstrations as new emissions. Section 3.9.3 of this memorandum provides more details on modeled TAP emissions.

3.9.1 Criteria Pollutant Emissions Rates for Significant Impact Level and Cumulative Analyses

A significant impact level (SIL) analysis was submitted as part of the air quality compliance demonstration. Cumulative NAAQS analyses were required for all criteria pollutants except SO_2 and 8-hour averaged CO. The emissions rates modeled for the SIL analyses for ON Semiconductor's sources were identical to those modeled for the cumulative NAAQS ambient impact analyses.

Tables 7 and 9 list criteria pollutant continuous (24 hours per day) emissions rates used to evaluate SIL and NAAQS compliance for standards with averaging periods of 24 hours or less for the VOC-controlled emissions and VOC-uncontrolled emissions operating scenarios, respectively. Tables 8 and 10 list criteria pollutant continuous (8,760 hours/year) emissions rates used to evaluate SIL and NAAQS compliance for standards with an annual averaging period for the VOC-controlled emissions and VOC-uncontrolled emissions operating scenarios, respectively. These modeled rates must be equal or greater than PTE or permit allowable facility-wide emissions for the listed averaging period. These criteria air pollutant emissions rates represent baseline actual emissions and the level of operational variability above baseline actual emissions for operational flexibility . They are the requested PTE for short and long term averaging periods based on the assumptions applied in the ambient impact analyses for both operating scenarios.

Table 11 lists criteria pollutant continuous (8,760 hours/year) emissions rates used to evaluate NAAQS compliance for standards with an annual averaging period for a requested FEC limitation. These modeled rates must be equal or greater than requested facility emissions cap for the annual averaging period. Only annual average emissions were modeled and only the controlled emissions operating scenario was presented. The controlled emissions scenario has been demonstrated to be the worst-case scenario for ambient impacts.

The Amalgamated Sugar Company (TASCO) facility was the only facility identified by DEQ as a nearby co-contributing source for this project. The TASCO emissions inventory was obtained from the 2014 National Emissions Inventory (NEI) submitted by each facility subject to the reporting requirement. The inventory established emissions on a quarterly basis during the calendar year to account for variations in activity levels for each emissions unit. This inventory reflects actual emissions for the inventory period rather than the potential to emit. Modeling of actual emissions for co-contributing sources is appropriate for these analyses. Figure 4 above shows the location of the ON Semiconductor and TASCO facilities in relation to one another, which are located approximately 3 kilometers (2 miles apart). The emissions rates modeled for the TASCO facility are listed below in Section 3.9.2.

Table 7. ON SEMICONDUCTOR SHORT-TERM CRITERIA POLLUTANT EMISSIONS RATES-CONTROLLED EMISSION SCENARIO

Emissions Point	Description	NO_x[a] (lb/hr)[b]	CO[c] (lb/hr)	PM_{10}[d] (lb/hr)	$PM_{2.5}$[e] (lb/hr)
BOI01	Boiler 1 - 8.37 MMBtu/hr Kewanee boiler – Low NOx	0.091	0.62	0.0636	0.048
BOI02	Boiler 2 - 8.37 MMBtu/hr Kewanee boiler – Low NOx	0.091	0.62	0.0636	0.048
BOI03	Boiler 3 - 8.17 MM Btu/hr Cleaver Brooks boiler	0.91	0.59	0.0590	0.059
BOI04	Boiler 4 - 8.37 MMBtu/hr Kewanee boiler- Low NOx	0.091	0.62	0.0636	0.048
HEAT	0.075 MMBtu/hr hot water heater	0.0074	0.0062	0.0006	5.60E-04
GEN02_S1	Generator engine #2 stack #1 - Cummins 1,112 kW	0[f]	2.46[g]	0.0547[h]	0.055[h]
GEN02_S2	Generator engine #2 stack #2 - Cummins 1,112 kW	0f	2.46[g]	0.0547[h]	0.055[h]
GEN03_S1	Generator engine #3 stack #1 - Cummins 1,655 kW	0[f]	3.18[g]	0.0897[h]	0.090[h]
GEN03_S2	Generator engine #3 stack #2 - Cummins 1,655 kW	0[f]	3.18[g]	0.0897[h]	0.090[h]
COOL01A	Cooling tower 1 - fan vent A	0	0	0.0124	5.65E-05
COOL01B	Cooling tower 1 - fan vent B	0	0	0.0124	5.65E-05
COOL01C	Cooling tower 1 - fan vent C	0	0	0.0124	5.65E-05
COOL01D	Cooling tower 1 - fan vent D	0	0	0.0124	5.65E-05
COOL01E	Cooling tower 1 - fan vent E	0	0	0.0124	5.65E-05
COOL01F	Cooling tower 1 - fan vent F	0	0	0.0124	5.65E-05
COOL02A	Cooling tower 2 - fan vent A	0	0	0.0124	5.65E-05
COOL02B	Cooling tower 2 - fan vent B	0	0	0.0124	5.65E-05
COOL02C	Cooling tower 2 - fan vent C	0	0	0.0124	5.65E-05
COOL02D	Cooling tower 12- fan vent D	0	0	0.0124	5.65E-05
COOL02E	Cooling tower 2 - fan vent E	0	0	0.0124	5.65E-05
COOL02F	Cooling tower E - fan vent F	0	0	0.0124	5.65E-05
COOL03A	Cooling tower 3 - fan vent A	0	0	0.0124	5.65E-05
COOL03B	Cooling tower 3 - fan vent B	0	0	0.0124	5.65E-05
COOL03C	Cooling tower 3 - fan vent C	0	0	0.0124	5.65E-05
COOL03D	Cooling tower 3 - fan vent D	0	0	0.0124	5.65E-05
COOL03E	Cooling tower 3 - fan vent E	0	0	0.0124	5.65E-05
COOL03F	Cooling tower 3 - fan vent F	0	0	0.0124	5.65E-05
COOL04A	Cooling tower 4 - fan vent A	0	0	0.0546	2.50E-04
COOL04B	Cooling tower 4 - fan vent B	0	0	0.0546	2.50E-04
COOL05A	Cooling tower 5 - fan vent A	0	0	0.0546	2.50E-04
COOL05B	Cooling tower 5 - fan vent B	0	0	0.0546	2.50E-04
FS_01	Wet scrubber #1 -manufacturing emissions	0.0039	0.003	0.0021	0.0021
FS_02	Wet scrubber #2 - manufacturing emissions	0.0039	0.003	0.0021	0.0021
FS_03	Wet scrubber #3 - manufacturing emissions	0.0039	0.003	0.0021[i]	0.0021[i]
VOC01	VOC Abatement Unit #1	0.20	0.17	0.0153	0.015
VOC02	VOC Abatement Unit #2	0.20	0.17	0.0153	0.015
MAU5BPT	Makeup air unit #5b -Ventilation Stack	0.44	0.37	0.0335	0.034
MAU5B_01	Makeup air unit #5b -Loading Bay Fugitives #1	0.037	0.031	0.0028	0.0028
MAU5B_02	Makeup air unit #5b -Loading Bay Fugitives #2	0.037	0.031	0.0028	0.0028
MAU5B_03	Makeup air unit #5b -Loading Bay Fugitives #3	0.074	0.062	0.0056	0.0056

a. Nitrogen oxides.
b. Pounds per hour.
c. Carbon monoxide.
d. Particulate matter with a mean aerodynamic diameter of 10 microns or less.
e. Particulate matter with a mean aerodynamic diameter of 2.5 microns or less.
f. Emergency electrical generator engines are exempted from 1-hour NO_2 SIL and NAAQS modeling per DEQ policy[5].
g. Emergency engines were modeled for CO emissions for 24 hours per day of testing and maintenance operation at maximum requested capacity.
h. Emergency engines were limited to 8 hours per day of testing and maintenance operation for particulates.
i. Particulate forming acids emissions were modeled from the wet scrubber stack with the maximum ambient impact at an emissions rate of 0.0264 lb/hr.

Table 8. ON SEMICONDUCTOR ANNUAL CRITERIA POLLUTANT EMISSIONS RATES – CONTROLLED EMISSION SCENARIO

Emissions Point	Description	NO_x[a] (lb/hr)[b]	$PM_{2.5}$[c] (lb/hr)
BOI01	Boiler 1 - 8.37 MMBtu/hr Kewanee boiler – Low NOx	0.091	0.0477
BOI02	Boiler 2 - 8.37 MMBtu/hr Kewanee boiler – Low NOx	0.091	0.0477
BOI03	Boiler 3 - 8.17 MM Btu/hr Cleaver Brooks boiler	0.91	0.059
BOI04	Boiler 4 - 8.37 MMBtu/hr Kewanee boiler- Low NOx	0.091	0.047709
HEAT	0.075 MMBtu/hr hot water heater	0.0074	5.60E-04
GEN02_S1	Generator engine #2 stack #1 - Cummins 1,112 kW	0.13[d]	0.0019[d]
GEN02_S2	Generator engine #2 stack #2 - Cummins 1,112 kW	0.13[d]	0.0019[d]
GEN03_S1	Generator engine #3 stack #1 - Cummins 1,655 kW	0.24[d]	0.0031[d]
GEN03_S2	Generator engine #3 stack #2 - Cummins 1,655 kW	0.24[d]	0.0031[d]
COOL01A	Cooling tower 1 - fan vent A	0	5.65E-05
COOL01B	Cooling tower 1 - fan vent B	0	5.65E-05
COOL01C	Cooling tower 1 - fan vent C	0	5.65E-05
COOL01D	Cooling tower 1 - fan vent D	0	5.65E-05
COOL01E	Cooling tower 1 - fan vent E	0	5.65E-05
COOL01F	Cooling tower 1 - fan vent F	0	5.65E-05
COOL02A	Cooling tower 2 - fan vent A	0	5.65E-05
COOL02B	Cooling tower 2 - fan vent B	0	5.65E-05
COOL02C	Cooling tower 2 - fan vent C	0	5.65E-05
COOL02D	Cooling tower 12- fan vent D	0	5.65E-05
COOL02E	Cooling tower 2 - fan vent E	0	5.65E-05
COOL02F	Cooling tower E - fan vent F	0	5.65E-05
COOL03A	Cooling tower 3 - fan vent A	0	5.65E-05
COOL03B	Cooling tower 3 - fan vent B	0	5.65E-05
COOL03C	Cooling tower 3 - fan vent C	0	5.65E-05
COOL03D	Cooling tower 3 - fan vent D	0	5.65E-05
COOL03E	Cooling tower 3 - fan vent E	0	5.65E-05
COOL03F	Cooling tower 3 - fan vent F	0	5.65E-05
COOL04A	Cooling tower 4 - fan vent A	0	2.50E-04
COOL04B	Cooling tower 4 - fan vent B	0	2.50E-04
COOL05A	Cooling tower 5 - fan vent A	0	2.50E-04
COOL05B	Cooling tower 5 - fan vent B	0	2.50E-04
FS_01	Wet scrubber #1 -manufacturing emissions	0.0039	2.08E-03[e]
FS_02	Wet scrubber #2 - manufacturing emissions	0.0039	2.08E-03
FS_03	Wet scrubber #3 - manufacturing emissions	0.0039	0.0021
VOC01	VOC Abatement Unit #1	0.20	0.0153
VOC02	VOC Abatement Unit #2	0.20	0.0153
MAU5BPT	Makeup air unit #5b -Ventilation Stack	0.44	0.0335
MAU5B_01	Makeup air unit #5b -Loading Bay Fugitives #1	0.037	0.0028
MAU5B_02	Makeup air unit #5b -Loading Bay Fugitives #2	0.037	0.0028
MAU5B_03	Makeup air unit #5b -Loading Bay Fugitives #3	0.074	0.0056

[a] Nitrogen oxides.
[b] Pounds per hour.
[c] Particulate matter with a mean aerodynamic diameter of 2.5 microns or less.
[d] Emergency engine was limited to 100 hours per year for baseline actual emissions plus operational variability.
[e] Particulate forming acids emissions were modeled from the wet scrubber stack with the maximum ambient impact at an emissions rate of 0.0114 lb/hr.

Table 9. ON SEMICONDUCTOR SHORT-TERM CRITERIA POLLUTANT EMISSIONS RATES-UNCONTROLLED EMISSION SCENARIO

Emissions Point	Description	NO_x[a] (lb/hr)[b]	CO[c] (lb/hr)	PM_{10}[d] (lb/hr)	$PM_{2.5}$[e] (lb/hr)
BOI01	Boiler 1 - 8.37 MMBtu/hr Kewanee boiler – Low NOx	0.091	0.619	0.0636	0.0477
BOI02	Boiler 2 - 8.37 MMBtu/hr Kewanee boiler – Low NOx	0.091	0.619	0.0636	0.0477
BOI03	Boiler 3 - 8.17 MM Btu/hr Cleaver Brooks boiler	0.912	0.590	0.0590	0.0590
BOI04	Boiler 4 - 8.37 MMBtu/hr Kewanee boiler- Low NOx	0.091	0.619	0.0636	0.0477
HEAT	0.075 MMBtu/hr hot water heater	0.0074	0.0062	0.0006	5.60E-04
GEN02_S1	Generator engine #2 stack #1 - Cummins 1,112 kW	0[f]	2.46[g]	0.0547[h]	0.0547[h]
GEN02_S2	Generator engine #2 stack #2 - Cummins 1,112 kW	0[f]	2.46[g]	0.0547[h]	0.0547[h]
GEN03_S1	Generator engine #3 stack #1 - Cummins 1,655 kW	0[f]	3.18[g]	0.0897[h]	0.0897[h]
GEN03_S2	Generator engine #3 stack #2 - Cummins 1,655 kW	0[f]	3.18[g]	0.0897[h]	0.0897[h]
COOL01A	Cooling tower 1 - fan vent A	0	0	0.0124	5.65E-05
COOL01B	Cooling tower 1 - fan vent B	0	0	0.0124	5.65E-05
COOL01C	Cooling tower 1 - fan vent C	0	0	0.0124	5.65E-05
COOL01D	Cooling tower 1 - fan vent D	0	0	0.0124	5.65E-05
COOL01E	Cooling tower 1 - fan vent E	0	0	0.0124	5.65E-05
COOL01F	Cooling tower 1 - fan vent F	0	0	0.0124	5.65E-05
COOL02A	Cooling tower 2 - fan vent A	0	0	0.0124	5.65E-05
COOL02B	Cooling tower 2 - fan vent B	0	0	0.0124	5.65E-05
COOL02C	Cooling tower 2 - fan vent C	0	0	0.0124	5.65E-05
COOL02D	Cooling tower 12- fan vent D	0	0	0.0124	5.65E-05
COOL02E	Cooling tower 2 - fan vent E	0	0	0.0124	5.65E-05
COOL02F	Cooling tower E - fan vent F	0	0	0.0124	5.65E-05
COOL03A	Cooling tower 3 - fan vent A	0	0	0.0124	5.65E-05
COOL03B	Cooling tower 3 - fan vent B	0	0	0.0124	5.65E-05
COOL03C	Cooling tower 3 - fan vent C	0	0	0.0124	5.65E-05
COOL03D	Cooling tower 3 - fan vent D	0	0	0.0124	5.65E-05
COOL03E	Cooling tower 3 - fan vent E	0	0	0.0124	5.65E-05
COOL03F	Cooling tower 3 - fan vent F	0	0	0.0124	5.65E-05
COOL04A	Cooling tower 4 - fan vent A	0	0	0.0546	2.50E-04
COOL04B	Cooling tower 4 - fan vent B	0	0	0.0546	2.50E-04
COOL05A	Cooling tower 5 - fan vent A	0	0	0.0546	2.50E-04
COOL05B	Cooling tower 5 - fan vent B	0	0	0.0546	2.50E-04
FS_01	Wet scrubber #1 -manufacturing emissions	0.0039	0.0033	0.0021	0.0021
FS_02	Wet scrubber #2 - manufacturing emissions	0.0039	0.0033	0.0021	0.0021
FS_03	Wet scrubber #3 - manufacturing emissions	0.0039	0.0033	0.0021[i]	0.0021[i]
VOC01	VOC Abatement Unit #1	0	0	0	0
VOC02	VOC Abatement Unit #2	0	0	0	0
MAU5BPT	Makeup air unit #5B -Ventilation Stack	0.44	0.371	0.0335	0.0335
MAU5B_01	Makeup air unit #5B -Loading Bay Fugitives #1	0.037	0.0309	0.0028	0.0028
MAU5B_02	Makeup air unit #5B -Loading Bay Fugitives #2	0.037	0.0309	0.0028	0.0028
MAU5B_03	Makeup air unit #5B -Loading Bay Fugitives #3	0.074	0.0618	0.0056	0.0056

a. Nitrogen oxides.
b. Pounds per hour.
c. Carbon monoxide.
d. Particulate matter with a mean aerodynamic diameter of 10 microns or less.
e. Particulate matter with a mean aerodynamic diameter of 2.5 microns or less.
f. Emergency engines are exempted from 1-hour NO_2 SIL and NAAQS modeling per DEQ policy[5].
g. Emergency engines were modeled for CO emissions for 24 hours per day of testing and maintenance operation at maximum requested capacity.
h. Emergency engines were limited to 8 hours per day of testing and maintenance operation for particulates.
i. Particulate forming acids emissions were modeled from the wet scrubber stack with the maximum ambient impact at an emissions rate of 0.0264 lb/hr.

Table 10. ON SEMICONDUCTOR ANNUAL CRITERIA POLLUTANT EMISSIONS RATES – UNCONTROLLED EMISSION SCENARIO

Emissions Point	Description	NO_x[a] (lb/hr)[b]	$PM_{2.5}$[c] (lb/hr)
BOI01	Boiler 1 - 8.37 MMBtu/hr Kewanee boiler – Low NOx	0.091	0.0477
BOI02	Boiler 2 - 8.37 MMBtu/hr Kewanee boiler – Low NOx	0.091	0.0477
BOI03	Boiler 3 - 8.17 MM Btu/hr Cleaver Brooks boiler	0.912	0.0590
BOI04	Boiler 4 - 8.37 MMBtu/hr Kewanee boiler- Low NOx	0.091	0.0477
HEAT	0.075 MMBtu/hr hot water heater	0.0074	5.60E-04
GEN02_S1	Generator engine #2 stack #1 - Cummins 1,112 kW	0.126	0.0019
GEN02_S2	Generator engine #2 stack #2 - Cummins 1,112 kW	0.126	0.0019
GEN03_S1	Generator engine #3 stack #1 - Cummins 1,655 kW	0.237	0.0031
GEN03_S2	Generator engine #3 stack #2 - Cummins 1,655 kW	0.237	0.0031
COOL01A	Cooling tower 1 - fan vent A	0	5.65E-05
COOL01B	Cooling tower 1 - fan vent B	0	5.65E-05
COOL01C	Cooling tower 1 - fan vent C	0	5.65E-05
COOL01D	Cooling tower 1 - fan vent D	0	5.65E-05
COOL01E	Cooling tower 1 - fan vent E	0	5.65E-05
COOL01F	Cooling tower 1 - fan vent F	0	5.65E-05
COOL02A	Cooling tower 2 - fan vent A	0	5.65E-05
COOL02B	Cooling tower 2 - fan vent B	0	5.65E-05
COOL02C	Cooling tower 2 - fan vent C	0	5.65E-05
COOL02D	Cooling tower 12- fan vent D	0	5.65E-05
COOL02E	Cooling tower 2 - fan vent E	0	5.65E-05
COOL02F	Cooling tower E - fan vent F	0	5.65E-05
COOL03A	Cooling tower 3 - fan vent A	0	5.65E-05
COOL03B	Cooling tower 3 - fan vent B	0	5.65E-05
COOL03C	Cooling tower 3 - fan vent C	0	5.65E-05
COOL03D	Cooling tower 3 - fan vent D	0	5.65E-05
COOL03E	Cooling tower 3 - fan vent E	0	5.65E-05
COOL03F	Cooling tower 3 - fan vent F	0	5.65E-05
COOL04A	Cooling tower 4 - fan vent A	0	2.50E-04
COOL04B	Cooling tower 4 - fan vent B	0	2.50E-04
COOL05A	Cooling tower 5 - fan vent A	0	2.50E-04
COOL05B	Cooling tower 5 - fan vent B	0	2.50E-04
FS_01	Wet scrubber #1 -manufacturing emissions	0.0039	0.0021[e]
FS_02	Wet scrubber #2 - manufacturing emissions	0.0039	0.0021
FS_03	Wet scrubber #3 - manufacturing emissions	0.0039	0.0021
VOC01	VOC Abatement Unit #1	0	0
VOC02	VOC Abatement Unit #2	0	0
MAU5BPT	Makeup air unit #5B -Ventilation Stack	0.441	0.0335
MAU5B_01	Makeup air unit #5B -Loading Bay Fugitives #1	0.037	0.0028
MAU5B_02	Makeup air unit #5B -Loading Bay Fugitives #2	0.037	0.0028
MAU5B_03	Makeup air unit #5B -Loading Bay Fugitives #3	0.074	0.0056

[a] Nitrogen oxides.
[b] Pounds per hour.
[c] Particulate matter with a mean aerodynamic diameter of 2.5 microns or less.
[d] Emergency engines were limited to 100 hours per year of operation for testing and maintenance.
[e] Particulate forming acids emissions were modeled from the wet scrubber stack with the maximum ambient impact at an emissions rate of 0.0114 lb/hr.

The hourly emissions listed below in Table 11 for the annual FEC limitations were modeled for 8,760 hours per year. Increased emissions above the potential to emit established using baseline actual emissions and operational variability emissions for the FEC were reflected in increased emissions rates for Boiler 3 (BOI03), Emergency Generator Engine 2 Stack 2 (GEN02_S2), Wet Scrubber 3 (FS_03), and VOC Abatement Unit 1 (VOC01) (highlighted in bold in Table 11).

Table 11. FACILITY EMISSION CAP ANNUAL AVERAGE CRITERIA POLLUTANT EMISSIONS RATES – CONTROLLED EMISSION SCENARIO

Emissions Point	Description	NO_x[a] (lb/hr)[b]	$PM_{2.5}$[c] (lb/hr)
BOI01	Boiler 1 - 8.37 MMBtu/hr Kewannee boiler	0.091	0.048
BOI02	Boiler 2 - 8.37 MMBtu/hr Kewannee boiler	0.091	0.048
BOI03	Boiler 3 - 8.17 MM Btu/hr Cleaver Brooks boiler	2.441	0.188
BOI04	Boiler 4 - 8.37 MMBtu/hr Kewannee boiler	0.091	0.048
HEAT	0.075 MMBtu/hr hot water heater	0.017	9.16E-04
GEN02_S1	Generator engine #2 stack #1 - Cummins 1,112 kW	0.126	0.0019
GEN02_S2	Generator engine #2 stack #2 - Cummins 1,112 kW	1.064	0.0091
GEN03_S1	Generator engine #3 stack #1 - Cummins 1,655 kW	0.237	0.0031
GEN03_S2	Generator engine #3 stack #2 - Cummins 1,655 kW	0.237	0.0031
COOL01A	Cooling tower 1 - fan vent A	0	5.64E-05
COOL01B	Cooling tower 1 - fan vent B	0	5.64E-05
COOL01C	Cooling tower 1 - fan vent C	0	5.64E-05
COOL01D	Cooling tower 1 - fan vent D	0	0.0013
COOL01E	Cooling tower 1 - fan vent E	0	5.64E-05
COOL01F	Cooling tower 1 - fan vent F	0	5.64E-05
COOL02A	Cooling tower 2 - fan vent A	0	5.64E-05
COOL02B	Cooling tower 2 - fan vent B	0	5.64E-05
COOL02C	Cooling tower 2 - fan vent C	0	5.64E-05
COOL02D	Cooling tower 12- fan vent D	0	5.64E-05
COOL02E	Cooling tower 2 - fan vent E	0	5.64E-05
COOL02	Cooling tower E - fan vent F	0	5.64E-05
COOL03A	Cooling tower 3 - fan vent A	0	5.64E-05
COOL03B	Cooling tower 3 - fan vent B	0	5.64E-05
COOL03C	Cooling tower 3 - fan vent C	0	5.64E-05
COOL03D	Cooling tower 3 - fan vent D	0	5.64E-05
COOL03E	Cooling tower 3 - fan vent E	0	5.64E-05
COOL03F	Cooling tower 3 - fan vent F	0	5.64E-05
COOL04A	Cooling tower 4 - fan vent A	0	2.50E-04
COOL04B	Cooling tower 4 - fan vent B	0	2.50E-04
COOL05A	Cooling tower 5 - fan vent A	0	2.50E-04
COOL05B	Cooling tower 5 - fan vent B	0	2.50E-04
FS_01	Wet scrubber #1 -manufacturing emissions	0.0039	0.0021
FS_02	Wet scrubber #2 - manufacturing emissions	0.0039	0.0021
FS_03	**Wet scrubber #3 - manufacturing emissions**	**0.019**	**0.0061**
VOC01	**VOC Abatement Unit #1**	**0.724**	**0**
MAU5BPT	Makeup air unit #5b -Ventilation Stack	0.441	0.0335
MAU5B_01	Makeup air unit #5b -Loading Bay Fugitives #1	0.037	0.0028
MAU5B_02	Makeup air unit #5b -Loading Bay Fugitives #2	0.037	0.0028
MAU5B_03	Makeup air unit #5b -Loading Bay Fugitives #3	0.074	0.0056

a. Nitrogen oxides.
b. Pounds per hour.
c. Particulate matter with a mean aerodynamic diameter of 2.5 microns or less.

3.9.2 Criteria Pollutant Emissions Rates for Nearby Source – TASCO - Nampa

Table 13 lists the criteria pollutant continuous (24 hours per day) emissions rates for the nearby TASCO source used to evaluate NAAQS compliance for standards with averaging periods of 24 hours or less. Table 14 lists TASCO's criteria pollutant continuous (8,760 hours/year) emissions rates used to evaluate NAAQS compliance for standards with an annual averaging period except where noted.

CH2M developed the hourly modeled emission rates for TASCO from the 2014 NEI spreadsheet provided by DEQ's Emissions Inventory Group to the DEQ modeling group. This inventory contained actual annual emissions rates for CO, total NOx, filterable PM_{10}, filterable $PM_{2.5}$, SO_2, and VOCs. The hourly and annual total NOx emissions rates are of concern for this project. Annual emissions in units of tons per year for each point or area source at the facility are documented in the 2014 NEI. Actual annual operating hours for each seasonal period and a seasonal activity percentage for each season (compared to the percentage total activity) allowed CH2M to estimate hourly emission rates. DEQ did not extensively review the derivation of the emission rates modeled by CH2M for TASCO's sources.

Table 12 lists the AERMOD seasonal operational factors were applied to certain sources. These TASCO sources were modeled at the full hourly emission rates listed in Tables 13 and 14 below only during the seasons listed. No emissions were modeled in the other seasons. Any TASCO emissions source not listed in Table 12 was modeled as operating continuously throughout the entire year.

Table 12. Seasonal Operational Factors for TASCO Sources

Model ID	Source Description	Seasons Modeled
40	Union Boiler	Fall, Winter
95	Lime Kiln A/B	Fall, Winter
220	Lime Kiln Building Material Handling	Fall, Winter
250	Pellet Mill Cooler System	Fall, Winter
270	A&B Process Slakers	Fall, Winter
400	Facility Fugitives	Summer, Fall, Winter
410	Carbonation Vent	Fall, Winter

The factors accounted for fall and winter season operations covering September through February at the listed emission rates and During March through August these sources were not modeled as operating, and AERMOD assigned an emission rate of 0.0 lb/hr for these sources. This approach is backed by TASCO's emissions inventory that accounts for seasonal operation of some sources. The combined stack for B&W Boilers 1 and 2 and the Riley Boiler (model ID 30) was assumed to operate continuously at the listed emission rates.

Table 13. TASCO CO-CONTRIBUTING SOURCE SHORT-TERM EMISSIONS RATES

Emissions Point	Description	NO_x[a] (lb/hr)[b]	CO[c] (lb/hr)	$PM_{2.5}$[d] (lb/hr)	PM_{10}[e] (lb/hr)
30	Combined Stack for B&W Boilers 1&2, and Riley Boiler	339.11[f]	11.55[f]	26.77[f]	53.84[f]
40	Union Boiler	4.06[f]	3.41[g]	0.44[g]	0.88[g]
95	Lime Kilns A and B	6.03[g]	239.13[g]	0.19[g]	0.39[g]
220	Lime Kiln Building Material Handling	0	0	0.16[g]	0.28[g]
250	Pellet Mill Cooler System	0	0	0.18[g]	0.37[g]
270	A&B Process Slakers	0	0	0.46[g]	0.91[g]
310	Drying Granulator	0	0	0.35[f]	0.88[f]

Table 13. TASCO CO-CONTRIBUTING SOURCE SHORT-TERM EMISSIONS RATES					
Emissions Point	Description	NO_x[a] (lb/hr)[b]	CO[c] (lb/hr)	$PM_{2.5}$[d] (lb/hr)	PM_{10}[e] (lb/hr)
320	Cooling Granulator #1	0	0	0.09[f]	0.16[f]
330	Cooling Granulator #2	0	0	0.09[f]	0.16[f]
340	Process #2 Bag	0	0	0.06[f]	0.11[f]
360	Specialties Sugar Handling	0	0	0.03[f]	0.07[f]
370	Packaging Line	0	0	0.02[f]	0.05[f]
400A	Facility Fugitives	0	0	0.32[h]	2.99[i]
410	Main Mill Kiln Process Exhaust Carbonation Vent	19.81[f]	717.21[f]	0	0

a. Nitrogen oxides.
b. Pounds per hour.
c. Carbon monoxide.
d. Particulate matter with an aerodynamic diameter of 2.5 microns or less.
e. Particulate matter with an aerodynamic diameter of 10 microns or less.
f. Source modeled continuously at this emissions rate.
g. Source modeled at this emission rate during fall and winter seasons. Nonoperational (0.0 lb/hr of emissions) during spring and summer seasons.
h. The facility fugitive source was actually modeled at this emissions rate for fall, winter, and spring seasons and was nonoperational for the summer season rather than just fall and winter seasons as described in the model report at an emission rate of 0.52 lb/hr of $PM_{2.5}$. Ambient impacts will be appropriately assessed using the actual modeled method.
i. The facility fugitive particulate matter emission source was modeled at the hourly emissions rate for fall, winter, and spring seasons and was nonoperational for the summer season, rather than just fall and winter seasons as described in the model report. The actual modeled approach is conservative.

Table 14. TASCO ANNUAL AVERAGE EMISSIONS RATES			
Emissions Point	Description	NO_x[a] (lb/hr)[b]	$PM_{2.5}$ (lb/hr)
030	B&W Boilers 1 &2, and Riley Boiler Combined Stack	219.74[c]	16.47[c]
040	Union Boiler	2.58[d]	0.28[d]
095	Lime Kilns A and B	2.37[d]	0.078[d]
220	Lime Kiln Building Material Handling	0	0.062[d]
250	Pellet Mill Cooler System	0	0.071[d]
270	A&B Process Slakers	0	0.18[d]
310	Drying Granulator	0	0.33[c]
320	Cooling Granulator #1	0	0.087[c]
330	Cooling Granulator #2	0	0.087[c]
340	Process #2 Bag	0	0.053[c]
360	Specialties Sugar Handling	0	0.032[c]
370	Packaging Line	0	0.023[c]
400A	Facility Fugitives	0	2.50[e]
410	Main Mill Kiln Process Exhaust Carbonation Vent	7.79[d]	0

a. Nitrogen oxides.
b. Pounds per hour.
c. Source modeled continuously.
d. Source modeled at this emission rate during fall and winter seasons. Nonoperational (0.0 lb/hr of emissions) during spring and summer seasons.
e. The facility fugitive particulate matter emission source was modeled at the hourly emissions rate for fall, winter, and spring seasons and was nonoperational for the summer season, rather than just fall and winter seasons as described in the model report. The actual modeled approach is conservative.

3.9.3 Toxic Air Pollutant Emissions

The increase in emissions from the proposed project are required to demonstrate compliance with the toxic air pollutant (TAP) increments, with an ambient impact analyses required for any TAP having a requested potential emission rate that exceeds the screening emissions level (EL) specified by Idaho

Air Rules Section 585 or 586. Review of the TAPs emissions inventory is the responsibility of the permit writer/project manager.

Hydrogen Peroxide and Acids TAPs Facility Draft Review Changes

ON Semiconductor provided comments regarding emissions rates of acid TAPs and hydrogen peroxide that are used in the manufacturing process. These changes affected the FEC project's emissions inventory and ambient impact analyses, and included the following:

- Phosphoric acid emissions are always controlled by one or more of the wet scrubbers (model IDs FS-01, FS-02, and/or FS-03). Phosphoric acid emissions are not routed to the VOC abatement units controlled or uncontrolled bypass stacks.
- A 99% control efficiency for post-collection and recovery phosphoric acid emissions was assumed to calculate controlled emissions.
- All acid gases and hydrogen peroxide emissions used in the manufacturing process were reduced by 90% to account for wastewater collection and recovery practices which limits the amount of emissions routed to the scrubbers to 10% of the total chemical usage.
- Corrections were made to the emissions inventory calculations for phosphoric acid and hydrogen peroxide to correct the maximum baseline monthly usage, which is used to estimate the baseline actual and operational variability average hourly emissions rates that are compared to TAP screening emission rate limits in Sections 585 and 586 of the Idaho Air Rules.

The final emissions rates used to demonstrate compliance with the TAPs screening emissions rate limits are listed in Table 15. All manufacturing process acids and hydrogen peroxide emissions at the listed average hourly emission rates were below screening emission rate limits for non-carcinogenic TAPs.

Table 15. FINAL MANUFACTURING PROCESS TAPs EMISSIONS

Noncarcinogenic TAP[a]	CAS[b] Number	Controlled Emission Rate[c]	Section 585 Screening Emission Level	Modeling Required?
Hydrogen peroxide	7722-84-1	1.96E-02	0.1	No
Phosphoric acid	7664-38-2	5.03E-03	0.067	No
Acetic acid	64-19-7	3.21E-08	1.67	No
Nitric acid	7697-37-2	1.73E-03	0.333	No
Hydrochloric Acid (Hydrogen chloride)	7647-01-0	1.5E-07	0.05	No

a. Toxic air pollutant.
b. Chemical Abstract Service.
c. Baseline actual emissions plus operational variability emissions reflecting reductions due to pollution control equipment and practices.

ON Semiconductor modeled five TAPs with emission rates that exceeded the screening emission rate limits (ELs) specified in Sections 585 and 586 of the Idaho *Air Rules*.

The hourly TAPs emission rates listed in Table 16 were modeled for 8,760 hours per year for Section 586 TAPs and for 24 hours per day for the Section 585 TAPs. The controlled and uncontrolled scenarios for VOC abatement units and wet scrubbers that exhaust manufacturing process emissions are independent operating scenarios.

ON Semiconductor applied a Chi/Q (χ/Q) method of demonstrating compliance with the TAPs increments. The χ/Q method consists of modeling each emissions point with the appropriate release parameters and a one pound per hour emission rate. The worst-case ambient impact for each source type was then selected to use in establishing ambient impacts. For example, there were three acid gas scrubbers evaluated for χ/Q impacts and only one scrubber unit is selected and the maximum impact for both the annual and 24-hour averaging periods is used for this project's current and future compliance evaluations. There were six different source types with unique χ/Q design values: boilers, the water heater, emissions control scrubbers, VOC abatement unit controlled, VOC abatement unit bypass, and makeup air unit 5B.

The average hourly emission rate presented by CH2M and ON Semiconductor for the 24-hour average non-carcinogenic compounds and annual average carcinogenic compounds were summed for each source type and multiplied by the appropriate χ/Q unit emission rate design impact. Each source group's impacts were summed to obtain a facility-wide TAPs impact to compare against the allowable non-carcinogenic and carcinogenic increments.

Controlled and uncontrolled operating scenarios were evaluated independently. The TAPs emissions inventories for the uncontrolled and controlled scenarios were unique, and required separate compliance demonstrations. The controlled scenario accounts for VOCs (including VOCs which are TAPs) emissions being reduced by thermal oxidation in either or both of the VOC abatement units. For the alternative uncontrolled scenario, the VOCs and VOCs which are TAPs are transported through either or both VOC abatement units' exhaust systems, but the VOC abatement control devices are bypassed and the uncontrolled emissions are exhausted out of bypass stacks. The bypass stacks have different locations, release heights, and diameters than the VOC abatement controlled stacks, so the χ/Q unit emission rate impact is different than the controlled χ/Q impact.

DEQ's review concluded that the appropriate 24-hour and annual χ/Q source-specific impacts were presented in the application. The permit writer-approved emissions inventory was used with the χ/Q impacts to demonstrate compliance with TAPs increments as listed below in Tables 27 and 28.

Table 16. TOXIC AIR POLLUTANT EMISSIONS RATES

Source Group	Aggregated TAP Emissions for Each Source Group				
	Annual average[a]				
	Formaldehyde (lb/hr)[b]	1,4-Dioxane (lb/hr)	Arsenic (lb/hr)	Cadmium (lb/hr)	Nickel (lb/hr)
Boilers	2.45E-03	0[d]	6.52E-06	3.59E-05	6.85E-05
Water Heater	5.52E-06	0	1.47E-08	8.10E-08	1.55E-07
VOC[c] Abatement Units – Controlled	3.03E-04	1.03E-04	8.08E-07	4.44E-06	8.48E-06
Makeup Air Unit 5B	4.41E-04	0	1.18E-06	6.47E-06	1.24E-05
Process Scrubbers – Uncontrolled	8.82E-06	0	2.35E-08	1.29E-07	2.47E-07
VOC Abatement Units - Uncontrolled	0	6.85E-03	0	0	0

a. Carcinogenic TAPs are regulated under Section 586 of the Idaho Air Rules with an annual averaging period (8,760 hours per year).
b. Pounds per hour.
c. Volatile organic compounds.
d. Where "0" is entered, the emissions unit(s) has/have zero or negligible quantifiable emissions of this regulated air pollutant.

3.10 Emission Release Parameters

Table 17 lists the point source emissions release parameters for modeled sources for the ON Semiconductor facility. Table 18 lists the elevated volume source release parameters for the ON Semiconductor facility that were used to represent fugitive emission sources. Tables 19 and 20 list the release parameters for modeled sources for the co-contributing TASCO facility.

Table 17. POINT SOURCE EMISSIONS RELEASE PARAMETERS									
Release Point	Description	UTM[a] Coordinates		Stack Base Elevation (m)	Stack Height (m)	Stack Gas Temp (K)[c]	Stack Flow Velocity (m/s)[d]	Modeled Diameter (m)	Stack Release Type
		Easting (m)[b]	Northing (m)						
BOI01	Boiler 1 – Kewanee w/Low NOx Burner	537,537.85	4,827,153.53	778.21	13.4	477.59	5.67	0.55	Raincap
BOI02	Boiler 2 – Kewanee w/Low NOx Burner	537,539.68	4,827,151.91	778.21	13.4	477.59	5.67	0.55	Raincap
BOI03	Boiler 4 – Cleaver Brooks	537,543.25	4,827,148.34	778.21	13.4	393.71	7.95	0.41	Raincap
BOI04	Boiler 3 – Kewanee w/Low NOx Burner	537,544.85	4,827,146.7	778.21	13.4	477.59	5.67	0.55	Raincap
HEAT	Water Heater	537,549.3	4,827,138.2	778.21	14.17	294.26	1.37	0.1	Raincap
GEN02_S1	Emergency Generator 2 – Stack 1	537,559.39	4,827,110.46	777.72	3.66	753.71	50	0.152	Default[e]
GEN02_S2	Emergency Generator 2 – Stack 2	537,559.83	4,827,109.85	777.72	3.66	753.71	50	0.152	Default
GEN03_S1	Emergency Generator 3 – Stack 1	537,554.39	4,827,105.46	777.62	3.66	735.93	50	0.152	Default
GEN03_S2	Emergency Generator 3 – Stack 2	537,554.87	4,827,104.85	777.62	3.66	735.93	50	0.152	Default
COOL01A	Cooling Tower 1 – Cell A	537,539.48	4,827,133.99	778.05	4.88	297.05	8.53	1.68	Default
COOL01B	Cooling Tower 1 – Cell B	537,537.32	4,827,131.84	778.05	4.88	297.05	8.53	1.68	Default
COOL01C	Cooling Tower 1 – Cell C	537,535.17	4,827,129.68	778.05	4.88	297.05	8.53	1.68	Default
COOL01D	Cooling Tower 1 – Cell D	537,540.77	4,827,132.7	778.05	4.88	297.05	8.53	1.68	Default
COOL01E	Cooling Tower 1 – Cell E	537,538.62	4,827,130.54	778.05	4.88	297.05	8.53	1.68	Default
COOL01F	Cooling Tower 1 – Cell F	537,536.43	4,827,128.13	778.05	4.88	297.05	8.53	1.68	Default
COOL02A	Cooling Tower 2 – Cell A	537,535.06	4,827,138.41	778.1	4.88	297.05	8.53	1.68	Default
COOL02B	Cooling Tower 2 – Cell B	537,532.91	4,827,136.25	778.1	4.88	297.05	8.53	1.68	Default
COOL02C	Cooling Tower 2 – Cell C	537,530.75	4,827,134.1	778.1	4.88	297.05	8.53	1.68	Default
COOL02D	Cooling Tower 2 – Cell D	537,536.36	4,827,137.11	778.1	4.88	297.05	8.53	1.68	Default
COOL02E	Cooling Tower 2 – Cell E	537,534.2	4,827,134.96	778.1	4.88	297.05	8.53	1.68	Default
COOL02F	Cooling Tower 2 – Cell F	537532.03	4,827,132.78	778.1	4.88	297.05	8.53	1.68	Default
COOL03A	Cooling Tower 3 – Cell A	537,530.65	4,827,142.82	778.14	4.88	297.05	8.53	1.68	Default
COOL03B	Cooling Tower 3 – Cell B	537,528.49	4,827,140.67	778.14	4.88	297.05	8.53	1.68	Default
COOL03C	Cooling Tower 3 – Cell C	537,526.34	4,827,138.51	778.14	4.88	297.05	8.53	1.68	Default
COOL03D	Cooling Tower 3 – Cell D	537,531.94	4,827,141.53	778.14	4.88	297.05	8.53	1.68	Default
COOL03E	Cooling Tower 3 – Cell E	537,529.79	4,8271,39.37	778.14	4.88	297.05	8.53	1.68	Default
COOL03F	Cooling Tower 3 – Cell F	537,527.35	4,827,136.95	778.14	4.88	297.05	8.53	1.68	Default
COOL04A	Cooling Tower 4 –	537,521.86	4,827,132.6	777.9	6.71	297.05	8.53	1.68	Default

Table 17. POINT SOURCE EMISSIONS RELEASE PARAMETERS									
Release Point	Description	UTM[a] Coordinates		Stack Base Elevation (m)	Stack Height (m)	Stack Gas Temp (K)[c]	Stack Flow Velocity (m/s)[d]	Modeled Diameter (m)	Stack Release Type
		Easting (m)[b]	Northing (m)						
	Cell A								
COOL04B	Cooling Tower 4 – Cell B	537,524.45	4,827,130.01	777.9	6.71	295.38	11.03	3.38	Default
COOL05A	Cooling Tower 5 – Cell A	537,529.47	4,827,124.98	777.86	6.71	295.38	11.03	3.38	Default
COOL05B	Cooling Tower 5 – Cell B	537,532.06	4,827,122.4	777.86	6.71	295.38	11.03	3.38	Default
FS_01	Wet scrubber #1 - manufacturing emissions	537,547.19	4,827,159.62	778.21	14.94	293.15	11.4	1.26	Default
FS_02	Wet scrubber #2 - manufacturing emissions	537,550.06	4,827,156.6	778.21	14.94	293.15	11.4	1.26	Default
FS_03	Wet scrubber #3 - manufacturing emissions	537,553.67	4,827,153.32	778.21	14.94	293.15	11.4	1.26	Default
VOC01	VOC Abatement Unit #1	537,595.10	4,827,115.14	777.83	3.66	304.26	28.4	0.41	Default
VOC02	VOC Abatement Unit #2	537,494.50	4,827,175.80	778.12	3.66	304.26	28.4	0.41	Default
VOC01_U	VOC Abatement Unit #1 - Uncontrolled	537,586.80	4,827,113.30	778.12	13.72	304.26	5.61	0.91	Default
VOC02_U	VOC Abatement Unit #2 -Uncontrolled	537,497.61	4,827,182.81	778.12	11.27	304.26	12.62	0.61	Default
MAU5BPT	Makeup air unit #5b - Ventilation Stack	537,510.08	4,827,199.46	778.81	9.83	0	7.321	0.573	Default

a. Universal Transverse Mercator, NAD83, Zone 11.
b. Meters.
c. Kelvin.
d. Meters per second.
e. Uninterrupted vertical release.

Table 18. VOLUME SOURCE EMISSIONS RELEASE PARAMETERS						
Release Point	Description	Universal Transverse Mercator Coordinates[a]		Release Height (meters)	Initial Horizontal Dimension (meters)	Initial Vertical Dimension (meters)
		Easting (x) (meters)	Northing (y) (meters)			
MAU 5B_01	MAU[b] combustion fugitives	537,524.14	4,827,196.2	4.2	1.42	3.87
MAU 5B_02	MAU[b] combustion fugitives	537,500.17	4,827,180.0	4.2	1.42	3.87
MAU 5B_03	MAU[b] combustion fugitives	537,510.5	4,827,170.8	4.2	1.42	3.87

a. NAD83 datum, Zone 11.
b. Makeup air unit.

DEQ's permitting policies and guidance require that each permit application have stand-alone documentation to support the appropriateness of release parameters used in the air impact analyses. ON Semiconductor's modeling report provided appropriate justification and documentation of assumptions and data supporting key release parameters used to model these point sources. Appendix C of the November 10, 2016 permit application contained manufacturer's data and specification sheets and CH2M's calculations for correcting exhaust volumetric flow rates to the actual release temperatures and atmospheric pressure at the Nampa site for flow rates CH2M stated as representative at standard temperature and pressure.

Boilers
Boilers 1, 2, and 4 (BOI01, BOI02, and BOI04) represented in the permit application and modeling report documentation had release parameters for a Cleaver-Brooks brand natural gas-fired boiler rated at 8.4 MMBtu/hr heat input with a natural gas fuel flow rate of 8.369 standard cubic feet per hour (scf/hr) in the Model LNEG-84/105 burner. These boilers are identified by ON Semiconductor as Kewanee brand boilers with Low NOx burners. Exhaust gas volumetric flow rate and exhaust release temperature listed on the specification sheet matched the modeled flow rate of 2,841 acfm and 400 degrees Fahrenheit (°F), or 477.6 Kelvin. The modeled stack exit diameter was 1.80 feet (or 21.7 inches) and the release height of 44 feet above grade, which is 9 feet above the building modeled roofline for each stack. The release heights and exit diameters were accepted based on CH2M's description of historical on-site verification of stack location and physical parameters.

Boiler 3 (BOI03) release parameters were supported in the application with a Cleaver-Brooks manufacturer specification sheet. The sheet noted that the correct rated heat input capacity at 100% load was 8.165 MMBtu/hr on natural gas instead of 7.9 MMBtu/hr. CH2M modeled an exhaust flow rate to 2,224 acfm and a release temperature of 249°F. These values were supported by the specification sheet data. A release height of 44 feet and an exit diameter of 16 inches were accepted based on CH2M's description of historical on-site verification of stack location and physical parameters.

Hot Water Heater
A manufacturer's specification sheet was supplied for the 0.075 MMBtu/hr natural gas-fired water heater. Exhaust flow rate and exit temperature data were not listed on the sheet. CH2M modeled the source with a stack temperature of 70°F (294.3 Kelvin) and an exhaust flow rate of 23 acfm. Based on the modeled exit diameter of 4 inches, the exit velocity was 1.37 m/s. The modeled release height of 46.5 feet above grade and the exit diameter of 4 inches were accepted based on CH2M's description of historical on-site verification of stack location and physical parameters.

Emergency Generators
The facility is equipped with two emergency electrical generator sets named Generator #2 and Generator #3. Both are fired on diesel and both engines are equipped with dual exhaust stacks.

The release parameters for Generator Engine #2 (GEN02_S1 and GEN02_S2) were supported in part by a Cummins manufacturer's specification sheet for a diesel-fired internal combustion engine rated at 1,350 bhp on standby service. The stack exit temperature of 897°F (or 753.7 Kelvin) was listed on this sheet, which matched the modeled exit temperature for each stack. The specification sheet listed a total engine flow rate of 6,945 cubic feet per minute at 100% load for standby operations. DEQ interpreted these units to be "actual" cubic feet per minute rather than "standard" cubic feet per minute and CH2M interpreted this to be in units of standard cubic feet per minute. Regardless, the modeled flow rate was 1,922.5 acfm for each for each of the two identical stacks, for a combined flow rate of 3,845 acfm, which is conservative compared to the manufacturer's specification sheet value. CH2M modeled this lower flow rate in response to DEQ's request for detailed justification for a stack exit velocity greater than 50 m/s. CH2M set each emergency generator engine exit velocity equal to 50 m/s according to the methods developed during the modeling protocol approval stage of the project. The modeled release height for each stack was 12 feet above grade and the exit diameter was 6 inches for each stack. The release heights and exit diameters were accepted based on CH2M's historical description that these values were determined by on-site verification of stack location and physical parameters by CH2M and ON Semiconductor staff.

Release parameters for Generator Engine #3 (GEN03_01and GEN03_02) followed the same methods as described above for Generator Engine #2. This diesel-fired Cummins engine is rated at 2,220 bhp at full load and will be limited to 75% load operation level during testing and maintenance and will produce 1,655 bhp at a 75% load level. The flow rate on the specification sheet at 75% load was listed as 8,950 cubic feet per minute and CH2M applied the 50 m/s exit velocity for each of the engine's two identical stacks. This engine is equipped with 6-inch diameter stacks, so applying the 50 m/s (164 feet per second) exit velocity yields the same 3,845 acfm modeled engine exhaust flow rate for both stacks combined so the modeled flow rate should be conservative compared to the manufacturer's specification sheet data. Modeled release heights were 12 feet above grade. The release heights and exit diameters were accepted based on CH2M's historical description that these values were determined by on-site verification of stack location and physical parameters by CH2M and ON Semiconductor staff.

MAU5BPT –Point Source

The release parameters were supported in the June 20, 2017, modeling report. A facility layout diagram showing the location of the material and chemical storage area exhaust fan included the 4,000 acfm flow rate.

Attachment 2 of the June 20, 2017 modeling report presented detailed verification of the actual flow rate exhausted by this point using in situ flow velocity measurements across the duct profiles. The two ducts that are routed to the MAU5BPT stack had a combined actual flow rate of 4,094 acfm. The modeled flow rate was 4,000 acfm which was supported in Attachment 3 of this modeling report with a Strobic Air Corporation specification sheet for this project. Note that there are two fan stacks in this design. One fan stack is used with the other nonoperational for backup use. The specification sheet listed a 4,000 acfm flow rate from the materials and chemical storage area conditioned space. The stack system's bypass vent and the additional stack top external stack tip treatment entrained flow rates were not included in the modeled flow rate. The exit temperature was assumed to be equal to the ambient temperature which is conservative for most periods, especially during night time periods. ON Semiconductor modeled this stack appropriately and the impacts did not apply a dispersion technique as defined in Section 512.01.c of the Idaho Air Rules. Stack release height was 7.7 feet above the modeled tier height representing roofline, and the modeled exit diameter was 22.6 inches. The release height and diameter values were accepted as accurate based on CH2M's past on-site release parameter inspection descriptions.

MAU5B_01, MAU5B_02, and MAU5B_03-Volume Sources

ON Semiconductor modeled a portion of the MAU5B air makeup unit emissions as three volume sources at the three loading dock doorways with release parameters estimated based on door locations, and approximate dimensions. Initial horizontal and vertical dimensions were identical for each doorway. Based on the values modeled and listed in the modeling report tables

An unscaled schematic depicted the locations of the loading bay doorways. A release height of 4.2 meters (13.8 feet) was used for the elevated volume sources. The method used by CH2M applied the entire height of the building to calculate the release height of the volume sources. Another more conservative method for open doorways uses the midpoint of the open doorway plus any height of the base of the doorway above grade elevation to establish the release height. Initial dispersion coefficients for the lateral and vertical directions followed methods established by EPA guidance and appropriately represented doorways of 20 feet in width and a structure 27 feet in height. DEQ accepted the modeled approach as appropriate for these analyses. DEQ acknowledged that the doorways were represented as continuously-emitting sources, which is a very conservative approach given the doors were not described as being left open to provide ventilation during normal operation of the building area. It is likely that these doors are open for periods of material transfer only. DEQ agrees the release parameters modeled are appropriate for the sources.

VOC Abatement Units
There are two VOC Abatement units at the facility designated VOC01 and VOC02. Each VOC abatement unit is equipped with three stacks. Two of the three stacks are designed to operate as bypass stacks which exhaust emissions uncontrolled. Of the two bypass stacks, only one is used for standard operations, the other is used for backup for maintenance or malfunction of the primary bypass stack. Only the primary bypass stack was included in the modeling analyses for each VOC abatement unit. A third stack exhausts emissions after being controlled by the abatement unit.

When the bypass stack is used the emissions are uncontrolled. Stack location, release height and diameter were field-verified by CH2M. Several sheets were included in the support documentation from the Munters Corporation for emissions control system equipped with a Zeol rotor concentrator with an internal incinerator.

The fan system for each unit consists of two independently operating fans, each rated at 7,000 scfm, based on the system maximum fan capacity of 14,000 scfm. The cover letter to the November 10, 2016 application provides a description of the VOC abatement unit operations. One fan operates for the bypass stack and the other fan operates for the controlled operations stack. The specification sheet listed a release temperature of 88°F. CH2M corrected the standard flow rates to 88°F and local atmospheric pressure for the modeled flow rates of 7,807 acfm for each controlled stack (model IDs VOC01 and VOC02) and uncontrolled stack (model IDs VOC01_U and VOC02_U). All modeled stack diameters and release heights were noted on the flow rate calculation and physical parameter sheets as being field-verified. VOC01 and VOC02 were each modeled with a flow rate of 7,944 acfm, VOC01_U was modeled with a flow rate of 7,731 acfm, and VOC02_U was modeled with a flow rate of 7,815 acfm. These values are close to CH2M's calculated value of 7,807 acfm and are valid for the ambient impact analyses.

VOC01 and VOC02 for controlled emissions were each modeled with a release height of 12 feet (or 3.66 meters) above grade and a stack diameter of 16 inches (0.41 meters) which matches the release parameter substantiation. VOC01_U and VOC02_U were modeled with 36 inch (0.91 meter) diameter stacks with release heights of 45 feet (13.7 meters) above grade for VOC01_U and 37 feet (11.3 meters) above grade for VOC02_U. The modeled stack height and diameter values matched the application's substantiation documentation, which was based on field-verified measurement by CH2M.

DEQ agrees the modeled controlled and uncontrolled VOC abatement unit stack release parameters were adequately supported.

Scrubber Units
There are three wet scrubbers (model IDs FS_01, FS_02, and FS_03) that control emissions from the fabrication processes. The units were modeled with identical release parameters except for location. CH2M verified stack location during field surveys. The field surveys produced measured stack exit diameters of 49.5 inches (1.26 meters) and release heights of 49 feet (14.9 meters) above grade which matched modeled values. A manufacturer's design schematic from Harrington also confirmed the exit diameter of 49.5 inches. The modeled exhaust flow rate of 30,120 acfm was supported by the value listed in the Harrington drawing and by multiple sheets which listed the 30,000 acfm inlet flow rate for specific acid gas and hydrogen peroxide control estimates. The exit temperature of the exhaust was assumed to be equal to the scrubbing media temperature of 68°F. All scrubber release parameters are adequately supported.

Thermal Processing Units
ON Semiconductor has installed a thermal processing unit (TPU) and proposes to install a second identical TPU. These units will control emissions of perfluorinated compounds on manufacturing processes and have an incineration and internal wet scrubbing system in each unit. Each unit has a heat input capacity of 60,000 Btu/hr of natural gas.

Each unit will emit exhaust through existing ventilation systems. When the facility operates in uncontrolled scenario, the TPU(s) will exhaust through the wet scrubber system (point source IDs FS_01, FS_02, and FS_03), and during controlled emissions operations, the TPU(s) will exhaust through the VOC abatement units (model IDs VOC01, and VOC02). The effect of the TPU unit exhaust stream on the exhaust streams for the scrubber stacks and VOC abatement units was not accounted for. EPA fuel conversion to exhaust F-Factor for natural gas combustion of 60,000 Btu/hr from the incinerator portion of each Edwards Kronis TPU would be approximately 637 wet standard cubic feet per minute (wscfm). This exhaust stream is run through the TPU scrubber unit which would likely cool the stream and potentially add moisture to the exhaust, with the resulting flow being less than 637 acfm. The lowest exhaust flow rate modeled for these emissions points was for the VOC abatement units, which were each modeled at 7,807 ACFM at 88°F, so the combined flow rate would be increased slightly, which should improve dispersion of the plume to some extent. DEQ concludes that ON Semiconductor used a conservative approach for the effects of the TPUs on the modeled flow rates and exit temperatures for the wet scrubber stacks and VOC abatement stacks.

Cooling Towers
Cooling towers 1, 2, and 3 are identical in design. Each unit is equipped with six cells designated "A" through "F". A Micron Technology mechanical systems specification sheet provided the overall design fan airflow for all six cells combined and the air exit temperature of 75°F (297.1 Kelvin). The specification sheet flow rate of 239,500 acfm was split evenly between the six cells, for 39,917 acfm per cell. ON Semiconductor modeled a flow rate of 40,065 acfm for each cell. This slight discrepancy was not explained but DEQ notes the difference will not cause any appreciable change in ambient impacts and accepts the modeled flow rates as adequately supported. Stack diameter is established using the fan diameter of each cell. Release height is determined using the cell height. CH2M determined the diameter of 5.5 feet and release height of 16 feet by field measurement.

Cooling towers 5 and 6 are each equipped with two cells, designated "A" and "B." The Micron Technology mechanical systems specification sheet listed the exit temperature of the airflow exiting the cooling tower cells at 72°F (295.4 Kelvin). Specification sheet airflow was listed as 418,800 acfm per tower, or 209,400 acfm per cell. Exit diameter the cooling tower point sources were set equal to each cell's fan diameter. CH2M documented the field measurements for the diameter as 11 feet (3.35 meters) and release height as 22 feet (6.7 meters) above grade.

DEQ agrees the cooling tower release parameters were adequately supported.

Co-contributing Emissions Source – TASCO Facility
The nearby TASCO facility was identified as a potential co-contributing source for inclusion in any applicable NAAQS analyses. Release parameters documented in the 2014 NEI were provided to CH2M for this project's ambient air impact analyses. DEQ did not further review the release parameters for the TASCO. DEQ determined the quality assurance and measures of the NEI process provided adequate justification and documentation of release parameters. The NEI data is collected by DEQ for the state's contribution to the national NEI databases maintained by EPA. The locations of the modeled TASCO emissions sources, as provided in the NEI data, appeared reasonably accurate and were accepted as submitted as appropriate for this project's analyses.

Table 19. TASCO POINT SOURCE EMISSIONS RELEASE PARAMETERS									
Release Point	Description	UTM[a] Coordinates, Zone 11		Stack Base Elevation (m)	Stack Height (m)	Modeled Diameter (m)	Stack Gas Temp (K)[c]	Stack Flow Velocity (m/s)[d]	Stack Release Type
		Easting (m)[b]	Northing (m)						
30	Riley Boiler	534,374	4,828,205	753.53	74.68	2.13	449.82	16.0	Default[e]
40	Union Boiler	534,345.67	4,828,220.41	753.43	20.12	1.22	435.93	7.7	Default
95	Lime Kiln A/B	534,311.11	4,828,192.46	753.55	24.99	0.91	352.59	10.1	Default
220	Lime Kiln Dust	534,311.1	4,828,195.79	753.53	24.08	0.76	305.37	5.1	Default
250	Pellet Cooler	534,372.69	4,828,302.73	753.36	1.83	1.19	305.37	14.7	Default
270	A & B Process Slakers	534,320.74	4,828,203.62	753.48	2.01	0.76	299.82	5.1	Default
310	Main Mill Vents	534,368.65	4,828,147.22	753.65	20.12	0.61	326.48	24.5	Default
320	Cooling Granulator #1	534,376.62	4,828,165.03	753.6	15.85	0.61	323.15	8.2	Default
330	Cooling Granulator #2	534,383.12	4,828,157.29	753.62	15.85	0.61	323.15	8.2	Default
340	Process #2 Bag	534,403.26	4,828,165.17	753.62	10.97	1.40	310.93	8.3	Default
360	Specialties Sugar Handling	534,413.68	4,828,178.55	753.65	9.14	1.07	310.93	4.1	Default
370	Packaging Line	534,424.92	4,828,189.71	753.7	7.92	0.49	310.93	30.3	Default
410	Carbonation Vent	534,299.04	4,828,185.74	753.59	32.92	1.01	355.37	6.7	Default

a. Universal Transverse Mercator.
b. Meters.
c. Kelvin.
d. Meters per second.
e. Default = vertical and uninterrupted.

Table 20. TASCO AREA SOURCE EMISSIONS RELEASE PARAMETERS							
Release Point	Description	Universal Transverse Mercator Coordinates[a]		Release Height (meters)	Initial Horizontal Dimension (meters)	Initial Vertical Dimension (meters)	Angle From North (degrees)
		Easting (x) (meters)	Northing (y) (meters)				
400A	Facility Fugitives	534,374.0	4,828,205.0	9.14	40.0	50.0	89

a. NAD83 datum, Zone 11.

4.0 Results for Air Impact Analyses

ON Semiconductor elected to demonstrate compliance for annual average NO_2 significant impacts level analyses (SIL) and NAAQS analyses using the Tier 1 NO_2 method with full conversion of NO to NO_2 assumed. This is the most conservative method and DEQ approval is not required. The Tier 2 Ambient Ratio Method 2 (Tier 2 ARM2) method was used for the 1-hour average NO_2 SIL and NAAQS analyses, using the default value of 0.5 for the minimum ambient ratio (ARM_MIN) value.

DEQ and ON Semiconductor determined that certain acids emitted from the wet scrubber control units must be considered as PM_{10} and $PM_{2.5}$ emissions. The SIL and cumulative impact analyses were not revised and re-run using the increased emission rates for the wet scrubbers (model IDs FS-01, FS-02, and FS-03). The method used to confirm compliance with the 24-hour and annual $PM_{2.5}$ and the 24-hour PM_{10} NAAQS is discussed in Section 4.2 of this memorandum.

4.1 Results for Significant Impact Analyses

Tables 21 and 22 provide results for the significant impacts level analyses (SIL) analyses for the controlled emissions scenario and the uncontrolled emissions operating scenario, respectively.

Table 21. RESULTS FOR SIGNIFICANT IMPACT ANALYSES-CONTROLLED SCENARIO				
Pollutant	**Averaging Period**	**Modeled Design Value Concentration ($\mu g/m^3$)[a]**	**SIL[b] ($\mu g/m^3$)**	**Percent of SIL**
$PM_{2.5}$[c]	24-hour	10.068[g]	1.2	839%
	Annual	1.353[h]	0.3	451%
PM_{10}[d]	24-hour	23.40[i]	5.0	468%
NO_2[e]	1-hour	127.66[j]	7.5	1,702%
	Annual	15.390[k]	1.0	1,539%
CO[f]	1-hour	1453.2[l]	2,000	73%
	8-hour	527.0[m]	500	105%

a. Micrograms per cubic meter.
b. Significant impact level.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
e. Nitrogen dioxide.
f. Carbon Monoxide.
g. Modeled design value is the maximum 5-year mean of highest 24-hour values from each year of a 5-year meteorological dataset.
h. Modeled design value is the maximum 5-year mean of annual average values from each year of a 5-year meteorological dataset.
i. Modeled design value is the maximum of highest 24-hour values from a 5-year meteorological dataset, or the maximum of 24-hour value from five individual years of meteorological data.
j. Modeled design value is the maximum 5-year mean of maximum 1[st] highest daily 1-hour maximum impacts for each year of a 5-year meteorological dataset. The SIL compliance design value was calculated assuming complete conversion of total NO_x to NO_2.
k. Modeled design value is the maximum annual impact of the individual years of a 5-year meteorological dataset. Complete conversion of NO_x to NO_2 was assumed.
l. Modeled design value is the maximum of first highest ambient concentrations at each receptor from any of 5 individual years of meteorological data.
m. Modeled design value is the maximum of first highest ambient concentrations at each receptor from any of 5 individual years of meteorological data.

Table 22. RESULTS FOR SIGNIFICANT IMPACT ANALYSES-UNCONTROLLED SCENARIO				
Pollutant	**Averaging Period**	**Modeled Design Value Concentration ($\mu g/m^3$)[a]**	**SIL[b] ($\mu g/m^3$)**	**Percent of SIL**
$PM_{2.5}$[c]	24-hour	9.614[g]	1.2	801%
	Annual	1.21[h]	0.3	403%
PM_{10}[d]	24-hour	22.74[i]	5.0	455%
NO_2[e]	1-hour	118.35[j]	7.5	1,578%
	Annual	13.46[k]	1.0	1,346%
CO[f]	1-hour	1,409[l] (1,430)[o]	2,000	70% (72%)
	8-hour	418[m] (519.99)[n]	500	84% (104%)

[a] Micrograms per cubic meter.
[b] Significant impact level.
[c] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
[d] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
[e] Nitrogen dioxide.
[f] Carbon Monoxide.
[g] Modeled design value is the maximum 5-year mean of highest 24-hour values from each year of a 5-year meteorological dataset.
[h] Modeled design value is the maximum 5-year mean of annual average values from each year of a 5-year meteorological dataset.
[i] Modeled design value is the maximum of highest 24-hour values from a 5-year meteorological dataset, or the maximum of 24-hour value from five individual years of meteorological data.
[j] Modeled design value is the maximum 5-year mean of maximum 1st highest daily 1-hour maximum impacts for each year of a 5-year meteorological dataset. The SIL compliance design value was calculated assuming complete conversion of total NO_x to NO_2.
[k] Modeled design value is the maximum annual impact of the individual years of a 5-year meteorological dataset. Complete conversion of NO_x to NO_2 was assumed.
[l] Modeled design value is the maximum of first highest ambient concentrations at each receptor from any of 5 individual years of meteorological data.
[m] Modeled design value is the maximum of first highest ambient concentrations at each receptor from any of 5 individual years of meteorological data.
[n] DEQ verification analyses using the 2014 individual year meteorological data. This design value was the maximum first high value and the SIL was exceeded at only one receptor, with UTM coordinates 537,675.4 meters Easting and 4,827,178.3 meters Northing.
[o] DEQ verification analyses using 2014 individual year meteorological data.

4.2 Results for Cumulative NAAQS Impact Analyses

CH2M presented cumulative impact analyses for the 1-hour and annual NO_2, 8-hour CO, 24-hour PM_{10}, 24-hour $PM_{2.5}$, and annual $PM_{2.5}$ NAAQS. The results for the controlled emissions scenario cumulative impact analyses are listed in Table 24, and the results for the uncontrolled emissions operating scenario are listed in Table 25. Ambient impacts for the facility and the nearby TASCO facility, when combined with approved ambient backgrounds, were below the allowable annual and 1-hour NO_2 NAAQS at all receptors where ON Semiconductor had exceeded the significant contribution in the SIL analyses.

Additional $PM_{2.5}$ and PM_{10} ambient impacts must be included in the cumulative NAAQS analyses. Acids collected from the manufacturing processes and routed to wet scrubber control devices are anticipated to create particulate matter emissions at the ambient conditions upon release to the atmosphere. The final ambient impact analyses will be used to establish NAAQS compliance for issuance of the Tier II FEC permit and as the baseline modeling demonstration to determine the incremental increase in impacts for future changes not addressed in this project's impact analyses. In lieu of submitting another revised modeling demonstration ON Semiconductor has elected to revise the analyses using the project's latest analyses and combining additional impacts resulting from the PM emissions formed from acids. The additional PM_{10} and $PM_{2.5}$ is emitted only from wet scrubbers, and a simple approach is to use the TAPs χ/Q impact for the scrubber source group and the additional emissions for each averaging period. DEQ agrees this is a valid approach to develop worst-case impacts and notes the following points:

- χ/Q TAPs unit emission rate impact factors are maximum impacts from the three wet scrubber emission points.
- The design value for 24-hour average TAPs is more conservative than the design values for both the 24-hour average $PM_{2.5}$ NAAQS and 24-hour average PM_{10} NAAQS.
- The TAPs design impact is a deterministic form of an ambient air quality standard where the

design impact is not paired in space and time, whereas impacts are paired in space and time for 24-hour $PM_{2.5}$ impacts given the probabilistic nature of the 24-hour $PM_{2.5}$ ambient air quality standard.

The additional particulate matter ambient impacts are listed below in Table 23.

Table 23. ADDITIONAL AMBIENT IMPACTS FROM PM FORMED FROM ACID EMISSIONS				
Pollutant	Averaging Period	Emission Rate (lb/hr)[a]	χ/Q[b] Unit Emission Rate Impact (μg/m³ per lb/hr)[c]	Ambient Impact (μg/m³)
$PM_{2.5}$[d]	24-hour	0.0264	18.58155	0.491
	Annual	0.0114	3.23804	0.037
PM_{10}[e]	24-hour	0.0264	18.58155	0.491

a. Pounds per hour.
b. "Chi over Q" – a generic ambient impact per unit of emissions factor.
c. Micrograms per cubic meter per pounds per hour emissions.
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

Table 24. RESULTS FOR CUMULATIVE IMPACT ANALYSES – CONTROLLED SCENARIO						
Pollutant	Averaging Period	Modeled Design Value Concentration (μg/m³)[a]	Background Concentration (μg/m³)	Total Ambient Impact (μg/m³)	NAAQS[b] (μg/m³)	Percent of NAAQS
$PM_{2.5}$[c]	24-hour	6.314[g] + 0.491[n]	24	30.80	35	88%
	Annual	1.466[h] + 0.037[n]	9.8	11.30	12	94%
PM_{10}[d]	24-hour	15.608[i] + 0.491[n]	77	93.10	150	62%
NO_2[e]	1-hour	179.24[j]	Included in model[k]	179.24	188	95%
	Annual	15.889[l]	11.7	27.6	100	28%
CO[f]	8-hour	483[m]	962	1,445	10,000	14%

a. Micrograms per cubic meter.
b. National ambient air quality standards.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
e. Nitrogen dioxide.
f. Carbon monoxide.
g. Modeled design value is the maximum 5-year mean of 8th highest 24-hour values from each year of a 5-year meteorological dataset.
h. Modeled design value is the maximum 5-year mean of annual average values from each year of a 5-year meteorological dataset.
i. Modeled design value is the maximum of 6th highest 24-hour values from a 5-year meteorological dataset.
j. Modeled design value is the maximum 5-year mean of 8th highest daily 1-hour maximum impacts for each year of a 5-year meteorological dataset.
k. Background NO_2 concentrations are included with the modeled output value.
l. Modeled design value is the maximum annual average value of 5 individual years of meteorological data.
m. Modeled design value is the maximum 2nd high value modeled over 5 individual years of meteorological data. This impact was included in ON Semiconductor's modeling report for the 2nd high SIL analysis impact.
n. Additional impact attributed to manufacturing process acids emitted from wet scrubbers.

Table 25. RESULTS FOR CUMULATIVE 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[b] ($\mu g/m^3$)**	**Percent of NAAQS**
$PM_{2.5}$[c]	24-hour	6.41[g] + 0.491[q] (6.03)[n]	24	30.90 (30.0)	35	88% (86%)
	Annual	1.32[h] + 0.037[q]	9.8	11.16	12	93%
PM_{10}[d]	24-hour	12.78[i] + 0.491[q] (15.199)[p]	77	90.3 (92.2)	150	60% (61%)
NO_2[e]	1-hour	186.26[o] (167.481)[j]	Included in model[k]	186.26 (167.5)	188	99% (89%)
	Annual	13.962[l]	11.7	25.7	100	26%
CO[f]	8-hour	477.1[m]	962	1,437	10,000	14%

a. Micrograms per cubic meter.
b. National ambient air quality standards.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
e. Nitrogen dioxide.
f. Carbon monoxide.
g. Modeled design value is the maximum 5-year mean of 8th highest 24-hour values from each year of a 5-year meteorological dataset.
h. Modeled design value is the maximum 5-year mean of annual average values from each year of a 5-year meteorological dataset.
i. Modeled design value is the maximum of 6th highest 24-hour values from a 5-year meteorological dataset.
j. Modeled design value is the maximum 5-year mean of 8th highest daily 1-hour maximum impacts for each year of a 5-year meteorological dataset. This is the impact for source group "NAAQS".
k. Background NO_2 concentrations are included with the modeled output value.
l. Modeled design value is the maximum annual average value of 5 individual years of meteorological data.
m. Modeled design value is the maximum 2nd high value modeled over 5 individual years of meteorological data, but the value represented here is the highest 2nd high value from a single year of meteorological data. Fatal run errors were observed in the application's 2013-2016 AERMOD output files. DEQ ran the uncontrolled scenario setup for the same 2014 individual year of meteorological data that produced the controlled scenario 8-hour average SIL and NAAQS design impacts.
n. DEQ noted a value of 6.03 $\mu g/m^3$, 24-hour average at receptor location UTM coordinates of 537,675.5 meters Easting and 4,827,129.8 meters Northing, as the design impact, based on review of the GRF graphics output file.
o. The modeling report listed this value for the design impact. This impact is the maximum highest first high value rather than the highest 8th high value for source group "NAAQS" and is a conservative approach. DEQ accepts the use of the maximum high 8th high impact for the 1-hour NO_2 NAAQS.
p. DEQ 24-hour PM_{10} verification run results based on the maximum 6th high 24-hour average impact at any receptor using a 5-year concatenated meteorological data file. Although slightly higher than the impact presented in the application's ambient impact analyses, compliance was demonstrated by a large margin.
q. Additional impact attributed to manufacturing process acids emitted from wet scrubbers.

Table 26 presents the results of the controlled emissions operating scenario for compliance with the requested annual FEC emissions limits.

Table 26. RESULTS FOR FEC IMPACT ANALYSES – CONTROLLED SCENARIO						
Pollutant	**Averaging Period**	**Modeled Design Value Concentration (µg/m³)[a]**	**Background Concentration (µg/m³)**	**Total Ambient Impact (µg/m³)**	**NAAQS[b] (µg/m³)**	**Percent of NAAQS**
NO_2[c]	Annual	26.980[e]	11.7[g]	36.68	100	37%
$PM_{2.5}$[d]	Annual	1.833[f]	9.8[g]	11.63	12	97%

a. Micrograms per cubic meter.
b. National ambient air quality standards.
c. Nitrogen dioxide.
d. Particulate matter with an aerodynamic diameter of ten microns or less.
e. Modeled design value is the maximum of annual values from each individual year of 5 years of data.
f. Modeled design value is the maximum 5-year mean of 8th highest 24-hour values from each year of a 5-year meteorological dataset.
g. NW AIRQUEST background value.

4.3 Results for Toxic Air Pollutant Impact Analyses

Tables 27 and 28 present results for TAPs modeling for the controlled and uncontrolled emissions operating scenarios. The impacts listed below are attributed to the facility-wide emissions. All design impacts are the maximum impacts. Annual average carcinogenic TAP impacts used the maximum impact from five individual years of meteorological data. All TAP impacts were below the applicable increments.

Table 27. RESULTS FOR TOXIC AIR POLLUTANT ANALYSES – CONTROLLED SCENARIO					
Pollutant	**CAS[a] Number**	**Averaging Period**	**Maximum Modeled Concentration (µg/m³)[b]**	**AAC/AACC[c] (µg/m³)**	**Percent of Increment**
Formaldehyde	50-00-0	Annual	1.53E-02 (1.86E-02)[d]	7.7E-02	20% (24%)[d]
1,4-Dioxane	123-91-1	Annual	5.44E-04	7.1E-01	1%
Arsenic	7440-38-2	Annual	4.09E-05 (4.97E-05)[d]	2.3E-04	18% (22%)[d]
Cadmium	7440-43-9	Annual	2.25E-04 (2.73E-04)[d]	5.6E-04	40% (49%)[d]
Nickel	7440-02-0	Annual	4.29E-04 (5.21E-04)[d]	4.2E-03	10% (12%)[d]

a. Chemical Abstract Service
b. Micrograms per cubic meter.
c. Ambient Concentration for Non-Carcinogens (toxic air pollutant allowable increments listed in Idaho Air Rules Section 585) /Ambient Allowable Concentration for Carcinogens (toxic air pollutant allowable increments in Idaho Air Rules Section 586).
d. Values in parentheses reflect maximum ambient TAPs impacts from both point source and fugitive volume sources for makeup air unit MAU5B.

Table 28. RESULTS FOR TOXIC AIR POLLUTANT ANALYSES – UNCONTROLLED SCENARIO					
Pollutant	**CAS[a] Number**	**Averaging Period**	**Maximum Modeled Concentration ($\mu g/m^3$)[b]**	**AAC/AACC[c] ($\mu g/m^3$)**	**Percent of Increment**
Formaldehyde	50-00-0	Annual	1.38E-02 (1.70E-02)[d]	7.7E-02	18% (22%)[d]
1,4-Dioxane	123-91-1	Annual	2.28E-02	7.1E-01	3%
Arsenic	7440-38-2	Annual	3.67E-05 (4.55E-05)[d]	2.3E-04	16% (20%)[d]
Cadmium	7440-43-9	Annual	2.02E-04 (2.50E-04)[d]	5.6E-04	36% (45%)[d]
Nickel	7440-02-0	Annual	3.85E-04 (4.77E-04)[d]	4.2E-03	9% (11%)[d]

a. Chemical Abstract Service
b. Micrograms per cubic meter.
c. Ambient Concentration for Non-Carcinogens (toxic air pollutant allowable increments listed in Idaho Air Rules Section 585) /Ambient Allowable Concentration for Carcinogens (toxic air pollutant allowable increments in Idaho Air Rules Section 586).
d. Values in parentheses reflect maximum ambient TAPs impacts from both point source and fugitive volume sources for makeup air unit MAU5B.

4.4 Chi/Q Individual Source Impacts

TAPs compliance was evaluated by determining the maximum ambient impact for all source groups at the facility. Each emissions unit was modeled with a unit emission rate of 1 lb/hr. The maximum ambient impact of all emissions units within a group was selected as the design impact for a unit emission rate, referred to as the "Chi/Q" analysis, providing maximum ambient impacts in units of $\mu g/m^3$ per lb/hr of emission rate for this source group. This analysis was conducted for both controlled and uncontrolled emissions scenarios, which affect the VOC Abatement Units (model IDs VOC01 and VOC02 for controlled emissions and VOC01_U and VOC02_U for uncontrolled emissions). Cooling towers are not expected to emit any TAPs—only particulate matter emissions—and are not included in the TAPs analyses. TAPs ambient impacts were supported in the June 20, 2017, submittal of ambient impacts modeling files and results summary excel spreadsheet. The following groups of sources were evaluated by CH2M and ON Semiconductor for TAPs compliance:

- Boilers 1, 2, 3, and 4;
- Water Heater;
- Emergency Generators 2 and 3, each with 2 stacks;
- Wet Scrubbers 1, 2, and 3;
- Makeup Air Unit 5B – one point source and 3 volume sources;
- VOC Abatement Units 1 and 2 Controlled; and,
- VOC Abatement Units 1 and 2 Uncontrolled.

The table below includes the χ/Q impacts for the three volume sources that representing fugitive emissions for the natural gas-fired MAU5B makeup air unit. The permit application applied a 75% split in emissions to the point source stack and 25% split spread among these three bay door fugitive sources. The MAU5B sources are not a driving factor in TAPs compliance, and all MAU5B sources emit from an area within a building currently used for material storage. The χ/Q values for the fugitive source were included in this table to maintain consistency with the modeling methodology that the applicant used in the facility-wide NAAQS analyses. Table 29 lists the model output χ/Q factors for the future compliance evaluations at the ON Semiconductor Nampa facility.

Table 29. χ/Q UNIT EMISSION RATE IMPACTS FOR FUTURE TAPs[a] COMPLIANCE EVALUATIONS					
Source Group	**Individual Source Model ID**	**24-hour Average Maximum Ambient Impact (μg/m³ per lb/hr)[b]**	**Annual Average Maximum Ambient Impact (μg/m³ per lb/hr)**	**Non-Carcinogenic TAPs Unit Emission Rate Design Impact for Future Compliance (μg/m³ per lb/hr)**	**Carcinogenic TAPs Unit Emission Rate Design Impact for Future Compliance (μg/m³ per lb/hr)**
Natural Gas-fired Boilers	BOI01	26.68565	3.84489	34.13911	4.41853
	BOI02	27.06613	3.80787		
	BOI03	**34.13911**	**4.41853**		
	BOI04	26.81939	3.62633		
Water Heater	HEATER	59.98452	**5.57685**	59.98452	5.57685
Emergency Generator Engines	**GEN02_S1**	**26.68547**	**3.40586**	26.68547	3.40586
	GEN02_S2	26.32798	**3.40581**		
	GEN03_S1	24.83431	2.6576		
	GEN03_S2	21.97802	2.6339		
Manufacturing Process Scrubbers	**FS_01**	18.25029	**3.23804**	18.58155	3.23804
	FS_02	18.4909	3.16309		
	FS_03	**18.58155**	3.14359		
VOC[c] Abatement Units – **Controlled** Emissions Scenario	**VOC_01**	27.00284	**5.29484**	33.34166	5.29484
	VOC_02	**33.34166**	5.00186		
VOC Abatement Units – **Uncontrolled** Emissions Scenario	**VOC01_U**	16.15577	**3.33041**	19.46569	3.33041
	VOC02_U	**19.46569**	2.4338		
Makeup Air Unit 5B – 1 point source and 3 volume sources[d]	**MAU5BPT**	**36.17835**	**6.55674**	Point - 36.17835	Point - 6.55674
	MAU5B_01	148.4879	31.09668	Fugitive - 169.7813[d]	Fugitive - 36.33611[d]
	MAU5B_02	159.0981	33.76931		
	MAU5B_03	**169.7813**	**36.33611**		

a. Toxic air pollutants.
b. Micrograms per cubic meter per pound per hour – "Chi/Q" impact level per unit emission rate of a pollutant.
c. Volatile Organic Compounds.
d. The combined worst case Chi/Q impact for the fugitive source component for TAPs impacts and the 25% assumed split for air makeup unit emissions results in the magnitude of the fugitive impact being 1.5 times the point source ambient impact for a unit emission rate.

5.0 Conclusions

The ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the Nampa ON Semiconductor facility will not cause or significantly contribute to a violation of any NAAQS and will not exceed allowable TAP increments.

References

1. *Policy on NAAQS Compliance Demonstration Requirements of IDAPA 58.01.01.203.02 and 01.403.02.* Idaho Department of Environmental Quality Policy Memorandum. Tiffany Floyd, Administrator, Air Quality Division, June 10, 2014.

2. *State of Idaho Guideline for Performing Air Quality Impact Analyses.* Idaho Department of Environmental Quality. September 2013. State of Idaho DEQ Air Doc. ID AQ-011. Available at https://www.deq.idaho.gov/media/1029/modeling-guideline.pdf.

3. *Ambient Ratio Method Version 2(ARM2) for use with AERMOD for1-hr NO_2 Modeling Development and Evaluation Report,* Prepared for American Petroleum Institute, 1220 L Street NW, Washington, DC 20005, by M. Podrez, RTP Environmental Associates, Inc., 2031 Broadway, Suite 2, Boulder, Colorado 80302, September 20, 2013.

4. *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard,* R. Chris Owen and Roger Brode, Environmental Protection Agency, Office of Air Quality Planning and Standards, September 30, 2014.

5. *DEQ Guidance for Minor New Source Review Modeling of 1-Hour NO_2 from Intermittent Testing of Emergency Engines*, State of Idaho Department of Environmental Quality September 2013, Doc. I D AQ-011 (September 2013).

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

The applicable parts are highlighted in yellow.

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).

ON Semiconductor 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 ON Semiconductor 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.

ON Semiconductor 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?

ON Semiconductor 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?

ON Semiconductor 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?

ON Semiconductor 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?

ON Semiconductor 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)

ON Semiconductor 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.

ON Semiconductor 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.

ON Semiconductor 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.

ON Semiconductor 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?

On Semiconductor 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.

ON Semiconductor 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?

ON Semiconductor 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.

ON Semiconductor 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?

ON Semiconductor 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?

ON Semiconductor 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?

ON Semiconductor 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 documents were received from the facility on May 1, 2018:

The facility did not specifically comments on the draft permit and SOB. The facility provided responses to the comments in the draft permit and SOB. It is attached. (2018AAG1011 & 2018AAG1012)

© ON Semiconductor
Aptina, LLC
1401 N. Kings Road
Nampa, Idaho 83687

May 8, 2018

Idaho Department of Environmental Quality
Air Quality Division
1410 North Hilton
Boise, ID 83706

Subject: Facility ID No. 027-00095, ON Semiconductor - Nampa, Nampa
Draft Tier II Operating Permit for Applicant Review

ON Semiconductor- Nampa (ON Nampa) has reviewed the draft Tier II operating permit and Statement of Basis (SOB) received on April 24, 2018. ON Nampa is providing updated responses to the technical questions outlined in the SOB and email request received from DEQ on 5/4/18..

Included below are responses to comments outlined in the SOB.

Response to DEQ SOB comments:

Comment A1- page 13: *Applicant: please look into this. Where is phosphoric acid used in the manufacturing process? Is it controlled by a wet scrubber?*

ON has confirmed that phosphoric acid emissions are controlled by a wet scrubber as noted in permit condition 4.4.7.

ON receives phosphoric acid in drums at 86% concentration. Drums in storage are expected to produce minimal emissions since this is a closed storage system. Emissions may be produced when a new drum is being placed into the system and are routed to a wet scrubber. Phosphoric acid from drum storage is then sent to a blending system that dilutes the phosphoric acid to a 20:1 concentration (4.3%) prior to being used in the fab. Phosphoric acid is used in one tool as part of the manufacturing process and any emissions would be controlled by a wet scrubber. It is estimated that approximately 90% of the total phosphoric acid used in the manufacturing process is discharged through ON's industrial wastewater system and is not emitted to the wet scrubber.

As outlined on pg. 12 of the SOB, phosphoric acid emissions from the manufacturing process at the scrubber stack temperature would be in the form of particulate emissions.

ON has contacted the scrubber manufacturer, Lantec to obtain equipment specific control efficiency for phosphoric acid. Lantec provided technical data which identified the wet scrubbers to have a control efficiency of 99% for phosphoric acid since phosphoric acid is not being heated at the ON Nampa facility and would be present in the form of water droplets containing phosphoric acid. Included in Attachment B is technical data from Lantec.

Comment A2- page 16: *Applicant: please update PM10/PM2.5 emissions from the manufacturing process to include H3PO4 emissions for both baseline actual emissions and operational variability component.*

You may apply scrubber control efficiency if the phosphoric acid is used with other acids, such as HCl, HF in the process, such as etching process and the emissions are controlled by a wet scrubber.

Please provide detailed process description and details on how emissions are calculated.

Please submit a revised EI spreadsheet including the above calculations with the comments on the draft permit.

ON has updated the PM10/PM2.5 emissions from the manufacturing process to include phosphoric acid as well as all other PM forming acids for both baseline actual emissions and operational variability component. The baseline actual and operational variability components emissions previously reporting in Table 2 below did not include PM emissions from manufacturing operations. Emissions in Table 2 have been updated to reflect the scrubber controlled PM forming acids for both baseline actual emissions and operational variability component.

A detailed process description is provided in the response to Comment A1 above. Phosphoric acid emissions are calculated utilizing a mass balance approach where it is assumed that 90% of the usage is discharged to the industrial wastewater system and the remaining 10% is controlled by a wet scrubber. The wet scrubber is estimated to have a control efficiency of 99%. Included below is the updated Table 2 showing the revised PM10/PM2.5 emissions which account for PM forming acid emissions (i.e. phosphoric acid, hydrochloric acid, hydrofluoric acid, nitric acid, hydrogen peroxide, and acetic acid). Included as an enclosure to this letter and submitted electronically is the updated Appendix A SOB emission calculations spreadsheet which provides the supporting calculations for the updated PM10/PM2.5 emissions.

Table 1 CRITERIA POLLUTANTS, BASELINE EMISSIONS, AND PROPOSED FEC [d]

Source	$PM_{2.5}$	PM_{10}	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	~~0.08~~ 0.13	~~2.01~~ 2.06	0.015	0.73	0.81	0.06	0.01
Operational Variability Component	~~1.06~~ 1.09	~~1.26~~ 1.28	0.23	10.29	12.70	0.91	0.16
Proposed Growth Component	~~0.84~~ 0.79	~~1.70~~ 1.65	5.75	14.97	12.49	25.91	0.17
Existing 2011 FEC Limits[b]	N/A	11	6	26	26	53	40
Total Proposed FEC	2	5	6	26	26	53	40

a) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.
b) Existing permit limits included for reference
c) Controlled average emission rate in pounds per year is an annual average, based on the proposed annual operating schedule and annual limits.
d) Emissions based on uncontrolled operational scenario (i.e., without using VOC Abatement Units)

Below is a summary of the changes made to the Appendix A SOB Manufacturing Emissions workbook and explanation for how the phosphoric acid emissions are calculated. Each cell that contained a change is identified with red highlight.

- The monthly phosphoric acid emission rate (lb/month) is based on monthly phosphoric acid usage obtained from issued records provided from the ON warehouse. Based on how phosphoric acid is used in the manufacturing process, it is assumed that 90% of the usage amount is discharged through ON's industrial wastewater system. The monthly phosphoric acid emission rate (lb/month) identified in row 39 is 10% of the monthly usage that is not discharged through the industrial wastewater system and are potential air emissions.
- The May 2015 phosphoric acid monthly emission rate was updated to reflect 10% of the monthly usage since it was inadvertently reported as the monthly usage amount in the 9/7/17 Appendix A SOB Manufacturing Emissions workbook. Value changed from 638.22 lb/month to 63.82 lb/month.
- This change resulted in a decrease to the phosphoric acid lb/hr uncontrolled PTE emission rate (cell Q39) since the rate is calculated based on the maximum monthly usage which was the May 2015 usage. Uncontrolled PTE decreased from 1.33 lb/hr to 0.503 lb/hr phosphoric acid.
- The May 2015 hydrogen peroxide monthly emission rate was updated to reflect 10% of the monthly usage since it was inadvertently reported as the monthly usage amount in the 9/7/17 Appendix A SOB Manufacturing Emissions workbook. Value changed from 628.02 lb/month to 62.80 lb/month.
- This change resulted in a decrease to the hydrogen peroxide lb/hr uncontrolled PTE emission rate (cell Q43) since the rate is calculated based on the maximum monthly usage which was the May 2015 usage. Uncontrolled PTE decreased from 1.31 lb/hr to 0.196 lb/hr hydrogen peroxide.
- Since phosphoric acid has been identified as PM forming and controlled by a scrubber, a YES was added to cells S39 and U39.
- The uncontrolled PM10 forming emission rates were updated to include phosphoric acid. Cell O60 changed from 31 lb/yr to 100 lb/yr; cell P60 changed from 0.0036 lb/hr to 0.0114 lb/hr; cell R60 changed from 0.016 ton/yr to 0.050 ton/yr.
- The controlled PM10 forming lb/yr and lb/hr emission rates were also updated to account for the acid specific scrubber control efficiencies identified in the wet scrubber section on pg. 12 of the SOB. Acid specific control efficiency was not accounted for in the 9/7/17 Appendix A SOB Manufacturing Emissions workbook for the controlled lb/yr and lb/hr emissions. Cell S60 changed from 31 lb/yr to 100 lb/yr; cell T60 changed from 0.0036 lb/hr to 0.0114 lb/hr.

Comment A3- page 16: *Applicant: if some of the phosphoric acid is used with other acids, such as HF, HCl, and the emissions are controlled by a wet scrubber, the scrubber control efficiency may be used in the calculation. In the EI spreadsheet, it is not clear whether the phosphoric acid monthly emissions have used scrubber control efficiency or not.*

The phosphoric acid emission rate in Table 3 Baseline Project Potential to Emit for Non-Carcinogenic Toxic Air Pollutants should be changed from 1.33 lb/hr to 0.00503 lb/hr to account for the controlled phosphoric acid emission rate after scrubber control and updated maximum monthly usage. Additionally, all other scrubber controlled acids should be updated as outlined below to account for the scrubber control efficiency since the values previously reported were uncontrolled emissions that did not take into account the scrubber control efficiency.

Table 2 BASELINE PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS

Non-Carcinogenic Toxic Air Pollutants	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Phosphoric Acid	~~1.33E+00~~ 5.03E-03	0.067	No
Acetic Acid	~~3.21E-06~~ 3.21E-08	1.67	No
Nitric Acid	~~8.64E-02~~ 1.73E-03	0.333	No
Hydrogen Peroxide	~~1.31E+00~~ 1.96E-02	0.1	No
Hydrogen Chloride	1.5E-07	0.05	No

The emissions updated in Table 3 above have also been updated in the Appendix A SOB TAPs Summary workbook. Each cell that contained a change is identified with red highlight.

Sincerely,

Shane Brown
Facilities Manager

Attachment:
ON SEMICONDUCTOR - NAMPA - Appendix A of SOB (Updated AEI_5-8-18).xls
Appendix B- Lantec Scrubber Technical Data

APPENDIX B

Lantec Scrubber Technical Data

Michelle McMullen

From: Dan Dickeson <dan@lantecp.com>
Sent: Thursday, April 26, 2018 11:36 AM
To: Michelle McMullen
Cc: Oscar Reynoso
Subject: RE: Scrubber Efficiency for Phosphoric Acid Removal

Hello Michelle,

Thanks for your note.

The efficiency of that scrubber for phosphoric acid removal will depend on how phosphoric acid gets into the air.

Phosphoric acid is non-volatile at temperatures near ambient, so it can only be present in air in the form of water droplets containing dissolved H_3PO_4.

If phosphoric acid gets airborne by spraying, splashing or bubbling gas through solutions of the acid, then the resulting mist droplets will be relatively large, and the packed scrubber can remove them with 99% efficiency or better.

However, if phosphoric acid is emitted by a process hot enough to actually vaporize H_3PO_4, then when the hot acid vapors come in contact with cooler air on their way to the scrubber they'll condense to form an aerosol (fog) of acid droplets in the sub-micron size range. The same will happen if P_4O_{10} (from combustion of phosphorus) reacts with atmospheric moisture to form H_3PO_4. Those acid fog droplets are so small, they have almost no inertia; they'll just follow the streamlines of air as it zig-zags around pieces of packing in the scrubber, so they won't be removed efficiently. If that's the case, you can probably see white fog (more persistent than the normal water vapor plume) at the scrubber stack.

Sub-micron-sized acid fog can be removed from air using a fiber-bed filter (candle filter) downstream of the packed scrubber. Those "CECO filters" are also available from HEE.

How is phosphoric acid getting into the air going to your scrubber?

Best regards,

Dan Dickeson
Technical Director

E-mail: dan@lantecp.com
Phone: 818-707-2285
Fax: 818-707-9367

LANTEC PRODUCTS, INC.
5302 Derry Ave., Unit G
Agoura Hills, CA 91301

Visit our web site at www.lantecp.com

-------- Original Message --------
Subject: Scrubber Efficiency
Date: Wed, 25 Apr 2018 20:33:00 +0000
From: Michelle McMullen <michelle.mcmullen@onsemi.com>
To:engineering@lantecp.com <engineering@lantecp.com>

I have a Lantec HEE (H9610601) scrubber, and I need information regarding it's efficiency for Phosphoric Acid Scrubbing using Caustic Soda. Can you provide me this information?

Thanks, Michelle

Michelle McMullen
EHS Engineer | ON Semiconductor
1401 North Kings Road | Nampa, ID 83687
☎: **(O)** 208-489-6081 | **(C)** 208-965-0708
✉: michelle.mcmullen@onsemi.com

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Nampa, Idaho 83687

RECEIVED
JUN 05 2018
BY: Jim Holler

June 5, 2018

Idaho Department of Environmental Quality
Air Quality Division
1410 North Hilton
Boise, ID 83706

Subject: Facility ID No. 027-00095, ON Semiconductor - Nampa, Nampa
Draft Tier II Operating Permit for Applicant Review

ON Semiconductor- Nampa (ON Nampa) has reviewed the draft Tier II operating permit and Statement of Basis (SOB) received on April 24, 2018. ON Nampa is providing responses to the technical questions outlined in the email request received from DEQ on 5/14/18 and 5/18/18.

Response to DEQ 5/14/18 and 5/18/18 emails:

Phosphoric acid scrubber efficiency: *According to the email from the scrubber manufacturer, the scrubber may not be able to remove phosphoric acid emissions from ON's process. According to the scrubber manufacturer, the acid fog droplets formed from vaporization process are so small, the scrubber won't have any removed efficiency. Therefore, scrubber control efficiency cannot be used in calculating phosphoric acid emissions.*

ON confirmed that the tool in which phosphoric acid is used operates at 25°C (77°F) and the phosphoric acid is at a 4.3% concentration. At this temperature and concentration, phosphoric acid would not form a vapor. Any phosphoric acid solution that becomes airborne would be in droplet form and based on the information provided by Lantec would be controlled by the scrubber at an efficiency of 99% or greater.

Modeling Analysis: *The submitted emission inventory did not account for the contribution of potential acid emissions from scrubbers to PM2.5 and PM10 emissions. It was estimated this could add 2.64E-02 lb/hr to the existing PM-2.5 emissions of 0.006 lb/hr. This is a very small emissions rate and DEQ believes NAAQS compliance would still be conservatively demonstrated under the existing facility configuration, as described in the submitted application, if the emissions rate were corrected. A source-specific impact factor of X/Q = 18.6 μg/m3 per lb/hr was determined for 24-hour TAP impacts, and using this factor and the 2.64E-02 lb/hr emission increase results in a maximum PM-2.5 increase in impact of about 0.49 μg/m3.*

If the issued permit were a standard permit to construct (PTC) and not a Facility Emissions Cap (FEC) permit, DEQ could simply state that NAAQS would still be assured if the emissions rate were corrected in the modeling analysis. However, for a FEC permit, the model approved by DEQ becomes a future NAAQS compliance evaluation tool for any facility changes made under the FEC. Idaho Air Rules Section 181.03 states the following for FEC permits, "Estimates of ambient concentrations shall be *determined during the term of this permit using the same model and model parameters as used with the estimate of ambient concentration analysis approved for the permit establishing the FEC. The permittee shall include any changes to the facility that are not included in the originally approved estimate of ambient concentration analysis."*

Because the model used in the FEC application will be approved for use in future changes to the facility, it is very important that the model be correct or conservative, as future implemented changes could result in impacts up the NAAQS. In the case of correcting for the adjusted PM emissions inventory, DEQ believes we can proceed using one of following options:

1. ON's consultant will revise the modeling analysis so that it is consistent with the emission inventory. The revised modeling files would be submitted to DEQ along with a description of what was changed and the results of those changes. Future changes would simply use this approved model to evaluate changes for NAAQS compliance.

2. ON or ON's consultant will submit a description of how NAAQS compliance is still demonstrated with the change in the emission inventory and will propose measures of how future use of the model will assure NAAQS compliance. Such measures would be incorporated into the issued permit as a permit condition to make them enforceable. Future changes would use the latest submitted model setup and the required adjustment measures to evaluate facility changes for NAAQS compliance.

Based on a review of the updated emissions inventory for particulate generating acids from ON Semiconductor's Nampa facility, IDEQ has identified that the previously submitted AERMOD atmospheric dispersion modeling did not include the particulate matter that is generated and emitted as a result of acids used onsite. The acid generated particulate would result in increases in both PM2.5 and PM10. The controlled acid particulate emissions that were not modeled in the originally submitted AERMOD modeling amount to 2.64E-02 lb/hr for both PM10 and PM2.5. These additional acids are identified in Table 1 below. The original modeling analysis included particulate emissions from hydrochloric acid and hydrofluoric acid. With regard to TAP emissions, all acid TAP emissions remain below applicable emissions screening levels and were documented in ON's 5/8/18 DEQ response letter.

Table 1 Additional Acid Forming Particulate Emissions

VOC Controlled/ VOC Uncontrolled	Scrubber control efficiency from the application and 5/1/2018 submittal	lb/hr, annual average Assume emitted as PM-10/PM-2.6	lb/hr, 24-hr average Assume emitted as PM-10/PM-2.5
Phoshporic Acid	99%	1.13E-03	5.03E-03
Acetic Acid	99%	1.91E-09	3.21E-08
Nitric Acid	98%	3.79E-04	1.73E-03
Hydrogen Peroxide	90%	9.86E-03	1.96E-02
Total		**1.14E-02**	**2.64E-02**

Based on IDEQ's confirmed ambient impact/emissions quantity (X/Q), the relative ambient impact per pound per hour 18.6 µg/m3 per lb/hr which means that the additional acid generated particulate would result in an increase of 0.49 µg/m3. Based on the previously submitted PM10 and PM2.5 AERMOD impact of 30.31 µg/m3, the addition of the X/Q analysis would still confirm NAAQS compliance with a total ambient impact of 30.8 µg/m3.

Although ON Semiconductor strongly confirms that NAAQS compliance would be maintained when including acid generated particulate, ON Semiconductor acknowledges, that IDAPA 58.01.01.181.03 states the following for Facility Emissions Cap (FEC) permits. "Estimates of ambient concentrations shall be determined during the term of this permit using the same model and model parameters as used with the estimate of ambient concentration analysis approved for the permit establishing the FEC. The permittee shall include any changes to the facility that are not included in the originally approved estimate of ambient concentration analysis." As a result, it is paramount that the modeling submitted for FEC permits is accurate for all sources.

Acknowledging that the modeling needs to be accurate, ON Semiconductor suggests the following:

- Complete the current FEC permit renewal utilizing the previously submitted AERMOD modeling and amending the impact analysis to utilize the AERMOD justified X/Q to include the ambient impacts of the acid generated particulate. This would include adding 0.49 µg/m3 to the facility wide PM2.5 and PM10 impacts to account for the additional particulate emissions.

- Include the following explicit permit conditions to ensure compliance with IDAPA 58.01.01.181.03

    - All future model impact analyses for the term of the permit shall include particulate emissions associated with acids with the capacity to be emitted as particulate. Acid emissions will be added to the ambient concentration analysis submitted and approved for the permit establishing the FEC. For the particulate generating acids, emissions impacts will be modeled utilizing the actual particulate emissions parameters including controlled emissions rate, location, temperature, velocity and dispersion characteristics.

    - This is consistent with the last portion of the IDAPA 58.01.01.181.03 which states "The permittee shall include any changes to the facility that are not included in the originally approved estimate of ambient concentration analysis."

Sincerely,

Shane Brown
Facilities Manager

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.

Company:
Address:
City:
State:
Zip Code:
Facility Contact:
Title:
AIRS No.:

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	26.0
PM10	5.0
PM	5.0
SO_2	6.0
CO	26.0
VOC	53.0
HAPS/TAPS	25.0
Total:	146.0
Fee Due	**$ 10,000.00**

Comments: