State of Oregon Department of Environmental Quality

Presiding/Hearing Officer's Report and Response to Comments

Date: April 16, 2024
Presiding/Hearing Officer: Nina DeConcini
Date of Hearing: Feb. 15, 2024
Company Name: Intel Corporation
Permit No.: 34-2681-ST-02
Application No.'s: 034907 and 034188

Summary of Findings and Final Decision

Intel Corporation submitted an air quality permit application called an Air Contaminant Discharge Permit, to the Oregon Department of Environmental Quality on July 7, 2023 for a proposed expansion at two semiconductor manufacturing facilities in Washington County: the Gordon Moore Park at Ronler Acres campus in Hillsboro and the Aloha campus in Aloha. Both campuses produce semiconductor products, more commonly called computer chips.

Since receipt of the application DEQ employed a combination of email, phone, web and regular mail updates through multiple waves of notification, in English and in Spanish. Specific engagement with environmental justice and environmental advocacy groups has taken place through individuals and organizations over the same time period.

After DEQ determined Intel's application to be complete on Sept. 7, 2023, DEQ held a virtual public information meeting on Oct. 11, 2023. Considering feedback received from individuals and organizations, DEQ then drafted an air quality permit and opened the public comment period on Jan. 10, 2024. DEQ held a virtual public hearing on Feb. 15, 2024. Public comment closed on March 8, 2024, which included a one-week extension based on multiple requests.

DEQ received a large number of comments on the draft air quality permit for the Intel Corporation both for and against issuing the permit. Reasons given for not issuing the permit or delaying issuance included concerns about the possible health impacts of increased emissions, and the completion of other regulatory requirements such as the risk assessment under the Cleaner Air Oregon program and requirements of the, now invalidated, Climate Protection Program.

DEQ determined Intel's modeling analysis demonstrates its increased emissions will not cause or contribute to an exceedance of the National Ambient Air Quality Standards, although the modeling shows that both nitrogen oxides (NO2) and particulate matter 2.5 (PM2.5) emissions may result in levels that get close to the standards at the Ronler Acres Intel site. Intel's risk assessment under Cleaner Air Oregon is scheduled for 2025, and DEQ is undertaking a rulemaking to reinstate the Climate Protection Program.

A number of comments indicated concern about technical issues with the permit itself; in particular, the need for clearer, verifiable information about Intel's emissions. DEQ evaluated existing emissions information and the emissions testing required in the draft permit and concluded that the required testing was sufficient for pollutants of highest concern except for PM2.5.

DEQ agrees commenters have raised valid concerns about this permit. DEQ has thoroughly evaluated all comments. Below is a summary of findings regarding the permit and changes made in response to comments:

- The main emissions points of hydrogen fluoride (HF), hydrogen chloride (HCl), fluorides, NOx and PM2.5 are the acid gas and ammonia (EXSC and EXAM) wet scrubbers and the rotor-concentrator thermal oxidizers (RCTOs). Emissions testing of these units has been prioritized. Emissions from other emissions units such as boilers and emergency engines can be adequately estimated using standard emission factors.

- Past emission test results support Intel's emissions estimates for hydrogen fluoride (HF) and hydrogen chloride (HCl), which comprise almost 100 percent of Intel's Hazardous Air Pollutant (HAP) emissions.

- The annual emissions testing (source testing) proposed in the draft permit for hydrogen fluoride (HF) and hydrogen chloride (HCl) from the EXSC scrubbers (HF and HCl) and EXAM scrubbers (HF only), which comprise the majority of Hazardous Air Pollutant emissions, was found sufficient and has been retained.

- The annual emissions testing (source testing) proposed in the draft permit of EXSC and EXAM scrubbers for fluorides, NOx and CO was found sufficient and has been retained.

- The annual emissions testing (source testing) proposed in the draft permit of RCTOs every two years for NOx, CO and VOC was found sufficient and has been retained.

- Emissions testing for PM2.5 was found to be insufficient but also difficult to perform. Testing of PM2.5 emissions has been added to the permit in the year 2027. Intel is required to submit a study and proposed testing plan to DEQ for approval before beginning the testing.

- Property boundary ambient monitoring of NOx for five years was changed to property boundary ambient monitoring of NOx and PM2.5 for three years beginning in the year 2028 when emissions are expected to be higher than they are in 2024 but less than what is allowed by the permit. Intel will be required to submit a monitoring plan for review and approval by DEQ.

DEQ is a state agency and must work within Oregon's and the nation's governmental framework to execute its regulatory role. DEQ is obligated under the law to issue permits that comply with all state and federal regulatory requirements in a timely manner.

DEQ has issued Intel's air quality permit. DEQ will hold Intel accountable for compliance with all conditions in the permit through multiple compliance methods and will take enforcement if violations occur.

This report and Response to Comments provides DEQ's responses to the public comments submitted during the comment period and public hearing. See below for a Table of Contents.

Table of Contents

Public comment

DEQ received 83 written comments and six oral comments submitted by individuals and groups, expressing multiple themes as noted in this Response to Comment document. Comments received during the public comment period as well as comments received at the public hearing are summarized or stated below. DEQ responses follow each comment or group of comments.

1.0 COMMENTS RELATED TO LAND USE AND PROPERTY VALUES

1.1 DEQ received a comment asking DEQ to decline any land use expansion associated with the draft air quality permit.

DEQ Response: Where industrial facilities are allowed to locate is a zoning issue and not within DEQ jurisdiction. DEQ received Land Use Compatibility Statements from the City of Hillsboro and Washington county that allow this type of operation to be located at the current sites. Determining which types of projects are appropriate for economic development in an area and allowed under land use laws is within the jurisdiction of the local land use agencies – typically cities and counties. DEQ evaluates the air emissions for the type of activity or activities proposed for a certain facility and, when a facility can meet all applicable requirements in current environmental law, DEQ will issue a permit and continue to monitor the facility for ongoing compliance.

1.2 DEQ received multiple comments regarding taxes paid by Intel, tax breaks received by Intel and other potential incentives or compensation Intel could offer local residents.

a. Intel reported revenues of $63 billion in 2022, while it already receives major tax breaks from the state and county. It has the money needed to do better in protecting the health of Washington County residents, and to reduce its climate impact. It has far more money than any individual who is being forced by our local government to pay higher taxes and fees for auto registration, gasoline, and proposed highway tolls. They need to pay their fair share.

b. I wonder what kind of reparation is the government planning for the communities that are going to be affected by this development? My kids and my family are going to breath a more polluted air on a daily basis as a result of this.

c. Any of Intel's facilities are looking to expand their pollutants, it is important to give residents within a certain distance the financial means to upgrade windows, HVAC systems, door seals, insulation, etc.
Like many people, I prefer to ventilate my home with open windows when there is temperate weather. If our opportunities for clean air are reduced, then we need to be able to make the aforementioned upgrades so that we can have high-quality air without significant increases to our utility bills. LAX airport made a deal with nearby residents in

this manner years ago due to air and noise pollution. It was a win-win. We can do the same here.

d. *If the state is approving the expansion of Intel and modification or their emissions permits in the name of profits and big corporate interests. The people in the neighborhoods around the campus should have a decrease in their property taxes as a compensation from having to breath a more polluted air. Is that part of the plan? I am also concerned about property values as we are going to live in a more contaminated area as a result of this government decision.*

DEQ Response: Property tax questions, like land use decisions, are not within DEQ's jurisdiction. Any potential incentives Intel could offer local residents would be under the exclusive purview of Intel. DEQ does not have the authority to compensate homeowners for potential property impacts under our permitting rules.

2.0 COMMENTS RELATED TO PER- AND POLYFLUOROALKYL SUBSTANCE (PFAS)

2.1 DEQ received comments regarding the use of PFAS use in the semiconductor industry. Below is a consolidation of the comments received.

a. *Oregon DEQ should begin to address air pollution from PFAS - "per- and poly-fluoroalkyl substances" in computer manufacture now – in this permit. It is acknowledged by the computer industry that PFAS are widely used in making chips. Today safer alternatives are available and should be required now – in the new permit. Intel should not be permitted to use surfactants or other chemicals that contain PFAS when safer alternative exist. Intel as a national leader in the electronics manufacturing industry should be setting the best example of environmental stewardship regarding the use of toxic chemicals such as PFAS chemicals in chip manufacture. DEQ should be updating our laws and regulations to assure that air, water and workers are protected from harm caused by PFAS chemicals used to make "chips".*

DEQ Response: DEQ appreciates the extensive information provided by the commenter related to Per- and Polyfluoroalkyl Substances (PFAS) usage in the manufacture of semiconductors. PFAS are a class of chemicals containing thousands of different compounds. EPA has established restrictive drinking water standards for several of these chemicals that have been identified to be highly toxic.

DEQ is currently in the process of developing a strategic approach to address PFAS across DEQ's environmental programs in air, water and land. Once this strategy is completed (expected in 2024), implementation activities will be prioritized in each of these areas. Upon completion, information will be posted on DEQ's PFAS web page: https://www.oregon.gov/deq/hazards-and-cleanup/toxicreduction/pages/pfas-in-oregon.aspx.

Currently, PFAS chemicals are not listed as hazardous air pollutants and are not regulated by the Federal Clean Air Act, which is why they are not addressed in the current permit modification. The Cleaner Air Oregon program currently requires reporting on emissions of a number of these compounds, and DEQ anticipates that future rulemakings for the CAO program will result in establishing health-based standards for several PFAS compounds. When Intel is called-in to the CAO program to perform a Risk Assessment, DEQ will require emissions estimates for PFAS compounds, and if applicable, could require risk estimates from some of these emissions.

3.0 COMMENTS REGARDING PERMITTING

3.1 DEQ received comments and questions regarding why Intel's permit is not a Title V permit, questions about costs and what the fees cover, and a request not to grant the permit under a single permit.

a. Why isn't this permit a Title V permit?

DEQ Response: The construction project such as the one that Intel is undertaking is classified as a Type 4 change under Oregon Administrative Rules 340-210-0225(4). Type 4 changes include construction or modification subject to New Source Review under OAR chapter 340, division 224.

OAR 340-210-0230 (5) requires that any person proposing a Type 4 change must comply with OAR chapter 340, division 224 and must submit an application for either a Construction Air Contaminant Discharge Permit, or a new or modified Standard Air Contaminant Discharge Permit, whichever is appropriate.

b. How much DEQ was charging Intel for this 5 year permit? The permit needs to be adequate enough to fund the activities of the permit. Permitting, reporting, enforcement, time and materials. How much will that cost? How is the amount of the permit assessed? Is it per ton emitted?

DEQ Response: The fee for this particular type of air quality permit is $63,000 as is set forth in Oregon Administrative Rules 340-216-8020 Table 2, Major New Source Review. This fee is only for the activities directly related to drafting and issuing the permit.

Intel is a Title V source and even though this is not a Title V permit and DEQ has not yet issued a Title V permit to Intel, Intel must pay Title V annual fees. Total Title V fees from all Title V sources are used to fund the Title V program; these fees cover on-going permit-related activities such as reviewing reports and enforcement, as well as other general costs associated with the administration of the Title V program. The annual Title V fees include a base fee that is currently $12,504.00 plus a per ton emissions fee that is currently $95.00 per ton. These fees are periodically adjusted for inflation.

b. I do not want the permit for Intel to be granted under a single air quality permit.

DEQ Response: Being under a single permit does not change the requirements that each of Intel's operations must meet.

3.2 DEQ received a comment about not granting the permit without further public input.

a. I do not want the permit for Intel to be granted without further public input.

DEQ Response: DEQ has sought public input on this permit in several ways and on a number of occasions. This included a public information meeting in which DEQ asked for input ahead of drafting the permit and putting the permit out for an extensive public comment period. For more information regarding DEQ's public outreach for the draft permit, see responses under 7.0 Public Outreach in this response document.

3.3 DEQ received a comment about not granting the permit without further inspections of the current chemicals and air pollution currently being released.

a. I do not want the permit for Intel to be granted without further inspections of the current chemicals and air pollution currently being released into our air in the local neighborhoods.

DEQ Response: Intel provided sufficient information about its processes and emissions that have enabled DEQ to thoroughly review and analyze the proposed activities for inclusion in the permit. DEQ has included additional monitoring requirements in the permit, called source testing, for several pollutants. For more information on the source testing requirements, please see the section entitled "Revised Source Testing Requirements" on page 50. Also, see responses under sections 4.0 Cleaner Air Oregon and 8.0 Health Impacts.

3.4 DEQ received a comment about not granting the permit without more stringent regulations.

a. I do not want the permit for Intel to be granted without more stringent and enforced regulations.

DEQ Response: The DEQ regulations and requirements that apply to this permitting action are stringent and Intel has met them. Once issued, DEQ will ensure compliance with permit conditions through a variety of methods including: reporting, monitoring and inspections. If violations occur, DEQ will take appropriate enforcement action.

3.5 DEQ received a comment regarding Intel's NOx pilot test.

a. When I asked why Intel couldn't try pilot-testing their new NOx emissions reduction system before receiving the permit to double emissions, one of Intel's representatives, stated that the testing of this system was tied to the permit to increase pollution. According to the public notice from the DEQ, the DEQ has combined the permits for the pilot test and the pollution expansion into one, for simplicity. Given the magnitude of Intel's pollution expansion request, I believe these permits should remain separate and

that the pilot test results should be available before Intel is permitted to expand its NOx output from 197 to 413 tons/yr.

DEQ Response: The NOx emission reduction system is an experimental system that Intel wishes to pilot test. Even though it will reduce NOx emissions if successful, OAR 340-210-0205(1)(b)(C) requires approval in a permit before Intel can operate the NOx pilot test system. Intel had applied to run this test under a separate permit modification before the application for the proposed plant expansion project was submitted. For simplicity, DEQ is including the pilot test and the expansion project in the same permitting process.

DEQ notes that the NOx emission rates in the permit do not take the NOx emission reduction system into account; if the pilot test is a failure, it will have no effect on permitted emissions levels.

Intel has met the requirements to be given this permit regardless of the NOx pilot test or its results. Further, the NOx pilot test is a voluntary action on Intel's part and DEQ cannot require Intel to make this test or to use it even if it is successful.

3.6 DEQ received a comment regarding the need for better information and emissions accuracy.

a. *Please make sure that Intel's emissions are accurate. I know that the data collected at the Hillsboro Airport is compared to what Intel reports but even DEQ admits they do not know how Intel gathers their data or reports emissions. It's in Intel's best interest to low ball their emissions. How can DEQ enforce a permit when they don't have accurate information. Through the Clean Air Act emissions are stated as public knowledge.*

I do not see information that describes how Intel estimates their emissions. How does Intel substantiate their data? The application seems to skirt "major source" designations and thus avoid technology standards. How is DEQ verifying the Intel data and model?

DEQ Response: Intel estimates their emissions using production data, hours of operation and emission factors. Some of those emission factors are derived from algorithms that Intel claims are Confidential Business Information. Confidential Business Information is exempt from public disclosure under OAR 340-214-0130 and ORS 192.311 to 192.478.

Information about emissions is public information, but the term "emissions" does not include the production and process information used to calculate emissions.

DEQ concluded that the permit application was complete for processing and analyzed Intel's emissions calculations. However, in response to concerns expressed during the public comment period, DEQ agrees that additional information about Intel's emissions is needed, and the permit has been revised to require testing to provide such information. This is discussed further in the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50.

3.7 DEQ received a comment about the need for increased emissions testing.

a. I am mildly alarmed at Intel's request to double their pollution emissions in our community. Intel has voluntarily suggested that they will increase the rate of testing for some of their pollution reduction equipment, but not said how many and how consistently. With such a large increase in emissions what is our community gaining from this? If Intel is indeed doubling their emissions should they not be held to linearly doubled emissions testing standards? Not arbitrarily partial testing.

DEQ Response: DEQ agrees that the testing proposed in the permit needs to be increased. This is discussed further in the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50.

3.8 DEQ received a comment about visible clouds or plumes from Intel.

a. I would like to close my first set of comments with a photo taken the morning of March 8, 2024, which shows plumes emitted from the Aloha campus in the background and the new Reed's Crossing Park (including a playground and dog park) in the foreground. Although these plumes are more visible because of the cool morning (and it is my limited understanding that the large plume may be primarily water), these plumes are an occasional point of discussion and concern on the informal neighborhood forum.*

** Photo is not included in this document.*

As a local home owner in Beaverton, I am concerned about the current "black smoke" emitted from the Aloha "fab" and have in the past inquired about its safety. You can imagine my concern when I received a flyer stating that Intel has asked to increase the amount of pollution the local "fabs" are permitted to emit.

DEQ Response: The large clouds or plumes rising from Intel come from Intel's cooling towers, which are part of Intel's closed loop heating water system that provides temperature control to fab tools and the fab Heating, Ventilating and Air Conditioning (HVAC) temperature control system. The plumes consist of saturated water vapor and tiny water droplets that condense out of the water vapor when the water vapor mixes with cooler ambient air. These cooling tower plumes are sometimes (incorrectly) called "steam plumes".

Cooling tower plumes appear a brilliant white when the observer and the sun are on the same side of the plume because the water droplets reflect sunlight. They can also appear very dark if the sun is behind the plume relative to the observer's location because the dense plume blocks sunlight from passing through it.

3.9 DEQ received a comment regarding fugitive emissions.

a. Does Intel perform stack testing or any tests on potential fugitive emissions from either plant? Are these available to the public? What compounds do these tests measure?

DEQ Response: The term “fugitive emissions” specifically refers to emissions from leaks, uncontrolled tank vents and emissions that do not come from stacks. Intel is not required to perform testing for potential fugitive emissions at either plant. However, Intel operates its emissions collection and control systems under negative pressure, meaning the pressure inside the collection and control systems is less than the atmospheric pressure outside the system. Any leakage goes into the collection and control systems rather than out.

If the comment was referring to regulated emissions from stacks, this is discussed in the section in the permit entitled “Revised Emissions Testing Requirements (Source Testing)”, page 50.

The permit also includes fugitive emissions from cleaning microprocessor production tools with isopropyl alcohol. The emissions of isopropyl alcohol are tracked by a method called mass balance; that is, it is assumed that all isopropyl alcohol used is emitted and the emissions are equal to the amount used, which can be tracked by keeping records of use. Stack testing of these emissions is unnecessary and is not required.

3.10 DEQ received questions/comments about Ambient Monitoring and Hazardous Air Pollutants.

a. *I see additional air monitoring will be conducted for NOx. Is there any planned air monitoring for other NAAQS or HAPs? What are the existing property boundary monitoring programs for the Intel campuses, if any; and what pollutants do they include? Where are the closest DEQ or federal air monitors in relation to the Intel campuses; and what pollutant do they include? Based on Table 6 of the Air Modeling Report (dated July 2023), it appears that none of the existing air monitors measure HAPs. Is there a monitoring schedule/program DEQ will implement to ensure Intel’s compliance with the permit? If there is a program, what pollutants will this include and what will be the frequency of this program?*

b. *Our 6-and 9-year-old granddaughters live with their parents only two blocks away from Intel's Ronler Acres semiconductor facility. As a parent, grandparent and advocate for all people living close to Intel's facilities in Washington County and farther away because of the distances that some air emissions travel, please address the following concerns and comments before issuing to Intel a Prevention of Significant Deterioration air permit.*

c. *Intel seems to work very hard to prevent being classified as a Major Federal Source of air pollution - from being classified as a facility that exceeds the emissions based upon the National Emissions Standards for Hazardous Air Pollutants or NESHAPs. A facility is considered a major source if it emits 10 tons per year of any single air pollutant or 25 tons per year in all the combined hazardous air pollutants. Intel states that is requesting to emit 24 tons per year in the aggregate, just one ton below the major source for all HAPS, then for individual HAPS, 8.9 tons per year of hydrogen fluoride; about one ton below what would trigger a major source obligation. My understanding is that Intel has provided its own data, and that DEQ is relying upon that data during the modeling process.*

d. *How can the public be assured that Intel has provided all the information to ensure that Intel is not itself a major source, which would invoke different technology standards?*

e. HAPS emissions will be at levels with razor thin margins to standards that could require stricter conditions, specifically surpassing the 25 tons threshold for a major source. Intel should be required to provide more information about how it is going to control these, and assurances that demonstrate it is.

DEQ Response: In 2023, Intel was inspected by the U.S. Environmental Protection Agency's National Enforcement Investigations Center. As part of that inspection, EPA requested information to validate Intel's claim that they are not a major source of hazardous air pollutants. The information Intel provided to EPA indicated that:

- Hydrogen fluoride and hydrogen chloride comprise essentially 100% of Intel's HAP emissions.
- Intel identified other HAPs in its application, but these estimated quantities are very low and are below source test detection limits.
- Intel's maximum HAP emissions from December 2020 through June 2023 on a 12-month rolling total basis were 6.6 tons per year, with maximum hydrogen fluoride and hydrogen chloride emissions of 4.1 and 2.5 tons per year, respectively.

DEQ independently estimated the maximum hydrogen fluoride emissions from the acid gas and ammonia (EXSC and EXAM) scrubbers using the results of two source tests conducted in 2016 and 2023. The estimates are 8.13 tons of hydrogen fluoride per year using the 2016 test results and 4.78 tons of HF per year using the 2023 test results. These results help to substantiate Intel's claim that it is not a major HAP source. For further information, please see **"**DEQ Response: Synthetic Minor Source (NEIC)" on page 64.

The permit requires Intel to perform source testing for HF and HCl annually. This annual testing will provide additional information to verify Intel's HF and HCl emissions calculations. This is discussed further in the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50.

The draft permit included a requirement to conduct ambient monitoring for NOx for five years at one location. The final permit revised this requirement to conduct ambient monitoring for NOx and PM2.5 for three years. This might require one monitoring station, or possibly two monitors placed at different locations; this will be determined when Intel submits a proposed monitoring plan to DEQ. The monitoring must begin by April 1, 2028, when emissions are expected to be higher than they are in 2024. The same permit condition requires Intel to post the monitoring results online.

3.11 DEQ received a comment about whether thermal oxidizer emissions are included in total emissions.

a. My understanding is that Intel is using destruction technology, meaning for some gases, they have little combustion units like oxidizers, breaking those molecules up by subjecting them to heat. That is creating a suite of other pollutants. Some of them are hazardous air pollutants. Question: Are those considered in the calculations for the totals?

DEQ Response: Intel uses pollution controls called thermal oxidizers to reduce certain emissions, primarily Volatile Organic Compounds (VOCs). The thermal oxidizers burn natural gas to destroy VOCs and other emissions; as noted in the comment, burning natural gas does produce other pollutants, such as carbon dioxide, nitrogen oxides, carbon monoxide and particulate matter. Emissions produced by thermal oxidizers are considered in the calculations of Intel's total emissions.

3.12 DEQ received a comment about oversight and compliance assurance.

a. How does DEQ plan to oversee Intel's monitoring of its emissions?

DEQ Response: Intel will be required to report its emissions on a regular basis, and DEQ will review these reports and compare the reported emissions to the emissions limits in the permit. In addition, DEQ will conduct on-site inspections periodically, both announced and unannounced. One of the main purposes of inspections is to ensure that Intel reports its emissions correctly.

3.13 DEQ received a comment regarding future emission control updating.

a. Will DEQ require Intel to update its emission control equipment as new technologies emerge going forward?

DEQ Response: The only time emission control equipment is reviewed for possible improvements or updates is when a facility triggers the permitting programs known as Major New Source Review and Prevention of Significant Deterioration, as Intel did for this permit. Under these programs, a pollutant-specific Best Available Control Technology analysis of all available emissions controls is required. A BACT analysis is not required at other times.

Intel already operates a number of emission controls. The BACT analysis for this permit did not identify any new emission control systems that would provide better pollution control.

3.14 DEQ received a comment about reducing PM emissions during inversions and wildfire smoke inundations.

a. Does Intel have the ability to shut down particulate matter emissions during air quality emergencies such as temperature inversions and wildfire smoke inundations?

DEQ Response: On days when DEQ issues an air quality advisory for PM2.5 or a smoke advisory is declared, Intel must limit the maintenance and readiness testing of their emergency generators. The emergency generators are powered by large diesel engines which emit PM2.5 and other pollutants. These emergency engines, referred to in the permit as RICE or Reciprocating Internal Combustion Engines, must be operated periodically for maintenance and readiness purposes.

3.15 DEQ received a comment about Continuous Emissions Monitoring Systems (CEMS)

a. DEQ should increase the locations and duration of emissions monitoring (CEMS).

DEQ Response: Intel is not required to use CEMS. At this time, DEQ has determined that emissions testing (source testing), is the best method for better understanding and quantifying Intel's emissions. This is discussed further in the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50.

3.16 DEQ received a comment stating that other plants will demand similar emission limits.

a. By allowing Intel to double their emissions, you have now set a precedent for the 15+ semi-conductor industries that are planned for the 1800 acre plot of land adjacent to HWY 26 and Evergreen Blvd. These plants will insist on the same toxic emission rates as you have allowed for the Intel plants.

DEQ Response: DEQ is issuing this permit because it complies with environmental laws. Other semiconductor companies are subject to the same rules. The limiting factor is the federal air quality standards, called the National Ambient Air Quality Standards, which may not be exceeded. If any facility requested permission to emit more, and those emissions would result in an exceedance of the NAAQS, then the request would be denied. Intel's emissions do not result in an exceedance of the NAAQS. For more information about how DEQ made this determination, see section 5.0 Modeling.

3.17 DEQ received a comment regarding the "Scrubber incident."

a. In a recent incident, Intel left a scrubber disabled for nine weeks at the Hillsboro plant, and no one knew, and there was no monitoring in the area that caught the problem. Were it not for a conscientious employee, the scrubber might have been off for much longer.

DEQ Response: The scrubber in question was operating, but the pH control system that helps ensure efficient operation was left off. DEQ has added a new condition to the permit that requires Intel to inspect pollution control devices to ensure that the device control systems are properly configured for normal operation before they are brought into use. For more information, please see response under 12.0, Previous Enforcement, in this response document.

3.18 DEQ received a comment regarding independent toxics monitoring, post emissions.

a. Intel has been fined by DEQ for other emissions problems in the past. I want to be sure any renewal of their air quality permit comes with a mandatory requirement to have independent toxics monitoring installed in nearby neighborhoods so we can be assured the company is complying with environmental regulations. There needs to be complete transparency by Intel of its emissions with the data posted online and periodically updated so nearby residents can be aware of emissions. Please do everything you can to make this happen.

DEQ Response: DEQ does not have the authority to require anyone to conduct independent toxics monitoring. DEQ also cannot require anyone to post emissions data online; however, emissions reports submitted to DEQ are public information and can be viewed at a DEQ office or by making a public records request online at https://ordeq/publicrecords.

3.19 DEQ received comments about compliance.

a. Past environmental lapses: Previous incidents of non-compliance and emission issues raised concerns about future adherence to environmental regulations.

b. Enhanced monitoring: Improved data collection and verification of emissions to ensure compliance and address past lapses.

DEQ Response: Major industrial facilities are often very complex operations, and occasional permit violations do occur. Intel is no exception. However, Intel took action to resolve violations when they occurred. DEQ has also revised the permit when violations have occurred to help ensure that the violations are not repeated. DEQ will also carry out its normal reviews and inspections to ensure compliance with all permit conditions and take appropriate enforcement action when violations occur.

Improved data collection and verification is discussed further in the section entitled “Revised Emissions Testing Requirements (Source Testing)”, page 50. In addition, the permit contains a new condition requiring Intel to inspect any emission control device before it is put back into service after being shut down to ensure it is properly configured for normal operation.

4.0 CLEANER AIR OREGON

4.1 DEQ received numerous comments regarding the need for DEQ to conduct a full risk assessment prior to approving the draft air quality permit modification. The following are provided as examples, but are not an exhaustive list of such comments:

a. *Intel should be required to join Cleaner Air Oregon before this permit is granted. A human health risk assessment needs to be conducted before releasing double the emissions. Especially for sensitive cohorts like children and those with breathing problems.*

b. *Is there an obligation for DEQ or Intel to perform a health risk assessment for the permit? (i.e., use modeled airborne concentrations to estimate human exposures for comparison to health benchmarks). Specifically, what are the contributions to health risk by compound released (primarily speaking to HAPs)?*

c. *Has DEQ or Intel performed a health risk assessment for either facility past/present?*

d. *Cleaner Air Oregon was established to be the health component to assure people of that. Because Intel uses so many hazardous, corrosive, toxic chemicals in their processes and that without assessing the emissions that are created by them, a higher standard of safety needs to be used. Intel needs to be called into Cleaner Air Oregon sooner rather than later.*

e. *We urge the Department of Environmental Quality (DEQ) to conduct a comprehensive assessment of the proposed increase in emissions, taking into account its proximity to the elementary school and the potential consequences on air quality standards, public health, and environmental sustainability. Transparent communication and stakeholder engagement throughout this process are crucial to ensuring that all concerns and perspectives are adequately addressed.*

f. *In conclusion, we respectfully request that the DEQ carefully scrutinize the proposed increase in air quality emissions for Intel and take immediate and appropriate measures to mitigate any adverse impacts on our community and the environment, especially considering its proximity to the elementary school.*

g. *Health impact assessments: Comprehensive evaluation of potential health risks associated with the expansion before and during operations.*

h. *We cannot depend on Cleaner Air Oregon to "call in" Intel--that make delay us for a decade.*

i. *I urge DEQ to pause this process to allow for the proper implementation of Clear Air Oregon (CAO) rules, and not allow Intel to get through now on a technicality related to the recent Appeals Court decision. Rather than wait up to a decade to "call in" Intel to comply with CAO, let's have that compliance now.*

DEQ Response: The Cleaner Air Oregon Program was established in 2018 to assess the potential health risks posed by emissions of toxic air contaminants from industrial and commercial facilities to nearby communities. The program requires that all facilities with air quality operating permits in the state perform a risk assessment and be regulated to health-based standards.

DEQ developed a prioritization protocol for "calling-in" the approximately 350 existing permitted facilities into the CAO program to perform their individual risk assessments. Using this protocol, DEQ established three prioritization groups for this process – groups one and two, both having 20 facilities, with the remaining facilities in group three. DEQ determined Intel would be in the second group of sources based on screening risk levels, proximity to residences, and pre-existing controls. DEQ will begin calling-in facilities from group two in April of 2024, and will continue to call-in sources every other month until completed, which will be in late 2025.

For the proposed permit modification, the CAO program rules required that Intel submit an emissions inventory for review. DEQ reviewed and approved the inventory Intel submitted as part of the permit application, noting increased emissions in toxic air contaminants. Based on the extensive controls specific to limiting emissions of the primary toxic air contaminants from the facility and the projected timeline for the proposed production increases at this facility, DEQ has confirmed the CAO call-in order based on the original prioritization.

DEQ anticipates calling Intel into the program in April 2025, when they will perform a complete risk assessment as required under the rules of the program. At that time DEQ will evaluate in more detail emissions of all toxic air contaminants, which for Cleaner Air Oregon, includes a list of over 630 chemicals – of interest for this facility are hydrogen fluoride and other fluoride emissions, as well as Per- and Polyfluoroalkyl Substance (PFAS) emissions. DEQ will determine the representativeness of emission estimation methodologies and assess both annual and short-term (daily) risk from operational activities. Given the complexity of Intel's manufacturing process and operations, DEQ anticipates that the assessment could take up to two to three years to complete. At the end of this process DEQ will determine risk and what additional permit conditions may be required to meet the program's health-based regulatory standards.

4.2 DEQ received a question regarding the involvement of other state and federal agencies prior to permit issuance.

a. What state and or federal health authorities will be asked to review the request for potential health risks before a decision is reached?

DEQ Response: DEQ conducted modeling for federally regulated pollutants to ensure that the increased emissions would not exceed the federal air quality standards set by the U.S. Environmental Protection Agency. The federal air quality standards are designed to protect public health. EPA reviewed DEQ's draft permit and provided input to DEQ on interpretation and assessment of the modeling results. For more information, please see responses under 5.0 Modeling section of this response document.

Intel will be "called in" to DEQ's Cleaner Air Oregon program in 2025, which will require Intel to perform a health risk assessment based on toxic air contaminant emissions. The Oregon Health

Authority (another state agency) will also be part of reviewing the risk assessment to assist with interpreting and communicating any significant risk. For more information, please see responses above and 8.0 Health Impacts in this response document.

In summary, consultation with state and federal public health authorities happens during the creation of air quality standards so that permits may be evaluated against those standards and maintain limits that will protect public health.

4.3 DEQ received comments regarding volatile organic compounds (VOCs) in the air quality permit.

a. Intel's expansion and application for modifications to its existing air quality permit brings up several concerns. For one Intel wants to double the amount of VOCs it will emit under the permit modification and it is my understanding that the Clean Air Act does not have provisions for covering VOCs. With this in mind will DEQ or Cleaner Air Oregon require testing and regulation control for VOCs many of which can be very harmful to human health.

DEQ Response: Volatile organic compounds (VOCs) are regulated pollutants under the Clean Air Act and Oregon's environmental regulations. Intel's production processes emit VOCs that are captured and routed to VOC control devices known as rotor concentrator thermal oxidizers for destruction. VOCs are currently regulated under the permit and Intel is required to operate emission control systems to reduce VOC emissions from their production processes. The permit also requires periodic testing of the pollution control devices to ensure proper destruction of the VOCs. In addition to these VOCs, Intel also uses isopropyl alcohol to clean production equipment. The isopropyl alcohol evaporates and is emitted directly to the atmosphere as fugitive emissions.

VOCs are a general class of chemical pollutants which includes individual substances that cause negative health effects– some of these pollutants are designated as hazardous air pollutants under the Clean Air Act, and DEQ further designates a larger number of the pollutants as toxic air contaminants, or TACs, under the Cleaner Air Oregon program. When Intel is "called in" to the CAO program, DEQ will assess the potential health risks from the VOC emissions that are designated as TACs and determine the appropriate permit conditions to ensure the risk meets health-based standards. See above 4.1 CAO response.

5.0 MODELING

DEQ received comments regarding the modeling and air quality analysis that was required for this permitting action. Intel performed the analysis and DEQ reviewed it. The comments and corresponding responses are grouped into the following subcategories and are provided as examples but are not an exhaustive list of such comments.

5.1 DEQ received comments regarding NOx emissions and impacts in neighborhoods.

a. *There is concern because the NOx limit approaches the maximum allowable level set by federal standards. Could you please share any research or studies done on the impact of the elevated NOx levels to residents of Hillsboro?*

b. *My concern is particularly heightened because the NOx limit approaches the maximum allowable level set by federal standards. Have you quantified the potential impacts on health? Increasing emissions in such proximity to residential areas is irresponsible.*

c. *I'm opposed to the increasing pollution limits for Intel, especially for NOx. as it is a residential area and these harmful gases although inside arbitrary limits can impact many people's lives especially children and older adults.*

DEQ Response: It is important to note the difference between the oxides of nitrogen expressed as NOx and NO2. NOx is a mixture of gases, principally NO2 and NO, and the mixture is referred to as NOx because it is not easy to determine the relative levels of NO2 and NO at their point of generation, usually fuel combustion. Of these, NO2 is the component of concern to public health and is regulated by the U.S. Environmental Protection Agency and assigned National Ambient Air Quality Standards (NAAQS) based on health criteria. These criteria include protection of sensitive groups such as children and older adults. Since the National Ambient Air Quality Standards are for exposure to NO2, all modeled and ambient monitoring concentration are for NO2 and not NOx.

Modeled concentrations of nitrogen oxides (NO2) approach the U.S. Environmental Protection Agency's National Ambient Air Quality Standards. However, these higher modeled concentrations are located within a few feet of the Ronler Acres property boundary and drop off rapidly away from the boundary, and in the vicinity of residential areas concentrations are well below the standards. Because of the relatively higher modeled concentrations of NO2 near the property boundary, an NO2 ambient monitoring plan will be required in the permit to measure actual NO2 levels at these locations near the property boundary.

d. *I see no model for National Ambient Air Quality Standards (NAAQS) for criteria pollutants such as NOx.*

DEQ Response: The U.S. Environmental Protection Agency established federal air quality standards called the National Ambient Air Quality Standards at levels to protect public health. These levels are developed by EPA in concert with committees of professionals with backgrounds in epidemiology and other scientific studies. After the levels are proposed and approved by EPA, they are regularly reviewed and revised by subsequent committees as new scientific studies and other evidence becomes available. The levels for all the criteria pollutants, including NO2, are established considering the effects on the most vulnerable exposure population, such as the very young and older adults. Intel must show compliance with these air quality standards at all locations, including schools and daycare centers.

e. Companies cluster in the same geographic area as Gordon Moore Park at Ronler Acres Campus. Impacted facilities include Preschool and Childcare are located within a few blocks. The permit prepared. does not mention these preschools and elementary schools in the draft. I can find nothing about the effects on sensitive human populations. Isn't it time for Oregon DEQ to include modeling that would protect these people in your regulatory requirements for chronic exposures? As you know, state plans can be more strict than federal mandates.

f. I urge DEQ to require from Intel a study of the social and economic landscape of the Tualatin Valley. The Hillsboro School District has eight Title One schools and the Beaverton School District has 16 Title One schools. Many of those schools are within a 3-kilometer radius of Ronler Acres and Aloha. DEQ should layer the topography in the Tualatin Valley (flat valley with mountain ranges surrounding it on three sides) with socioeconomic patterns and imagine why it seems this permit modification proposal brings economic improvement at the expense of the low-income.

DEQ Response: The New Source Review analysis that evaluates modeled concentrations of the criteria pollutants relative to the federal air quality standards, known as the National Ambient Air Quality Standards or NAAQS, applies to all areas outside of the Intel plant boundary irrespective of the population or activities affected. This is because the health assessment that underlies the NAAQS includes the health effects to the most sensitive populations, including children and older adults. As a result, modeled impacts of the criteria pollutants on specific areas or populations, including schools, daycare centers, residences, etc., are usually not separately evaluated as the health assessment is incorporated into the NAAQS.

The risk assessment of the toxic air contaminant emissions as part of the Cleaner Air Oregon program explicitly considers the types and locations of the population exposed, and identifies schools, daycare centers, residences, parks, and other areas where sensitive populations may be present. To be clear, the risk assessment of the toxic air contaminants as part of CAO is an entirely separate analysis from the NAAQS analysis that is part of New Source Review. For more information about CAO, please see responses under 4.0 of this response document.

g. Plume modeling proves that toxic air spreads to neighborhoods which are more vulnerable, adding to their cumulative health risk.

DEQ Response: The New Source Review modeling of Criteria Pollutants, which is the analysis discussed here and is used for approval of this permit modification treats all areas outside the plant boundary as equally subject to the NAAQS. Although modeling shows the emissions from the facility disperse broadly around the Ronler campus, the highest modeled concentrations are located in close proximity to the Ronler Acres property boundary and drop off rapidly away from the boundary. Concentrations in the residential neighborhoods are well below the standards than reported in the modeling report.

5.2 DEQ received comments regarding PM2.5 and long-distance impacts.

a. PM2.5 pollutants can travel quite far from their source, even to Portland where I live.

DEQ Response: PM2.5 can travel long distances; it's small mass means that it can stay suspended for longer periods of time before it is deposited by gravity.

For example, PM2.5 from wildfire events, where large amounts of material are burned generating enormous amounts of PM2.5 at high temperatures with high plumes and smoke layers, can travel long distances at high concentrations.

However, for the Intel analysis where PM2.5 is emitted at relatively low to moderate temperatures with low plume heights, the highest modeled concentrations, which are below the National Ambient Air Quality Standards, are located at or near the property boundary. The level of modeled concentrations falls off rapidly away from the property boundary, and were calculated out to about 12 miles, where concentrations were well below the Standards.

b. Although the immediate impact of PM2.5, NOx, and other gases will be in the Hillsboro/Aloha area, PM2.5 can be carried by the westerly winds a great distance. How much more air pollution can we tolerate in the Portland/Metro area? to do business without enough filters/scrubbers or controls to contain the PM2.5, NOx, etc.,.

DEQ Response: Based on emission rates and stack parameters, including stack velocity and temperature, dispersion modeling of non-reactive PM2.5 and NOx showed highest concentrations at the property boundary, and less than significant levels well before reaching the eastern reaches of the Tualatin Valley. A separate analysis of NOx as a precursor to ozone, a regional pollutant formed in the atmosphere, showed total ozone including the contribution from Intel to be below the NAAQS.

5.3 DEQ received comments about the new PM2.5 NAAQS.

a. In the March 2024, the USEPA adopted a new primary annual PM2.5 NAAQS standard (changed from 12 ug/m3 to 9 µg/m3). What impact, if any, does this have on the permit application and air modeling? For example, in Revised Appendix D (dated November 2023) Table 23 – the cumulative PM2.5 concentration, accounting for background, resulted in a concentration of 9.1 µg/m3 (i.e., exceeds the NAAQS).

b. Has anyone made an estimate of whether the new permit's levels of emissions would impact Washington County's ability to meet the new annual PM2.5 standards of 9 micrograms per square meter?

c. On Feb. 7, 2024, the EPA issued a new standard for annual PM2.5 emissions from 12.0 micrograms per cubic meter (µg/m3) to 9.0 µg/m3, based on scientific evidence that shows the current standard does not protect public health with an adequate margin of safety. as required by the Clean Air Act (CAA). Does this mean states have up until 2032 for attainment of this new standard? Does it mean that Intel can work under the old standard to build their new plants; or are they required to build them beginning now under the new standards?

DEQ Response: As noted in the comment, the U.S. Environmental Protection Agency has recently announced a revision to the annual National Ambient Air Quality Standard for PM2.5, changing it from 12 micrograms per cubic meter (ug/m3) to 9 ug/m3. This change will become

effective on May 6, 2024. Since the planned issue date of the permit is before the effective date, the current Intel expansion and permit action is not subject to the revised standard.

However, DEQ is aware of the closeness of total modeled PM2.5 concentration to the NAAQS. A major factor in evaluating PM2.5 concentrations in Oregon is the relatively high background concentration, and for the Tualatin Valley and Hillsboro the annual average background is about 60% of the NAAQS. At the same time as EPA was considering revising the standard, the DEQ Laboratory was re-evaluating the 2022 PM2.5 monitored values for Hare Field and flagged those hours of wildfire smoke intrusion. DEQ deemed these smoke impacts days to be an exceptional event and not part of the regional background.

In January 2024, the DEQ Laboratory issued a revised estimate of background and the multi-year average background fell from 6.6 to 6.2 ug/m3. Although the Intel permit will be issued prior to the effective date of the new standard, the model results for annual PM2.5 have been updated to include both the revised NAAQS together with a revised background in which the effects of wildfires in 2022 have been removed. The results show a project total of 2.5 ug/m3 which is then added to the background concentration of 6.2 ug/m3 for a combined total of 8.7 ug/m3 which is below the revised PM2.5 annual NAAQS of 9 ug/m3. The summary Table 2 in the modeling report has been revised to show these new concentrations. The modeling report is available online at: oregon.gov/deq/Programs/Documents/Intel-PSDModelingSummary and in DEQ Intel project files. Because of the relatively high modeled and background concentrations of PM2.5, DEQ is requiring PM2.5 ambient monitoring at or near the property boundary as a permit condition.

d. We ask that Intel provide sound data to demonstrate emissions will not exceed limits, especially for NO2 and PM 2.5. With PM 2.5 from unfiltered trucks and woodsmoke, we are already beyond healthy levels of PM 2.5 with its carcinogenic and respiratory risks.

DEQ Response: The emission rates used in the modeling that showed compliance with the health-based NAAQS, are tracked and reviewed over the life of the permit. Changes in these emission rates, or their associated emission parameters, could require additional modeling to show compliance with the standards. In regard to modeled concentrations and health impacts, DEQ defers to EPA and the setting of the NAAQS based on science and the deliberations of health professionals.

5.4 DEQ received a comment about impacts on farms, agriculture, soil, and visibility.

a. Intel operates in a valley surrounded by small family farms, some are conventionally farmed using herbicides and pesticides but a good many use only organic and regenerative practices, and we are concerned about pollution from Intel on the soils where we grow.

DEQ Response: As part of this analysis, Intel was required to address the impacts to vegetation around the facility. Using EPA guidance criteria, the modeling of emissions and their effects on vegetation in the vicinity of Intel showed no adverse impacts. More information can be found in the modeling report available online at… (See next page for link.)

oregon.gov/deq/Programs/Documents/Intel-PSDModelingSummary and in the DEQ Intel project files.

b. Given the significant increase in permitted NOx emissions, what analysis has the DEQ or Intel performed to assess the adverse effects of acid rain or haze to form? Particularly as this region has a higher moisture content at times/experiences more rain events.

DEQ Response: Intel followed EPA guidance to determine if emissions from the facility will cause negative impacts through deposition to vegetation. An analysis of wet and dry deposition was conducted, as described in the modeling report, and it was determined the levels of nitrogen deposition in the area around the project were estimated at 5.89 kilograms per hectare-year (kg/ha-yr), which is considered far below levels that would cause adverse effects.

Intel also demonstrated the impacts on visibility and deposition at affected Wilderness areas were below federal standards and not significant. After review, the Federal Land Managers (U.S. Forest Service and the National Park Service), concurred with the analysis and determined the increases in emissions from Intel were not a cause for concern for areas under their management.

c. The presentation does not show how much of a health risk this may pose on Intel's neighboring communities which includes many farmers and small families. There's also no information in the slides on how far into the region these pollutants will reach into the soil and air and to what level the emissions can impact our health.

DEQ Response: The modeling report of July 2023 and the subsequent updates and refinements showed that total modeled concentrations of the criteria pollutants, including those from Intel, to not be greater than the health-based National Ambient Air Quality Standards adopted by EPA, and therefore considered not to have adverse health impacts. An analysis in the modeling report of impacts to vegetation and agriculture also shows that impacts are within the acceptable guidance values established and documented by EPA.

d. The Tualatin Valley prides itself on its parks, greenways, waterways, trails, natural areas, and other amenities for fitness, health, and recreation. We enjoy clean water, clean air, and clean earth. I urge DEQ to require from Intel a parks impact study so that stakeholders truly understand the legacy at stake by adding more significant pollutants to the air.

DEQ Response: As described above, modeled air concentrations and deposition were found to not quantitatively adversely impact vegetation, soils, waterways, visibility, and other features of the natural environment based on EPA and other guidance. It is beyond the scope of the modeling and air quality analysis to assess the impact on the qualitative aspects of the natural environment, (i.e., parks).

5.5 DEQ received comments about meteorology as used in the modeling.

a. Which model of EPA accepted models is Intel using? AIR MOD or AIR SCREEN?

DEQ Response: Regarding model choice, AERMOD is the primary Gaussian plume dispersion model approved by EPA for the refined modeling of industrial sources such as Intel. AERSCREEN is a simplified screening model using the AERMOD algorithms but with conservative assumptions and uses conservative screening meteorology. The most recent version of AERMOD, as provided by the EPA, was used as the model for the Intel project.

b. Questions the air modeling capability of Atmospheric Dynamics, Inc. and requests Intel get a second opinion.

DEQ Response: DEQ reviews all modeling submissions with the same level of scrutiny to ensure the analysis was performed in accordance with EPA and State guidance and rules. Based on our review, DEQ concluded the modeling prepared by Atmospheric Dynamics and submitted by Intel meets the criteria set out by EPA to show compliance with the National Ambient Air Quality Standards using the AERMOD modeling system. Since Intel is classified as a federal major source, EPA has also reviewed the analysis. Both the modeling report submitted by Intel and the modeling summary written by DEQ detail the modeling that was conducted, including assumptions and modeling inputs, and are available online on the DEQ web page for Intel, https:ordeq.org/intel.

c. Based on the Air Modeling Report (July 2023), it appears the air model did not properly account for the Reed's Crossing development. For example, in the land use map (Figure 4), much of Reed's Crossing is categorized as undeveloped cultivated crops -- when in fact, some of this area has been developed. What impact, if any, does this misclassification (and others, where made) have on the air modeling methods and outcomes (i.e., rural v. urban classification)?

DEQ Response: The urban – rural classification is used in AERMOD to account for the heat island effect present in urban areas for the hours after sunset. Following EPA guidance, this determination is based on land use within three kilometers of the facility in question. For the Intel project, two areas were defined, respectively, for the Aloha and Ronler Acres properties, each with a radius of three kilometers. Based on EPA guidance, if an area thus circumscribed has more than 50% urban characteristics, which includes residential housing, commercial, and industrial uses, it is classified as an urban area, otherwise it is rural. Based on these criteria and the land use map used for the analysis, both Intel properties are located in areas classified as urban. The fact that Reed's Crossing is not yet shown on the land use map does not impact the urban rural classification, since the area is already classified as urban, and the absence of the Reed's Crossing development had no effect on the model results.

DEQ notes the Reed's Crossing development for when Intel is called-in to the Cleaner Air Oregon program. The Cleaner Air Oregon program carefully reviews active and future land use when determining risk from toxic air contaminants.

d. What are DEQ and Intel's obligations to incorporate the future planned land uses when drafting and approving permits?

DEQ Response: For modeling purposes, land use maps and other information are only available historically. Although land use mapping is revised periodically, and the most recent version readily available is used, it is not feasible to specifically generate a map more current to the time of permit application. For example, see Figure 4 of the modeling report for the land use map used for the Intel project modeling. The modeling report is available online at https://www.oregon.gov/deq/Programs/Documents/Intel-PSDModelingSummary.pdf, and in the DEQ Intel project files. Additionally, the Cleaner Air Oregon program carefully reviews active and future land use when determining risk from toxic air contaminants.

e. Are model output plume/contour maps (for modeled concentrations and particle deposition) available to the public to help us understand the behavior and extent of modeled concentrations and predicted impacts?

DEQ Response: Depending on the project and nature of the modeling, contour maps can be helpful for showing the pattern and magnitude of modeled concentrations. For the Intel analysis, the single source significance impact modeling plots can be found on p. 66 of Attachment C of Appendix D – Air Quality Impact Assessment (modeling report). Because of the size of the Intel property, and the dispersed nature of emissions points across the facility, the cumulative source modeling focused on the locations of highest modeled concentrations, which were located at the property boundaries. The plot that best identifies these high modeled concentrations is Figure 10 of Appendix D – Air Quality Impact Assessment (Revised) of Nov. 2023.

f. AERSURFACE version 20060, utilizing the 2016 National Land Cover Dataset, including tree canopy and impervious geotiff files, will be used." I urge DEQ to use a dataset newer than 2016. In the last 8 years, tree reduction mostly due to disease, weather, and development in the areas surrounding the Ronler Acres and Aloha Intel sites has been significant. A newer dataset would reflect this as well as the significant tree reduction that has taken place throughout the Portland metro area, which would be impacted by pollutants according to data on page 66.

DEQ Response: AERSURFACE is a program based on land use that characterizes important factors affecting air turbulence and dispersion. These factors include 1) soil moisture, and surface reflectivity or albedo, which affect the solar energy available for convective turbulence, and 2) the roughness of the land surface, such as trees and structures, which affect mechanical turbulence.

For determining soil moisture and reflectivity values, an area 10 kilometers by 10 kilometers centered on the meteorological tower is used, and for surface roughness values, land characteristics extending one kilometer from the tower are used. This information is taken from land use maps, which are dated by their nature, although they are revised periodically. It is not feasible to specifically generate a map current to the time of permit application, although adjustments can be made on a case-by-case basis for a major change. Since a large portion of

the land on and surrounding the Hillsboro Airport is dedicated to airport use, changes in land use have not been major, and the effects on average surface characteristics was not significant.

g. Regarding the meteorological analysis, various plumes will result from this expansion application. What will be their heights? When you apply the wind rose, at what elevations and distances will particulates fall out? The modeling uses a 3-kilometer radius, and we consider this too small. We recommend actual meteorological testing occur to vet the actual hazardous radius.

DEQ Response: The surface meteorological data collected at the Hillsboro Airport is first analyzed and quality-controlled by the National Weather Service. Prior to the use of data in the dispersion model, the data goes through multi-step pre-processing to ensure the data is complete, to refine the data to reflect conditions of the area of the airport, and to format the data for use in AERMOD. As a result, the meteorological data has been carefully reviewed and evaluated before use in the dispersion model.

Plume height is calculated by the model using a number of variables including stack height, stack temperature and exit velocity, the effect of nearby buildings, and windspeed and direction. The model also calculates pollutant concentrations at an array of points, usually laid out in a grid pattern, which can extend many kilometers from the facility. The grid points are usually assigned three dimensional coordinates and follow ground elevations.

The three kilometer radius is only used to identify urban or rural dispersion and is not used to limit the extent of the modeling. Depending on the pollutant and averaging time, the array of modeling receptors, or grid points where concentrations are modeled, can extend many kilometers from Intel, typically less than 15 kilometers.

h. We did not see a robust discussion of climate change in the meteorological analysis. This past year, we have experienced pineapple expresses, polar expresses and we are alternating between El Niño effects and La Niña effects. Rain quantity and wind velocity are impacted by these changing climate variables. Do these "new normals" factor in?

DEQ Response: Dispersion modeling as part of New Source Review, which is the current permit action, is limited to a data snapshot in time due to the need for accurate meteorological data. For the Intel modeling, the past five years of meteorology, measured at the nearby Hillsboro airport, were used. The effects of climate change are beyond the scope of New Source Review, and climate change is not specifically addressed in the modeling other than as it may be reflected in the five-year snapshot of local weather, which includes windspeed and direction, temperature, and precipitation.

5.6 DEQ received comments about ambient air monitoring.

a. We are concerned that the Hare Field Station is out of the prevailing winds from Ronler and Aloha and will not be the accurate measure it is intended to be. We are also concerned that the Sellwood [SE Lafayette] Monitoring Station is quite far (over hills and 10 miles) from Ronler and Aloha. We recommend additional most effective monitoring stations be placed within the Tualatin Valley with due regard to the facility locations, the prevailing winds, and within vetted hazard radiuses. The meteorological modeling needs verification.

DEQ Response: DEQ places ambient monitors, such as for PM2.5, in areas expected to have high concentrations and where people live and work. The Hare Field monitor is located in the center of a residential area where it is exposed to emissions from traffic on local streets, residential wood burning in the winter season, emissions from area wide commercial and industrial activities including data centers, other local industrial sources, and Intel.

When establishing background concentrations for an air quality analysis, the optimal choice is to use monitoring data that is most representative and nearest to the source being modeled. Since the establishment of an ambient monitor is very costly and resource intensive to set up and operate, DEQ is limited in the areas that can be selected for monitoring. As a result, existing monitoring data for a given pollutant may be located many miles from the area of interest. In such circumstances, monitoring data from all available sites are reviewed, and the most representative and protective set of data is selected and used. Such is the case for the use of monitoring data from SE Lafayette Street in Portland for use as background concentrations of pollutants in Hillsboro. Although distant from the Hillsboro area, the SE Lafayette monitor is located in a similar residential area, although exposed to higher pollution levels from street traffic and commercial and industrial activity. As a result, the SE Lafayette monitor is expected to give higher average readings, that is more protective, than if a similar monitor were to be placed in Hillsboro. Distinct from these background monitors, Intel will be required to install NO2 and PM2.5 property boundary monitors in support of Intel's air quality modeling and to ensure the NAAQS are met.

5.7 DEQ received comments about cumulative source inventory and modeling.

a. Will DEQ be measuring the emissions separately for each Intel location, or will you also be measuring the combined emissions of both plants, as many neighborhoods will be impacted by emissions from both sites?

DEQ Response: The emissions from both the Aloha and Ronler Acres facilities were included in a composite set of emissions that were modeled as operating simultaneously at each of their full potential to emit emission rates. As a result, all modeled pollutant concentrations included the contributions from both plant sites.

b. The plan increases carbon monoxide, sulfur dioxide, oxides of nitrogen, and other pollutants that are harmful to human health and in some cases carcinogenic. We urge you to consider the impact of the Intel proposal in relation to and cumulatively with other major Washington County polluters including the Hillsboro Airport, Stark's Twin Oaks Airpark, in combination with the many other chip factories, data centers and other industry polluters in the area.

DEQ Response: For the AERMOD dispersion modeling, the initial inventory of sources for the cumulative, or so-called competing source analysis, included most permitted sources with documented emissions that were located within a large area centered on Intel. The inventory did not include sources that were in planning or that had not yet been permitted. The inventory also did not explicitly include small, non-permitted sources of emissions, such as airports, residential wood heating, on-road vehicle emissions, etc. The emissions and resulting ambient concentrations from the smaller, un-regulated sources are assumed to be represented in the monitored background concentration. Additionally, DEQ is requiring an NO2 and PM2.5 ambient monitoring plans in the permit to measure actual NO2 and PM2.5 levels near the property boundary of the Ronler Acres campus.

5.8 DEQ received a comment regarding the NAAQS as protective of public health.

a. There are doubts about the current EPA limits and their capacity to adequately protect our community from the potential hazards associated with doubling of Intel's pollution. It is essential that the DEQ scrutinizes whether these limits align with the latest scientific understanding and best practices.

DEQ Response: The federal air quality standards, officially called the National Ambient Air Quality Standards, are the result of a long and detailed process that is based on health science, epidemiological studies, and the deliberations of health professionals. DEQ concluded the analysis provided by Intel demonstrates that Intel will operate within the federal air quality standards. In addition, because of the relatively high modeled concentrations of NO2, DEQ is requiring an NO2 ambient monitoring plan in the permit to measure actual NO2 levels near the property boundary. DEQ is also requiring PM2.5 ambient monitoring at or near the property boundary as a permit requirement.

6.0 CLIMATE CHANGE/GREENHOUSE GAS EMISSIONS/CLIMATEPROTECTION PROGRAM

6.1 DEQ received the following comments regarding Intel’s increase in greenhouse gas emissions and the effect on climate change as well as the Best Available Emissions Reduction element of the Climate Protection Program. The following are provided as examples, but are not an exhaustive list of such comments:

a. *Intel proposes to increase its GHG emissions by 906,560 tons per year, more than doubling the emissions from these facilities. This has major implications for the decarbonization goals of the state of Oregon and for Intel's own stated goal of achieving net-zero greenhouse gas emissions by 2040.[12] The doubling of emissions requires deeper scrutiny from DEQ, particularly as the stated GHG control measures in the permit refer only to current processes and Intel's plans for the facilities include operating as a "foundry" with potential different processes. The intent of the CPP is to "to reduce greenhouse gas emissions from sources in Oregon, achieve co-benefits from reduced emissions of other air contaminants, and enhance public welfare for Oregon communities, particularly environmental justice communities.*

b. *Intel has identified only two methods to reduce Green House Gases (GHGs). The application shows no new efforts to move towards the requirements of Cleaner Air Oregon and the Climate Protection Program. Please hold Intel accountable to these higher standards.*

c. *There are new and innovative solutions to decrease these greenhouse emissions, primarily within the hands of the equipment manufacturers themselves. I understand it's expensive to retrofit existing equipment to meet more strict environmental standards, but at the same time I see Intel as prioritizing their profits over environmental concerns. They won't do better at increased costs unless they're forced to. The air quality is going to get a lot worse, especially combined with the new Master plan South Hillsboro development with an additional 8000 planned homes with a boundary less than a mile from one of the fabs.*

d. *Finaly, we must all take a lesson from the world's Climate Crisis and remember that the long-term effects of our get-rich-quick schemes can cost us dearly, and may cost us the lives of our children and grandchildren.*

e. *The expansion of Intel to dramatically increase manufacturing capacity could come at a high and lasting cost. As Oregon's largest employer, Intel has the opportunity to take a strong leadership position in the state's climate action strategies, especially in the area of GHG reductions. Intel has a corporate responsibility to not only provide family wage jobs (which is does) but to do it in an environmentally responsible manner that supports community goals. I'm interested in what the company is planning to mitigate increased production capacity. More advanced air scrubbing technologies, energy efficiency measures in the plant? Incentives for employees to reduce their own carbon footprints? What does it say about Intel if it doesn't heed requirements on climate action?*

f. *Allowing a 110% increase in GHG emissions and a more than 90% increase in PM 2.5 emissions is* ***not*** *in the public's interest. And, we request that best available emissions reduction (BAER) control Intel's GHG emissions. I would like to see Intel set the example for their employees, for all the people living in Oregon and especially for all the other companies in Oregon. I want to hear Intel spokespersons say: No increase in Greenhouse Gas emissions anymore! Only REDUCTIONS, because Intel is an industry LEADER! Come on, Intel, you can do this. Be the industry leader we need you to be.*

g. *In 2020, Governor Brown signed EO-20-04 to reduce greenhouse gas emissions 45 % below 1990 emissions levels by 2035. Intel's request is taking Governor Brown's bill the opposite direction.*

h. *I am a resident in the Orenco neighborhood, I have a background in electrical engineering, and I am also a community activist concerned about the Climate Crisis. I attended the virtual public hearing on February 15th yesterday, and I was able to ask many questions regarding Intel's permit request to double their pollution output, including their GHGs. Thank you for the answers that you and the Intel representatives provided and for listening to our community's concerns.*

DEQ Response: DEQ is conducting a rulemaking to re-establish a climate mitigation program in place of the recently invalidated rules that established Oregon's Climate Protection Program. The Oregon Court of Appeals determined that DEQ did not fully comply with notice requirements during the 2021 rulemaking process for the program, thereby invalidating the rules and program. The court's ruling did not impact the Environmental Quality Commission's underlying authority to establish and enforce the Climate Protection Program. The Climate Protection Program 2024 rulemaking is scheduled to conclude by the end of 2024, with implementation expected to begin in 2025. More information is available on the rulemaking web page: https://www.oregon.gov/deq/rulemaking/Pages/CPP2024.aspx.

The Climate Protection Program used two approaches for reducing greenhouse gas emissions: declining and enforceable limits, or caps, on emissions from the use of fossil fuels, and a Best Available Emissions Reduction, or BAER, approach for other site-specific emissions at facilities, such as emissions from industrial processes. Companies regulated by the declining cap on emissions from the use and combustion of fossil fuels in Oregon included natural gas utilities and liquid fuels and propane suppliers. Intel was one of approximately 15 facilities which would have been regulated by the BAER component of the Climate Protection Program rules.

Key steps in the BAER process included DEQ notifying the facility in writing that they were being "called-in" to the program, the facility submitting a BAER assessment, DEQ's review of the facility's BAER assessment, including any requests for additional information, and a BAER order where DEQ would specify what actions, if any, the facility would have needed to take to comply with the program.

BAER was invalidated as part of the court decision mentioned above and would have to be re-established through the Climate Protection Program 2024 rulemaking.

6.2 DEQ received comments about carbon offsets and carbon pricing.

a. Where does DEQ obtain its carbon offsets? Are they purchased from a local exchange?

b. If the permit is approved, at least, condition it with a carbon pricing structure for emissions that is high enough to quickly incentivize the company to develop alternative production methods.

DEQ Response: Fuel suppliers regulated by the Climate Protection Program under the declining emission caps could have complied in part with the use of Community Climate Investments credits. Under this model, fuel suppliers would have been able to earn CCI credits by contributing funds to DEQ-approved third-party entities. The DEQ-approved entities would have invested any funds in projects that reduced greenhouse gas emissions in Oregon, prioritizing projects that benefited environmental justice communities. A regulated fuel supplier could only demonstrate compliance with the Climate Protection Program by using the compliance instruments DEQ distributed or by purchasing CCI credits. No other credits or offsets were acceptable.

The future approach to these "offsets" will be determined in the Climate Protection Program 2024 rulemaking. More information is available on the rulemaking web page: https://www.oregon.gov/deq/rulemaking/Pages/CPP2024.aspx. See answer to 6.1 above.

6.3 DEQ received a comment about the increase of greenhouse gas emissions as negative aspects of the expansion.

a. We ask that DEQ remember its responsibility to the residents and taxpayers of Oregon to temper aggressive corporate expansion with protection of the public from the negative impacts of this growth. Intel's proposal will more than double greenhouse gas emissions and the company will become the largest emitter of greenhouse gases in the state of Oregon.

DEQ Response: While DEQ is responsible for regulating facilities to ensure they operate within specified permit conditions that are protective of public health, DEQ is not responsible for controlling expansion of companies operating within Oregon. For more information about land use, please see responses under 1.0 Land use and property values section in this response document.

6.4 DEQ received a comment about the use of specialty gases on site at Intel.

a. If approved by DEQ, Intel would become the highest emitter of GHGs in Oregon. The Oregon State Fire Marshal report for Intel shows quite a few specialty gases on site. Does DEQ have information about which ones contribute to Intel's GHGs emissions?

DEQ Response: DEQ's Greenhouse Gas Reporting Program (OAR 340, Division 215) requires reporting of greenhouse gas emissions data and related information from major sources including large stationary sources with air quality permits, such as Intel. A stationary source must annually report emissions of the three most common greenhouse gases, carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O), and fluorinated greenhouse gases, including

but not limited to; hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6) and, for semiconductor facilities, GHGs originating from the use of heat transfer fluids. A summary of reported biogenic and anthropogenic greenhouse gas emissions data for these facilities is available at https://www.oregon.gov/deq/ghgp/Pages/GHG-Emissions.aspx.

7.0 PUBLIC OUTREACH

7.1 DEQ received the following comments regarding DEQ's outreach associated with this permitting action. The following are provided as examples, but are not an exhaustive list of such comments:

a. What methods did DEQ use to communicate updates regarding the proposed permitting action at Intel?

DEQ response: DEQ used a combination of email, phone, web and regular mail updates through multiple waves of notification, in English and in Spanish, since the initiation of this project, which began after Intel submitted its application in July 2023. Specific engagement with environmental justice populations has taken place through individuals and organizations such as:

- Neighbors for Clean Air (environmental advocacy organization)
- Earth Justice (environmental advocacy organization)
- Northwest Environmental Defense Center (environmental advocacy organization)
- Adelante Mujeres (Washington County community organization)
- Centro Cultural (Washington County community organization)
- Washington County commissioners

The input DEQ received came in via these forums:

- Feedback at the Oct. 11, 2023 public information meeting and at the public hearing on Feb. 15, 2024.
- Directly to the project manager via email in response to post cards and other outreach efforts
- In meetings and discussions with environmental advocacy organizations who represent EJ populations on multiple occasions to hear concerns and consider suggestions.

7.2 DEQ received comments from several residents in the Reed's Crossing community and one other neighborhood that did not get a post card regarding the public hearing despite being in the two-mile radius of the Intel Aloha campus.

a. Many residents including me are barely starting to hear about this, and many in my neighborhood are still not aware of this as I and other's didn't get any mail about it. As you likely know - folks aren't checking the DEQ page regularly to be apprised and those mailers are important to raise awareness.

I want to make sure my neighbors (and I) who moved to the area in 2023 (with new houses / new addresses) were included in the post card mailing that went out, and that…

the database you used is current.

These would be addresses south of TV Hwy, between Cornelius Pass Road and 209th Ave, and north of McInnis Lane. It's a brand new development and many of us never received a postcard notice of this process though we are within 1/2 mile of the Aloha campus for Intel. Thanks for your help, work, and support.

b. *Although we live less than one-half mile from Intel's Aloha campus, we never received notification of the September 7, 2023 or the October 11, 2023 virtual public information meetings; nor did we receive notification of the February 15, 2024 virtual public hearing.*

c. *As I mentioned above, I am appreciative of the department's transparency in providing the permit materials for review and facilitating public meetings. However, I fear that the public outreach did not fully account for the large, ongoing development of Reed's Crossing.*

d. *First, I read in the Public Meeting Slides (dated 2/15/2014) that 36,000 postcards were sent to residents and businesses within two miles of both plants (Aloha and Ronler Acres) in January. I reside within 0.5 miles of the Aloha property boundary and did not receive a postcard. I am concerned that because my address is "new" within the last year, I did not receive the intended notification. In an informal, limited survey of my neighbors across the entire development (some resident tenures dated back several years), there was a split that did or did not receive a notification. On my same street, I am unaware of anyone who received a notification.*

e. *I am well-aware of the challenges of having a new USPS address and can understand if mailed postcards did not include new addresses. However, Reed's Crossing is a major development that has been under construction for several years. And due to our near-property boundary proximity to the Aloha campus, extra consideration should have been made to ensure proper public outreach and "community-right-to-know" measures (e.g., hand-deliver postcards, communicate via the HOA). The same considerations should have been made to the development builders because of the frequent and extended time tradesmen spend outdoors during the development construction.*

DEQ response: DEQ regrets that some post cards were not delivered as intended. The primary methods DEQ uses to publicize information regarding permitting and other regulatory actions include web page postings, electronic communication through our GovDelivery system and working with a variety of organizations and advocacy groups. Post card mailings are not required, nor a primary method DEQ uses to inform community members of potential permitting actions, but in this case DEQ decided to use post cards on two distinct occasions. First, within a one-mile radius of the Intel Aloha and Ronler acres sites when major updates to the web page were added in October 2023 and then again in January 2024 to a two-mile radius (36,000 in total), of both Intel sites.

DEQ has investigated the reason for why the post cards to the Reed's Crossing community weren't delivered. Evidently, although the community is well within the two-mile radius of the Aloha Intel site, the U.S. Postal Service's Every Door Direct Mail program mapping tool does not show any carrier routes for Reed's Crossing or for much of the 97007 zip code. DEQ followed

up with the USPS representatives to better understand how USPS is informed when housing is established and residents are located in an area. DEQ learned that cities and 911 call centers are the jurisdictions that assign zip codes in geographic areas and communicate that information to USPS. In some cases (Reed's Crossing, zip code 97007), the local mail delivery comes from a different zip code, 97123. In order for mailings through the EDDM system to be delivered to Reed's Crossing, DEQ would have had to identify a specific carrier route within 97123, specifically carrier route 56, for the post cards to have been delivered to 97007.

This information will help inform future communication efforts. DEQ appreciates the feedback from the community so we can improve our outreach going forward.

The most reliable and secure way for community members to stay informed and receive updates is to sign up through GovDelivery, DEQ's email listserv. Check the box that says 'Air Quality Permits': https://public.govdelivery.com/accounts/ORDEQ/subscriber/new?topic_id=ORDEQ_692.

8.0 HEALTH IMPACTS

8.1 DEQ received numerous comments regarding health impacts from the proposed emissions increases in Intel's draft permit. The following are provided as examples but are not an exhaustive list of such comments. In some cases, commenters provided personal medical information which has been excluded.

a. *I am a SE Portland resident, and I am not an expert in this issue. However, I am very concerned that DEQ will not require sufficient measures to reduce the amount of additional pollution/;emissions/greenhouse gases from the proposed expansion. I understand this expansion will provide numerous economic benefits, but I don't see how the Portland metro area can absorb such a large amount of additional pollution without worsening the already high levels of air pollution from which we all suffer, especially those with weak immune systems or breathing problems.*

b. *As a resident of Reed's Crossing with two small children, I am very much opposed to the increase in pollution that is being proposed. We should be trying to make our air quality better, not sacrificing it for short term profits. If Intel wants to manufacture new products, it should be on them to develop a way to do it without increasing pollution, and not at the cost of the air my children will breathe.*

c. *I am writing this letter as a concerned resident who lives less than 1/2 mile away from the Intel Campus in Aloha. I built a home here to live in without the thought of the threat of emissions being of concern. I find it appalling actually that I am even having to write this. Reeds Crossing is a mixed use master planned community that should NOT have to take into account an emissions / pollution issue. This is just too close to where people live, where families are being raised. Please take this into consideration when looking at this. The reality is that our health should outweigh any decision to consider this even being allowable. I hope the DEQ considers what the impact on the community might be with this massive increase in emissions.*

e. *I am one of many residents only ~0.5miles away from the Aloha campus proposing increased emissions. I ride my bike next to this site to get to work. This Intel site is situated in a location that has expanded immensely to accommodate new housing, South Hillsboro which I am a part of is the largest housing development in Oregon and has been brought inside the urban growth boundary. I am greatly concerned about this emissions increase and do not find it aligned with the housing goals of this area. I find it unwise to grant increases at this site, at current levels I am already concerned of health impacts and many residents have experienced occasional industrial smells lingering in the air. I am proud of the way Oregon has established an urban growth boundary to be strategic about it's land use, and such practice helps open up land outside the UGB for farmland and other industrial uses like Intel is requesting. I am not opposed to Intel's development and many of us residents are in the tech industry or even directly employed by Intel, but if this site is to accommodate more manufacturing, then the site should invest into capturing this pollution so that it does not harm the growing communities in this area.*

f. *I am a resident at Reeds's Crossing barely .5 miles away from the Intel Aloha campus. Based on the Intel Draft Air Permit, there are plans to introduce new pollutants e.g. Increased PM, Carbon Monoxide which are dangerous elements to be exposed. Being a parent with toddler kids myself and for the community where there are growing kids and elderly folks I would like to request sincerely for reduced emissions from Intel Aloha campus.*

g. *I am a resident in less than 1/2 mile from the Intel campus in Aloha. I live and work in Hillsboro adjacent to the Ronler Acres campus I am strongly in opposition to the increased pollution and emissions limits for Intel, particularly since the NOX limit approaches the maximum allowable by federal standards.*

h. *As a resident less than 1/2 mile from the Intel campus in Aloha and who conducts life and work in Hillsboro adjacent to the Ronler Acres campus I am strongly in opposition to the increased pollution and emissions limits for Intel, particularly since the NOX limit approaches the maximum allowable by federal standards.*

i. *While profits and economy are an understandable concern, it is not in the best interest of community public health (have you quantified these potential impacts?) to increase emissions in such an area so close-in to residences. This is irresponsible and I would not be in favor of this unless pollution controls are far stronger, even though you outline they are already stringent. We are in a climate crisis, this is the wrong direction to be going.*

j. *This decision would impact real people, including all the thousands of Intel employees who live in the area. My grandsons live within a few miles of the Intel campus, and hundreds/thousands of children are in schools and daycare centers close by. There are many senior living complexes in the vicinity with older people, many of whom have compromised immune systems. What assurances do the families have that the air will be safe? Intel's air quality permit modification raises serious concerns about the health, environmental, and climate impacts that will result from an expanded plant's increased pollution. The expansion will result in sharp increases in harmful air pollutants, including particulate matter, and a doubling of greenhouse gas emissions. Clearly, this will lead to*

adverse health effects, including preventable deaths, and exacerbate the climate crisis. The most concerning aspect of the permit application is that it will allow Intel to emit 27 more tons of particulate matter a year.

k. *My wife and I live on Taurus place in Beaverton, less than 2 miles from the Intel Aloha campus. In that less than 2 mile drive are hundreds of homes where local residents live, work, and go to school. I'm very opposed to granting Intel the ability to increase emissions from their campus. The campus is too close to residential areas and local schools for there to be more air pollution. This is a public health concern.*

l. *Considering the location right in the middle of a residential area, with sensitive populations nearby including school children, elderly people, people in nearby care facilities, and people living and working in the area who have respiratory issues, I would urge the Department of Environmental Quality to work with Intel to reduce PM 2.5 emissions, not allow an almost doubling of emissions. We are local residents residing in SE Hillsboro, about 2 miles from the Aloha Intel plant.*

DEQ Response: DEQ acknowledges public concern regarding how proposed increases in pollution emitted from Intel might impact health, particularly the health of vulnerable populations such as children and older adults.

There are two regulatory mechanisms that DEQ has for ensuring that Intel's air quality permit is protective of public health. The first regulatory requirement, and the one used for approval of this permit modification, is based on what are called "criteria pollutants," such as particulate matter, sulfur dioxide (SO2), and nitrogen oxides (NO2), as examples. These pollutants are regulated by the U.S. Environmental Protection Agency's New Source Review program.

One component of New Source Review is a requirement that Intel performs an air quality modeling analysis that is intended to protect public health by ensuring federal air quality standards, called National Ambient Air Quality Standards, for the criteria pollutants, will not be exceeded. EPA sets these standards at levels that protect public health, including sensitive populations such as children and older adults. Part of DEQ's review of the permit application is to ensure that these standards are not exceeded when facilities increase emissions.

EPA's process for the establishment and revision of the NAAQS is based on health science, epidemiological studies, and the deliberations of health professionals. DEQ determined the modeling analysis provided by Intel demonstrates that Intel's increased emissions will not cause or contribute to an exceedance of the federal air quality standards.

However, the modeling shows that both NO2 and PM 2.5 emissions may result in levels that get close to the standards. As result, DEQ has added the following conditions to the permit:

- A PM2.5 emissions testing program to take place in 2027.
- Adding PM2.5 monitoring to the previously proposed NO2 ambient monitoring at the Ronler Acres property boundary. Intel will be required to submit a monitoring plan for DEQ's review and approval.

The second regulatory requirement is DEQ's Cleaner Air Oregon Program that analyzes a larger number of toxic air contaminants against health-based criteria. DEQ established this program in

2018 to assess the potential health risks posed by emissions of toxic air contaminants from industrial and commercial facilities to nearby communities. The program requires that all facilities – both existing and new – with air quality operating permits in the state perform a risk assessment and be regulated to health-based standards.

Cleaner Air Oregon uses the latest toxicological science to set regulatory thresholds for risk on over 200 toxic air contaminants. DEQ has developed reference values for each toxic air contaminant for determining cancer and noncancer risk to all members of the public, including sensitive and vulnerable populations such as children. DEQ anticipates calling Intel into Cleaner Air Oregon in April of 2025, when Intel will perform a risk assessment as required under the rules of the program. For more information, please see responses under 4.0 Cleaner Air OR in this response document.

9.0 ENVIRONMENTAL JUSTICE

9.1 DEQ received the following comments regarding environmental justice and the impact of Intel's draft air quality permit on marginalized populations.

a. DEQ should think about EPA's draft policy on Environmental Justice Air Permitting and build that into the Intel permit. Orenco Station and Brookwood neighborhoods should be evaluated through EPA's tool "EJSCREEN" which takes into account potential environmental insults to the community.

b. Did the permit application include an environmental justice or cumulative impacts evaluation? For example, according to the attached EJScreen report for an area surrounding the Aloha campus, environmental justice indicators are higher than the national and Oregon average.

c. What regulatory obligation does DEQ have to assess environmental justice or cumulative impacts in the permit process?

DEQ response: DEQ recognizes low-income communities and communities of color are systemically more impacted by industry and pollution due to patterns of land use and economic inequality. Since the receipt of the permit application from Intel, DEQ met with environmental advocacy organizations who represent EJ populations on multiple occasions to hear concerns and consider suggestions associated with protecting marginalized populations and improving air quality in the drafting of the permit. They include:

- Neighbors for Clean Air (environmental advocacy organization)
- Earth Justice (environmental advocacy organization)
- Northwest Environmental Defense Center (environmental advocacy organization)

DEQ reached out to additional culturally relevant groups.

- Adelante Mujeres (Washington County community organization)
- Centro Cultural (Washington County community organization)

DEQ did not utilize EJ Screen or AirToxScreen for the purposes of drafting Intel's air quality permit. DEQ recognized that there was a significant Spanish speaking population around the

Intel sites. As a result, DEQ translated multiple communication documents into Spanish and offered interpretation services for the public hearing. A cumulative impact assessment was part of the modeling that Intel was required to perform for its proposed expansion. For more information on the modeling, please see responses to comments under 5.0 Modeling in this response document.

10.0 COMMENTS RELATED TO INTEL PAYING DEQ/CONFLICT OF INTEREST

10.1 DEQ received several comments regarding Intel's payment to DEQ to provide resources for permitting work.

a. Conflict of interest: The state paying retired employees to review Intel's application raised concerns about objectivity and capacity to handle complex proposals.

b. Capacity: DEQ's capacity to review the complex proposal and potential conflict of interest with the state hiring retired employees using Intel funds.

c. Intel and DEQ took advantage of ORS 468.073(1) to enter into an agreement that allows the company to pay for its own permit team. While legal, in principle it raises some serious concerns for me, such as eroding my confidence I have in DEQ's work as a regulator and its requirement to protect the general public from hazardous chemicals.

d. As I understand it, Intel has paid DEQ to expedite the process directly, another instance of eroding confidence in DEQ's work.

e. The weakest player in this gamble is the DEQ itself which lacks the deep technological knowledge to keep watch on behalf of a wary public and to call it quits when the risk proves too great. Why not require Intel to provide that expertise to the DEQ by funding the necessary staff? Just as Intel has financed the acceleration of this review by funding the employment of technical specialists to assess its chances, so might Intel be required to fund specialized staffing in the DEQ to monitor its progress on behalf of the public.

DEQ Response: By law, regulated facilities can utilize a legal mechanism called "Receipts Authority" to pay DEQ directly to process a permitting action. DEQ and Intel have a fee agreement in place that acts as the mechanism for DEQ to receive payment from Intel for work performed. This arrangement provides dedicated resources to conduct the work, however, DEQ still performed all of the necessary steps required to process the permitting action, including public engagement. The staff hired for this project all possess extensive experience working in air quality permitting, project management and public engagement. The Receipts Authority provision allows DEQ's to dedicate the necessary resources to that permitting process without disrupting and delaying already-planned air quality permitting work. Regardless of the funding mechanism, DEQ performed all of the work in the same way it would have under regular permitting circumstances.

11.0 MONITORING OF AIR QUALITY

11.1 DEQ received the following comments regarding how DEQ monitors air quality.

a. In addition concerns were brought up as to whether DEQ was using newer air monitoring technology and whether the monitoring locations were close enough to the Intel facilities to acquire accurate readings.

b. Finally is the concern that current laws and regulations are not adequate to protect us from the dangers of particulate matter and other toxic pollutants. For example the Clean Air Act only provides limits for 6 pollutants while recognizing another 187 hazardous air pollutants that cause cancer and other ill effects to human health. I trust you will give the aforementioned concerns serious consideration before granting Intel their permit modification.

DEQ response: DEQ's Laboratory is responsible for monitoring ambient air using EPA approved air toxics and criteria pollutant methods at our monitoring stations. There are newer methods that can be used in some instances to move to continuous monitoring, but DEQ does not have the resources to purchase and operate these at this time.

DEQ operates an ambient monitoring network with the purpose of monitoring in areas that represent the communities at large. DEQ appreciate that these locations can't monitor all neighborhoods and all types of sources due to limited resources. These monitoring locations are not meant to be property boundary monitors.

For more information about property boundary monitoring required in Intel's permit, please see 3.0 Comments Regarding Permitting.

12.0 PREVIOUS ENFORCEMENT

12.1 DEQ received a comment regarding Intel's previous enforcement actions.

a. I am a resident of West Hillsboro. Intel already has multiple emission related compliance issues. In 2022 they left an air scrubber off for 64 days! How can we be trusting this company to make safe choices for the people of this community. We all know they have more than enough money to pay the paltry fines incurred by such infractions.

DEQ Response: DEQ's civil penalty assessment for air quality violations and Intel's proposed permit modification are separate activities that are occurring in parallel. Under Intel's current permits, air quality and others, DEQ requires the facility to maintain compliance with all conditions of the permits. This oversight continues independently from the modification application DEQ is considering presently. This scenario is true for all regulated entities.

Intel is now in full compliance and has paid the civil penalty with a portion of the penalty dedicated to funding wood stove replacement in Washington County through a Supplemental Environmental Project.

DEQ's Office of Compliance and Enforcement has a set process used to determine the appropriate response for non-compliance with applicable permit conditions and environmental laws and permits. DEQ's enforcement authority is limited under state law to assessing civil penalties, ordering a facility to operate in compliance with air quality rules, and, in extreme cases, revoking a facility's permit.

13.0 GENERAL APPROVAL AND DISAPPROVAL

13.1 DEQ received the following comments opposing the proposed project. The following are provided as examples, but are not an exhaustive list of such comments:

a. *I live in Washington County near Intel and I vehemently oppose Intel's request to more than double its greenhouse gas emissions to nearly 1.7 million tons per year. This simply cannot be allowed. Immediate NO. Absolutely not. Period. These companies are unhealthy for our air and water, two basic needs!*

b. *These companies are unhealthy for our air and water, two basic needs! We know they can do better or not exist in my backyard! Who keeps them accountable? Not so good and do not want it worse!!!*

c. *As a voter, and as someone with children who lives EXTREMELY close to Intel (Aloha) and works extremely close to the Hillsboro campus, I STRONGLY OBJECT to any increase in emissions for Intel.*

d. *If whoever is reading this would not move here because of the increase in emissions that Intel would be contributing to, please reject Intel's Standard Air Contaminant Discharge Permit modification proposal.*

e. *I am very concerned about the requested increase in air pollutants by Intel and would like the DEQ to reject the proposal and hold firm to its standards and duty to protect our air. Intel is a company with a lot of money and innovative, creative people. I think we should challenge and push them to develop cleaner ways of developing and running production instead of lowering standards.*

f. *I live just blocks from the Intel Aloha campus. I would like to go on record to say that I would not like more emissions pumped into the air I live with daily.*

g. *We live about one-half mile from the Intel Aloha Campus. From what we read on the DEQ website, Intel is asking for air quality permit changes allowing increased emissions of air contaminants.*

h. *We do not agree with Intel's proposed modifications to its existing air quality permit because we are opposed to any additional pollution being added to the air we breathe every day.*

DEQ Response: DEQ evaluates the air emissions for the type of activity or activities proposed for a certain facility and, when a facility can meet all applicable requirements in current environmental law, DEQ will issue a permit and continue to monitor the facility for ongoing compliance. None of the commenters opposed to DEQ issuing the permit identified specific elements of the permit that required change or re-evaluation. No further consideration by DEQ is necessary for this comment category.

13.2 DEQ received comments from the following organizations supporting the proposed air quality permit:

- Oregon Business and Industry
- Oregon Business Council
- Portland Chamber of Commerce
- Washington County Chamber of Commerce

All four organizations listed above cited Intel's contributions to the economy and employment, community engagement and support of local organizations, sustainability, research and development and commitment to long term investment in Oregon as reasons for supporting the issuance of the air quality permit.

DEQ Response: DEQ acknowledges the support for Intel's proposed air contaminant discharge permit. None of the commenters endorsing DEQ's issuance of the proposed permit identified elements of the permit action that required change or re-evaluation. No further consideration by DEQ is necessary for this comment category.

14.0 OTHER COMMENTS

14.1 DEQ received a comment about the industrial growth allowance.

a. I understand that DEQ has blocks of offsets through the growth allowance. Intel's use of the current block means that other businesses cannot utilize the PM 2.5 emissions. Does that guarantee that another block will be released so that others can emit PM 2.5?

DEQ response: Currently, an Industrial Growth Allowance in the Portland-metro region exists for nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOCs). At this time, there is no Growth Allowance for PM2.5. A stationary source that increases their emissions of PM2.5 above certain thresholds must model those emissions to ensure they will not exceed federal air quality standards, called National Ambient Air Quality Standards.

DEQ established an industrial growth allowance for ozone precursor pollutants, nitrogen dioxide and volatile organic compounds, in the Portland-Vancouver-Salem Ozone Maintenance Plans (1996 and 2007), and for carbon monoxide in the Portland Carbon Monoxide Maintenance Plans (1996 and 2004). DEQ included industrial growth allowance for these pollutants into maintenance inventories in the respective maintenance plans.

Rules Applicable to the Portland Area (OAR 340-242-0400 through 0440) codify the implementation of the Industrial Emissions Management Program in the Portland Air Quality Maintenance Area.

Oregon Administrative Rules 340-224-0520(2)(a) describes the calculations to determine if a facility is within a distance of the Portland AQMA such that it must request an allocation from the emissions bank if it desires to increase emissions of NOx, VOC or CO.

OAR 340-222-0042(2)(b) references the need to obtain an allocation from an applicable growth allowance when a stationary source is seeking a Plant Site Emission Level increase.

OAR 340-224-0060(2)(c) (Requirements for Sources in Maintenance Areas) and 0260(2)(b)(C) codify requirements for sources subject to New Source Review and State New Source Review to obtain allocations from the applicable growth allowances.

In addition to the regulatory procedures for accessing the emissions bank, the 2007 Portland Ozone Maintenance Plan documents that DEQ will only authorize the initial use of up to 1,000 tons of VOC and 1,000 tons of NOx. The current balance of emission bank for each pollutant is:

- 514 tons for VOC
- 479 tons for NOx
- 2471 tons for CO

When 750 tons or more of these initial increments is requested and approved for either or both pollutants, DEQ will conduct an analysis of ozone levels and expected trends to determine if conditions support the release of another 1,000-ton increment for either pollutant. DEQ must open this analysis to public comment. DEQ has not released more than the initial 1,000-ton increments for VOC or NOx to date.

14.2 DEQ received comments about why Intel is allowed to increase emissions while other pollution control efforts such as woodstove change out programs and vehicle inspection are still required by DEQ.

DEQ Response: Oregon's overall strategy to meet air quality standards and reduce air pollution is known as the State Implementation Plan. The plan contains all rules, programs and policies that are implemented in the state to limit sources of air pollution, including permitting Oregon facilities like Intel, woodstoves, transportation strategies, and vehicle inspections. Pollution reduction contributions from these sectors are all necessary and are developed to ensure a balanced combination of strategies that will protect air quality statewide.

The Environmental Quality Commission is DEQ's governing body and adopts federal requirements and state standards for DEQ's air quality permitting program. These standards establish emission limits for permitted facilities in Oregon. The EQC adopted rules into the SIP that allow for a facility to expand and increase emissions so long as permitting requirements are met. These include a review to ensure that the increase in emissions would not cause an area around the facility to exceed the federal air quality standards, called National Ambient Air Quality Standards, as well as identify and install Best Available Control Technology.

To identify Best Available Control Technology, Intel evaluated whether it could switch to different pollution controls to better control pollution, taking cost into account. DEQ's review of the BACT analysis found that Intel is already using pollution controls that meet BACT, and the same

controls will be used on the proposed new facilities. Intel is also voluntarily installing additional pollution controls on some its equipment. Finally, Intel obtained “off sets” from DEQ’s Industrial Growth Allowance for specific pollutants to balance projected emission increases. For more information about the Industrial Growth Allowance, please see response above.

14.3 DEQ received a comment about the use of PurpleAir.com to measure air quality.

a. *Today is a snow day with hardly any auto traffic. I looked at PM2.5 emissions from PurpleAir.com near their plants, and they were at levels that, if doubled, would classify the air quality as being possibly unhealthy or unhealthy for sensitive individuals. That means on any normal day, our air quality near their facilities will pose a risk for sensitive people as their facilities run around the clock.*

DEQ response: PurpleAir sensors only measure PM2.5 concentrations and should be viewed with some caution because they also measure woodstove smoke. On cold days, there is a lot of woodstove use. PurpleAir data cannot be used for regulatory purposes. AirNow.gov includes information about PurpleAir and other community monitors along with EPA monitors.

14.4 DEQ received comments about a variety of outreach methods, community engagement, utilizing third party verification, reporting issues and other suggestions that may or may not be pertinent to the draft air quality permit. Comments relevant to the proposed permitting action are included below.

a. *Design solutions that are accessible, affordable, and beneficial to underserved communities.*

b. *Conduct community charrettes to collect and publish feedback and build trust among stakeholders.*

c. *Provide training and education to empower communities and all stakeholders including undeserved to participate. Ensure everyone has the knowledge and skills necessary to participate in and benefit from these solutions.*

d. *Insure access to technology are addressed to facilitate participation of all stakeholders.*

e. *Ensure data sovereignty and privacy. Protect data privacy through encryption and anonimization of data.*

f. *Recognize the need for and ensure community cooperation in developing and adopting programs.*

g. *Provide training and education on community solutions to all stakeholders.*

h. *Establish systems to form public-private alliances between public communities and the private sector stakeholders to achieve goals and remove friction.*

i. *Implement safeguard tools for community and workers to report issues in real time. It is critical to ensure the well-being of all people and to integrate safeguard systems to*

protect people, their health, their homes and the environment.

j. Enable the ability for organizations working on these issues to verify these claims.

DEQ Response: DEQ acknowledges the suggested improvements by the commenters. In some cases, DEQ is already using the methods identified for outreach and stakeholder engagement. Issues can be reported through DEQ complaints system: https://ordeq.org/complaints. For worker safety concerns, Intel employees would contact Oregon Occupational Safety and Health Administration.

At this time, DEQ does not have the resources to implement some of the commenter's recommendations around greater community engagement and education.

14.5 The League of Women Voters, Washington County unit, submitted comments concerning the following categories below. As noted, and where applicable, responses to these comments and questions are interspersed throughout this Response to Comment document.

a. Climate and health impacts.

DEQ response: See responses under 6.0 Climate Change/Greenhouse Gas Emissions/Climate Protection Program and 8.0 Health Impacts.

b. Particulate matter emission increases.

DEQ response: See responses under 3.0 Permitting and 8.0 Health Impacts.

c. Woodstove exchange emission reductions compared to Intel's proposed increase in emissions.

DEQ response: See response to 14.2 Other Comments.

d. Monitoring oversight.

DEQ response: See responses under 3.0 Permitting.

e. Keeping the public informed.

DEQ response: See response under 7.0 Public Outreach.

f. Whether the increase in emissions would impact Washington County's ability to meet the new annual PM 2.5 standards.

DEQ response: See responses under 5.0 Modeling.

g. Does Intel have to shut down equipment during air quality emergencies such as wildfire or temperature inversions.

DEQ response: See responses under 3.0 Permitting.

h. As a result of the newly established PM 2.5 standard, do states have until 2032 to attain the new standard and whether Intel has to meet the new standard or old standard under their permit.

DEQ response: See responses under 5.0 Modeling.

14.6 A Washington County non-profit advocacy organization, Save Helvetia, submitted comments concerning the following categories below. As noted, and where applicable, responses to these comments and questions are interspersed throughout this Response to Comment document.

a. Conducting the risk assessment under Cleaner Air Oregon prior to issuing the proposed air quality permit.

DEQ response: See response under 4.0 Cleaner Air Oregon.

b. A broader radius for the meteorological analysis.

DEQ response: See response under 5.0 Modeling.

c. How is climate change factored into the meteorological analysis.

DEQ response: See response under 5.0 Modeling.

14.7 DEQ received six verbal comments at the Feb. 15, 2024 public hearing that duplicated many of the concerns already raised by others in the following categories below. As noted and where applicable, responses to these comments and questions are interspersed throughout this Response to Comment document.

a. *How DEQ got the word out regarding this proposed permitting action.*

DEQ response: See response under 7.0 Public Outreach.

b. Health impacts associated with emission increases, particularly for people living near Intel's facilities.

DEQ response: See response under 8.0 Health Impacts.

c. What DEQ will require in the permit to protect health.

DEQ response: See response under 8.0 Health Impacts.

d. Where DEQ should monitor emissions from Intel.

DEQ response: See response under 11.0 Monitoring of air quality.

e. The difference between pollutants covered under the National Ambient Air Quality Standards and toxic air contaminants covered under Cleaner Air Oregon.

DEQ response: See response under 5.0 Modeling and 8.0 Health Impacts.

f. Acknowledged the need for adequate funding for DEQ to do its job.

DEQ response: Acknowledged.

14.8 DEQ received a comment which included an op-ed that highlighted the following categories below. As noted, and where applicable, responses to these comments and questions are interspersed throughout this Response to Comment document.

a. A summary of a climate action lawsuit in Montana.

DEQ response: Acknowledged. No impact on elements of Oregon's air quality permit for Intel.

b. Concerns about increases in greenhouse gas emissions and other pollutants.

DEQ response: See responses in 6.0 Climate Change/Greenhouse emissions/Climate Protection Program and 8.0 Health Impacts.

c. DEQ's enforcement actions with Intel.

DEQ response: See responses in multiple sections: 3.0 Permitting, 12.0 Previous Enforcement.

d. Information about the use of fluorinated compounds used in the semiconductor industry.

DEQ response: See responses under 3.0 Permitting.

e. Intel paying DEQ to work on this permit.

DEQ response: See responses under 10.0 Comments related to Intel paying DEQ/Conflict of Interest.

14.9 DEQ received a comment about the potential of Intel using a specific technology for nitrogen removal from the air.

a. Norsk Technology started its company by exploiting a novel technology to produce artificial fertilizer by taking nitrogen out of the air. Can we exploit this technology (from the 1800's) to help our air quality here in Portland. If not, why? If we can exploit this technology then maybe not apply it to all of the manufacturing companies in Oregon. Then, can we find creative ways to sell, use, and take advantage of this fertilizer? Maybe even creating viable seeds that thrive on high amounts of nitrogen. Could we use nitrogen on regular car gas or even racing car gas or airplane gas/diesel.

DEQ response: This technology is not relevant to Intel's emissions nor is it relevant to the draft air quality permit.

15.0 COMMENTS SUBMITTED THAT HAVE BEEN FORWARDED DIRECTLY TO INTEL

15.1 DEQ received the following comments which were outside the scope of this proposed permitting action that DEQ has forwarded directly to Intel. DEQ's permitting program rules do not require facilities to respond to these types of comments.

a. *What are they doing to make the release of all there contaminants down to zero or to improve the air quality being omitted from there facilities?*

b. *I'm interested in what the company is planning to mitigate increased production capacity. More advanced air scrubbing technologies, energy efficiency measures in the plant? Incentives for employees to reduce their own carbon footprints?*

c. *Is Intel providing employment opportunities that would offset even a fraction of that (proposed increase in emissions)?*

d. *While decreasing NOx emissions is worthwhile, a NOx emission reduction system will not address any of the other pollutants that Intel wants to increase: particulate matter 2.5 microns and higher, CO, VOC, Fluorides and GHGs. Intel mentioned it has a plan to reach net zero by 2040, but I'm unclear how they can have such a goal when they are asking to basically double their emissions now. I would like to see a detailed year-by-year 2040 plan made available to the public. I would also like to see legislation holding Intel accountable to their plan before they receive this permit to increase their pollution. INTEL? When I asked why Intel feels it needs to increase its permit for pollution emissions, the Intel representative Wes Lund gave a short answer explaining that it had to do with the fab processes. I would like to understand this better, and I think the community should have a decent explanation as well. How quickly would Intel ramp up its pollution output? Is Intel really unable to decarbonize its current industrial processes? If so, what chance does it have to reach net zero by 2040? (Carbon offsets are limited, dubious, and will not help our local pollution concerns.)*
Other members of my community expressed concerns regarding how their sacrifice of breathing dirtier air will benefit them and not just Intel. This is a valid question, and we deserve to know what the benefits are compared to the cost of doubling pollution emissions. (For example, will Intel be able to produce 4x more with 2x emissions? How many new jobs will be created? Will these new jobs be available to existing community members, or will they attract mostly new people from out of state?)

The CHIPS Act gives us an amazing opportunity to invest in our community and also a chance to invest in technologies that will help the U.S. be more secure and less dependent on foreign supplies. I want to see Intel expand and prosper, and I understand that there will be benefits and drawbacks to this. However, Intel's expansion is a chance to do things better and explore greener options. It is far easier and more cost effective to build new systems and buildings with sustainability in mind first, rather than trying to retrofit later.

I would like to see Intel producing and storing more green energy on-site—wind and solar. Large buildings and parking lots are great for solar installations. There are also bladeless wind turbine options available for large buildings. Will Intel invest in these in order to offset their carbon footprint? Would large-scale on-site battery and/or heat storage allow them to decarbonize some/all of their industrial processes? (Has a small-scale on-site nuclear power plant been considered?)

To date, our planet has warmed about 1.1 degrees Celsius since the Industrial Revolution, and we have been experiencing more and more drastic weather events for the past 5 to 10 years now. On our current trend, warming is likely to surpass 1.5 degrees by 2030. That's about 5 years away—the same length of time as this 5-year pollution permit that Intel is requesting. I don't want to find out how bad it can get before we reach net zero and begin the hard work of carbon capture.

As a major polluter, Intel must take seriously its responsibility to do everything it can to decrease and eliminate its carbon emissions. Our State and our local community cannot just trust that corporations like Intel will do the right thing—we must hold them accountable. I question whether Intel's pollution permit aligns with its stated intent to reach net-zero by 2040, and I am concerned how doubling emissions will derail Hillsboro's sustainability goals in the short-term and long-term.

"Good neighbor" agreements: Collaborative agreements with Intel to address community concerns and establish safeguards during the expansion process.

Secondly, if Intel is indeed expanding linearly in such a fashion this would suggest that the new facilities are using the same emission reduction technology that the relatively old fabrication plants at Ronlar acres already use. Why is Intel not considering improved technology to reduce their emissions output? Intel's increase in pollution is roughly equal to 68,000 additional homes here.

e. *In their planning process, Intel should consider ways to mitigate these air pollution emissions on site at their local area. Surely, there are scrubbers and new technology being thought of to sequester air pollution at its source. Human lives at Intel, Hillsboro/Aloha and in Oregon are at stake.*

f. *I'm interested in what the company is planning to mitigate increased production capacity. More advanced air scrubbing technologies, energy efficiency measures in the plant? Incentives for employees to reduce their own carbon footprints?*

While decreasing NOx emissions is worthwhile, a NOx emission reduction system will not address any of the other pollutants that Intel wants to increase: particulate matter 2.5 microns and higher, CO, VOC, Fluorides and GHGs. Intel mentioned it has a plan to reach net zero by 2040, but I'm unclear how they can have such a goal when they are asking to basically double their emissions now. I would like to see a detailed year-by-year 2040 plan made available to the public. I would also like to see legislation holding Intel accountable to their plan before they receive this permit to increase their pollution.

g. *When I asked why Intel feels it needs to increase its permit for pollution emissions, the Intel representative gave a short answer explaining that it had to do with the fab processes. I would like to understand this better, and I think the community should have a decent explanation as well. How quickly would Intel ramp up its pollution output? Is Intel really unable to decarbonize its current industrial processes? If so, what chance does it have to reach net zero by 2040? (Carbon offsets are limited, dubious, and will not help our local pollution concerns.)*

h. *Other members of my community expressed concerns regarding how their sacrifice of breathing dirtier air will benefit them and not just Intel. This is a valid question, and we deserve to know what the benefits are compared to the cost of doubling pollution emissions. (For example, will Intel be able to produce 4x more with 2x emissions? How many new jobs will be created? Will these new jobs be available to existing community members, or will they attract mostly new people from out of state?)*

i. *The CHIPS Act gives us an amazing opportunity to invest in our community and also a chance to invest in technologies that will help the U.S. be more secure and less dependent on foreign supplies. I want to see Intel expand and prosper, and I understand that there will be benefits and drawbacks to this. However, Intel's expansion is a chance to do things better and explore greener options. It is far easier and more cost effective to build new systems and buildings with sustainability in mind first, rather than trying to retrofit later.*

   I would like to see Intel producing and storing more green energy on-site—wind and solar. Large buildings and parking lots are great for solar installations. There are also bladeless wind turbine options available for large buildings. Will Intel invest in these in order to offset their carbon footprint? Would large-scale on-site battery and/or heat storage allow them to decarbonize some/all of their industrial processes? (Has a small-scale on-site nuclear power plant been considered?)

   To date, our planet has warmed about 1.1 degrees Celsius since the Industrial Revolution, and we have been experiencing more and more drastic weather events for the past 5 to 10 years now. On our current trend, warming is likely to surpass 1.5 degrees by 2030. That's about 5 years away—the same length of time as this 5-year pollution permit that Intel is requesting. I don't want to find out how bad it can get before we reach net zero and begin the hard work of carbon capture.

   As a major polluter, Intel must take seriously its responsibility to do everything it can to decrease and eliminate its carbon emissions. Our State and our local community cannot just trust that corporations like Intel will do the right thing—we must hold them accountable. I question whether Intel's pollution permit aligns with its stated intent to reach net-zero by 2040, and I am concerned how doubling emissions will derail Hillsboro's sustainability goals in the short-term and long-term.

j. *Another question is. Is there a better way to Produce their product that does not involve the release of contaminants into the atmosphere and surrounding Environmental areas especially the greenhouse gas sense we need to cut them to stop global worming or reverse the affects.*

k. *Has Intel improved cleaning up the contaminants that leaves their facilities at all in the past 5 years? What steps are they going to do to clean up the contaminants over the next 5 years?*

l. *Intel needs to install better equipment and processes to reduce their toxics emissions and take steps to reduce or mitigate their greenhouse gas emissions by creating a forest preserve, funding renewable energy, or use of other proven carbon mitigation strategies.*

16.0 CONCLUSION

Based on the comments received during the public comment period, DEQ has issued the Air Contaminant Discharge Permit. Below is a summary of findings regarding the permit and changes made in response to comments:

- The main emissions points of hydrogen fluoride (HF), hydrogen chloride (HCl), fluorides, NOx and PM2.5 are the acid gas and ammonia (EXSC and EXAM) wet scrubbers and the rotor-concentrator thermal oxidizers (RCTOs). Emissions testing of these units has been prioritized. Emissions from other emissions units such as boilers and emergency engines can be adequately estimated using standard emission factors.

- Past emission test results support Intel's emissions estimates for hydrogen fluoride (HF) and hydrogen chloride (HCl), which comprise almost 100 percent of Intel's Hazardous Air Pollutant (HAP) emissions.

- The annual emissions testing (source testing) proposed in the draft permit for hydrogen fluoride (HF) and hydrogen chloride (HCl) from the EXSC scrubbers (HF and HCl) and EXAM scrubbers (HF only), which comprise the majority of Hazardous Air Pollutant emissions, was found sufficient and has been retained.

- The annual emissions testing (source testing) proposed in the draft permit of EXSC and EXAM scrubbers for fluorides, NOx and CO was found sufficient and has been retained.

- The annual emissions testing (source testing) proposed in the draft permit of RCTOs every two years for NOx, CO and VOC was found sufficient and has been retained.

- Emissions testing for PM2.5 was found to be insufficient but also difficult to perform. Testing of PM2.5 emissions has been added to the permit in the year 2027. Intel is required to submit a study and proposed testing plan to DEQ for approval before beginning the testing.

- Property boundary ambient monitoring of NOx for five years was changed to property boundary ambient monitoring of NOx and PM2.5 for three years beginning in the year 2028 when emissions are expected to be higher than they are in 2024 but less than what is allowed by the permit. Intel will be required to submit a monitoring plan for review and approval by DEQ.

DEQ would like to thank all individuals who took the time to review the proposed permit as well as those who engaged in the public process and/or submitted comments.

17.0 REVISED EMISSIONS TESTING REQUIREMENTS (SOURCE TESTING)

Many commenters stated that emissions testing in the draft permit was insufficient or suggested additional emissions testing. Many commenters were also concerned that Intel's emissions estimates could not be verified. These topics are related and this special section of the Response to Comments was created to examine them.

"Source testing" is the term DEQ uses to refer to testing of emissions from regulated facilities. Source testing is also known as "stack testing" or "emissions testing". Source testing involves sampling and analyzing exhaust gas and measuring the exhaust flow rate to quantify emission rates. Different test methods are required for different pollutants. Source testing is usually performed by source testing companies that specialize in this type of work; these companies are hired by the facility required to do the testing (Intel in this case). The source testing companies provide the equipment for taking the necessary samples, doing any on-site analyses, transporting the samples to laboratories for analysis, and writing a report giving the test results and data associated with the testing. The source testing company must submit a source test protocol to DEQ for approval prior to the testing, and the source tests can be observed by DEQ staff, and frequently are.

Based on a significant number of comments that Intel's emissions estimates could not be verified, and that additional testing is needed, DEQ reconsidered the emissions testing that was proposed in the draft Intel permit and finds that much of the proposed testing is appropriate and the only significant improvements needed were in the area of testing for PM2.5; however, DEQ also finds that additional explanation of the testing requirements is needed and is provided below.

What is the purpose of the testing?

The purpose of the testing is to verify as well as possible that certain of Intel's emissions calculated for the EXSC and EXAM scrubbers and RCTOs *do not underestimate actual emissions* from these units.

Intel calculates and reports many of its emissions using confidential production data and DEQ-approved emission factors. Some of the emission factors are derived from confidential Intel testing and analysis. However, it is possible to perform source testing to verify reported emissions using non-confidential data. Source testing has limitations that can make the results difficult to use, but if acceptable source test results can be obtained they can be used to make comparisons with Intel's calculations and hopefully provide reasonable assurance that Intel's emissions calculations *do not underestimate emissions*.

DEQ does not intend to replace or revise Intel's method of calculating emissions. DEQ's intent is simply to verify that Intel's calculations *do not underestimate emissions*.

It is acceptable for Intel's calculations to overestimate actual emissions because the only negative consequences of this are that Intel could trigger regulatory requirements that it might not trigger with more accurate emissions calculations. It is also acceptable for Intel's calculations to equal actual emissions. However, it is not acceptable for Intel's calculations to underestimate actual emissions, because that might allow Intel to improperly avoid regulatory

requirements. It might further allow Intel's emissions to be greater than the emissions that were modeled. It is for these reasons that DEQ's intent is to verify that Intel's calculations do not underestimate actual emissions.

It must be noted that source test data can be variable, especially if pollutant concentrations are very low, as they often are from Intel's emissions sources[1]. This may make it very difficult to interpret the test data or to get reasonable or reliable results from emissions calculations based on source test results. However, source testing is the only method available to verify Intel's emissions calculations.

Which pollutants should be tested?

Intel has a large number of process emissions points that emit a variety of pollutants. DEQ does not consider it necessary to require testing of all of those pollutants. Instead, DEQ believes testing should be focused on the pollutants of greatest concern. The table below lists pollutants with DEQ's considerations and conclusions:

Pollutants	Priority for testing	Comments
NOx	High priority because of modeling results are close to the 1 hour NOx NAAQS[2].	Annual testing
CO	Medium priority because the Portland Area was formerly a CO nonattainment area.	Annual testing
VOC	Medium priority because the Portland Area was formerly an ozone nonattainment area, and to ensure RCTOs are operating properly.	Retain existing testing
PM/PM10/PM2.5	High priority because modeled PM2.5 emissions are close to both the current and future PM2.5 NAAQS, and have not been verified by past testing.	Test for PM
SO2	Low priority, no danger of exceeding a NAAQS.	No testing
CO2e (Greenhouse Gases)	It is anticipated that GHGs will be addressed by DEQ's Climate Protection Program, and source testing methods are not available.	No testing
Fluorides	Medium priority because of past compliance issues.	Annual testing
Total HAPs	Low priority because Intel's estimated emissions are well below the total HAP major source threshold; also, these and other air toxics will be addressed by DEQ's Cleaner Air Oregon program.	No testing
Largest Single HAP[3]	High priority because emissions are close to a Major HAP Source regulatory threshold and it is	Annual testing

[1] DEQ recognizes that some of Intel's emission rates are high, but some pollutants are emitted from a large number of emissions points, and are carried in very large volumes of air, resulting in very low concentrations at the testing locations. Low concentrations can make source testing difficult.
[2] National Ambient Air Quality Standard, standards set by the U.S. EPA to protect public health and welfare.
[3] Hazardous Air Pollutant

Hydrogen fluoride (HF)	important to ensure emissions are not underreported	
Hydrogen chloride (HCl)	Low priority but is the second highest HAP and together HF and HCl comprise the majority of HAP emissions, and HF testing can also test for HCl	Annual testing

Which emissions units should be tested?

DEQ does not consider it necessary to test all of Intel's emissions units. Emissions from boilers, heaters and emergency engines (known as RICE) can be calculated from fuel usage or operating loads using emission factors that have been established by testing similar sources at other facilities. Fugitive VOC emissions from equipment cleaning using isopropyl alcohol can be calculated using a method called mass balance. Other emissions sources have low emissions and DEQ does not consider testing to be necessary.

DEQ believes that it is unnecessary to test the following emissions sources for the reasons given:

Sources	**Reason(s):**
RICE (emergency engines)	Emission factors are based on extensive testing by other parties and are considered adequate
PSSS Scrubbers	No process emissions, only scrubber drift
Fugitive VOCs (IPA cleaning in clean rooms)	Emissions can be calculated from mass balance
Heaters	Emissions are low, existing emission factors are considered adequate
Lime Silos	Emissions are minor
Cooling Towers	Drift emissions only, not testable
Paved Roads	Not testable

The emissions sources that DEQ considers necessary to test are the EXSC scrubbers, the RCTOs, and to a lesser extent the EXAM scrubbers. These are all air pollution control devices that control the three types of emissions from the microprocessor production processes: EXSC scrubbers treat acid gases, such as HF and HCl; RCTOs treat VOCs; and EXAM scrubbers treat ammonia. The production processes also emit other pollutants such as NOx, CO and PM2.5 which pass through and are emitted from the EXSC and EXAM scrubbers. The RCTOs combust natural gas and VOCs, which produces significant amounts of NOx, CO and PM2.5.

In addition to the above, the draft permit required one-time testing of boiler and TMXW emissions. These have been retained in the permit.

Method Detection Limit (MDL)

When source testing is conducted, a sample of the pollutant being tested must be obtained from the exhaust gas stream. Test methods for some pollutants require capturing a certain minimum amount of the pollutant being tested. This minimum "capture" amount establishes the lowest

result that can accurately be measured by the test and is referred to as the Method Detection Limit (MDL). If less than the minimum amount of sample is captured, then a test result may be calculated but the result is not considered accurate and the test result is usually reported as "less than" the MDL. A particular problem with source testing at Intel is that Intel's process exhaust gases are very dilute (low concentrations of pollutants in high volumetric flow rates).

Low concentrations make capturing a sufficient amount of sample difficult. One way to try to solve this problem is to run the test for longer periods of time to attempt to capture a larger sample. For some pollutants this can be done, but for other pollutants this can be problematic because the longer the test run goes, the more likely it is for problems to occur that can invalidate the test.

Testing Planned for 2024

The 2024 test program includes the determination of each RCTO unit's VOC emissions, VOC destruction and removal efficiency (DRE), and NOx and CO emission rates. A total of 10 RCTO units will be tested at the Ronler Acres and Aloha campuses.

The 2024 test program includes testing the emissions from wet scrubbers for Fluoride and HF emissions. A total of 29 operating acid gas scrubbers and 13 ammonia scrubbers at the D1C, RP1, D1D, MSB, RB1, D1B and F15 Fabs will be evaluated at the Ronler Acres and Aloha campuses. The acid gas scrubbers abate acid gases within the overall Acid Gas Exhaust System (EXSC) while the ammonia scrubbers abate ammonia within the overall Ammonia Exhaust System (EXAM).

Testing Proposed in the Draft Permit

The following table summarizes the testing that was proposed in the draft Permit:

Sources to be tested	Pollutants to Test For	When and How Often
EXSC Scrubbers, all	F, HF, HCl, NOx and CO	2025 and every year thereafter
EXAM Scrubbers, all	F, HF, NOx and CO	2025 and every year thereafter
TMXW, one electric and one natural gas	NOx and CO	2025, then every 5 years
RCTOs, all	NOx and CO (oxidizer outlet) and VOC (inlet, oxidizer outlet and concentrator outlet)	2025 or 2026, then every 2 years
Boilers, one from each group of identical boilers subject to NOx or CO BACT	NOx and CO	Within 2 years of permit issuance

Arrangement of Exhaust Systems and Pollution Control devices

Acid and ammonia gases from each microprocessor production Fab are routed into separate exhaust collection systems. There are a number of Fabs and a number of exhaust systems, but each exhaust system is not necessarily dedicated to a single Fab; an exhaust system may

collect exhaust gases from two or more Fabs or portions of a Fab. Similarly, a single exhaust system is not necessarily treated by a single, dedicated set of scrubbers.

DEQ staff went to Intel and observed three exhaust systems. In general, the exhaust systems at this site are complex and vary from location to location. Two exhaust systems are described in detail below:

- The first exhaust system observed has a main header duct that is round in cross section and about four to five feet (est.) in diameter coming out of the Fab, with two to four smaller ducts round in cross section and two to three feet in diameter (est.) connected to the main duct, including connections immediately before the scrubbers. Rectangular ducts lead from the main header duct to the scrubbers. All scrubbers in this set would theoretically treat the same exhaust gases and the emissions from each scrubber should be similar, but one of the smaller ducts connecting to the main header duct is so close to the first scrubber that complete mixing of the exhaust gases cannot be assumed.
- The third exhaust system observed is the EXSC exhaust system that serves the D1X Mod 1, Mod 2 and Mod 3 Fabs. The main exhaust header duct is round in cross section and runs the length of the three Fabs and is an estimated seven feet or more in diameter and an estimated 300 to 400 feet long. Multiple smaller inlet ducts that are round in cross section connect at various locations along the main header and carry exhaust from the Mod 1, 2 and 3 Fabs to the main header duct. In addition, EXSC exhaust gases from production tools in Mod 4 and MSB2 will be collected in the future in the D1X main header duct. Because of the possibly different exhaust gas compositions in the inlet ducts, the composition of the exhaust gases in the main header may vary along the length of the duct.
  At several locations along the header duct, side runner ducts that are round in cross section carry exhaust gases from the main header to groups of EXSC scrubbers. Each separate side runner duct carries exhaust gases from the main header to a set of multiple scrubbers. Each side runner duct splits at the scrubber set and routes exhaust gases to the individual scrubbers through rectangular inlet ducts. Each scrubber in the set treats a portion of the side duct exhaust stream in parallel before emitting the treated exhaust gases to atmosphere. This means that all scrubbers in a set will be treating the same exhaust gases and theoretically the emissions from each scrubber should be similar. However, each set of scrubbers does not necessarily treat the same exhaust gases because each side runner duct draws exhaust gases from a different location along the length of the main header duct.
- The second exhaust (D1D-EXSC) system was not observed in the same detail but is generally arranged similarly to the first and third.

EXAM and VOC exhaust systems were also observed and are generally similar to the EXSC exhaust systems.

Scrubber HF Removal Efficiency

One commenter stated that the scrubber HF removal efficiency is not known and that Intel uses an assumed removal efficiency in its HF emissions calculations. The commenter suggested that

scrubbers should be tested at the inlet and outlet in order to determine the actual removal efficiency. DEQ has not followed this suggestion for two reasons:

- Scrubber inlet ductwork is not equipped with test ports and the ducting is not arranged in way that would allow proper inlet testing. The ducts that carry exhaust gases to the scrubber sets are round in cross section, but scrubber inlet ducts are rectangular. Further, the round ducts have multiple side inlet or outlet ducts spaced too closely to allow for good mixing of the exhaust gases.
- Second, it is not necessary to know the actual scrubber efficiency. Intel's emissions calculations make use of unverifiable emission factors derived from confidential process data to calculate the pre-scrubber emission rates, which are then multiplied by an assumed removal efficiency, resulting in a composite emission factor that is used to calculate the post-scrubber emission rates (that is, the emissions to atmosphere). Even if the removal efficiency were known rather than assumed, the composite emission factors include an unverifiable component and are therefore also unverifiable:

  (unverifiable emission factors) x (assumed scrubber efficiencies) =

  (unverifiable composite emission factors)

It is only the final emissions to atmosphere that are of interest, and since these can in principle be verified by source testing, DEQ concludes that testing at the scrubber inlets is not necessary at this time.

Emissions Variability

One commenter pointed out that DEQ has little or no information about process and emissions variability over time, and that it is especially necessary to understand emissions variability with regard to HF emissions, which are close to the major HAP source regulatory threshold of 9 tons per year.

DEQ reviewed some past HF source test results and information that was submitted to EPA's National Enforcement Investigation Center (NEIC) after NEIC inspected Intel in 2023. DEQ's review is discussed under *HF, NOx and CO Emissions Variability* on page 69. In summary, the source tests all showed emissions variability, and showed significant variability in the oldest source test.

DEQ's primary goal for source testing of HF is to ensure that Intel is not underreporting emissions of HF. A secondary goal is to ensure that there is sufficient testing to account for emissions variability.

Microprocessors are made by subjecting a disk of silicon, called a "wafer", to a large number of physical/chemical process steps in a specific order to produce many identical microprocessors on the wafer. The specific steps used and the order they occur in is called a "recipe". Starting with a batch of blank wafers, it can take from one to four months to produce a batch of finished wafers covered with microprocessors. The production steps take place in a large number of different tools. The large number of tools and recipes mean that many different batches of wafers can be processed at the same time, with different starting and finishing dates and spending different amount of time being processed.

This means that at any point in time, many different processes are occurring, each one individually generating different emissions, with all of the emissions going to one of a number of exhaust systems where they are mixed together to varying degrees. While the emissions from the individual processes may vary significantly, the large number of different processes producing emissions at the same time will tend to dilute and weaken the effect of any single process' emissions, resulting in less variability in the overall exhaust composition.

There are 52 EXSC scrubbers and 32 EXAM scrubbers listed in Intel's application. Intel's testing programs for the EXSC and EXAM scrubbers involve testing each operating scrubber exhaust and requires approximately four months to complete. Testing of a single scrubber takes about two days with triplicate four hour tests. Depending on how many scrubbers are tested concurrently, a set of scrubbers that treat a single exhaust flow will take many days or even weeks, and a different combination of processes will be occurring on each day. Testing 52 EXSC scrubbers will include 156 tests occurring over multiple months, with each day representing a different combination of processes producing different exhaust compositions. Thus, a single test program for the EXSC scrubbers will provide information representing different process/exhaust compositions, and DEQ considers this an adequately large sample size to characterize emissions variability. Repeating this testing annually will also gather information about year to year variability.

Conclusion: Testing for HF and other pollutants from scrubbers

Considering the above discussion, DEQ concludes that the annual scrubber testing for HF in the proposed permit is adequate to account for process/emissions variability. The annual scrubber testing in the proposed permit also included F, HCl, NOx, and CO, and these have been retained.

Testing for PM/PM10/PM2.5 (new permit condition 47)

In simple terms, testing for PM involves drawing a sample of exhaust gas through a filter. The filter captures particulate matter from the exhaust gas. The filter is weighed before and after the test; any increase in weight after the test represents the amount of PM captured by the filter. Other information gathered during the test can then be used to calculate the PM emission rate and concentration.

Although PM testing is simple in principle, it has to be conducted very carefully and following very precise procedures to ensure accurate sample capture and weighing. Any problems with the procedure can render a test invalid. As discussed earlier, the low concentrations in exhaust gases make it difficult to capture enough sample to meet the Method Detection Limit requirement.

Because PM concentrations are very low in Intel's exhaust gases, very long sampling runs are required to obtain enough sample to have a valid test result. Very long sampling runs increase the likelihood of problems occurring that can invalidate the test.

DEQ also notes that the majority of Intel's PM emissions are emitted from the EXSC scrubbers and RCTOs. DEQ further notes that a number of EXSC scrubbers are equipped with WESPs, which will reduce the already low concentration of PM in the exhaust.

DEQ believes that a focused test program is the best way to obtain useful PM emissions data. Intel has proposed to conduct a study to try to determine the best way to obtain useful PM emissions data and to propose a testing scheme for DEQ to approve. DEQ has agreed with this approach; however, DEQ required a back-up plan in case DEQ does not approve Intel's proposed testing scheme.

DEQ's backup plan is that the following PM testing must be conducted if DEQ does not approve Intel's proposed testing scheme:

Intel must test at least 50% of the operational non-WESP-equipped EXSC scrubbers and at least 50% of the operational RCTOs (oxidizer outlet only[4]).

- The test methods must be either ODEQ Method 5, or EPA Methods 5 and 202, or an alternate test method approved by DEQ.
- Because unusually long sampling runs may be necessary, a minimum of one sampling run per scrubber is required.

This testing must be conducted in calendar year 2027.

In order to compare the source test results with Intel's emissions calculations, Intel must calculate PM emissions for the same time period as the source testing period, but without taking any WESPs into account (that is, assuming 0% PM removal in the WESPs).

Testing of TMXW CUB3-OX293B-0-70 (permit condition 43)

Permit condition 43. requires testing one of the TMXW devices in 2025, and then one every five years thereafter. Former condition 43.a. required a one-time test of TMXW device CUB3-OX293B-0-70, which is electrically heated, unlike the other TMXW devices which are heated by natural gas. Intel informed DEQ that TMXW device CUB3-OX293B-0-70 is used for research and development and is only run occasionally. DEQ has deleted the testing requirement for this unit.

4 Intel staff stated that PM in the RCTO inlet stream will adhere to and blind the zeolite concentrator thereby reducing the concentrator's effectiveness, so the chemistry used in tools that exhaust to the VOC system is controlled to prevent PM emissions. DEQ considers this a valid reason for not testing the concentrator outlet.

Summary of Source Testing Requirements (revised permit conditions 41 and 46)

The following table summarizes the required testing:

Sources	2024 Planned Testing	2025	2026	2027 PM2.5	2028	2029 Permit term ends
Year	**0**	**1**	**2**	**3**	**4**	**5**
Boilers		NOx and CO				
RCTOs, every 2 years	NOx, CO, VOC, DRE		NOx, CO, VOC, DRE, flow		NOx, CO, VOC, DRE, flow	
RCTOs, Once				PM, flow Per test plan or backup		
EXSC Scrubbers, Annual	HF	F, HF, HCl, NOx and CO	F, HF, HCl, NOx and CO	F, HF, HCl, NOx and CO	F, HF, HCl, NOx and CO	F, HF, HCl, NOx and CO
EXSC Scrubbers, Once				PM, flow Per test plan or backup		
EXAM Scrubbers Annual	HF	F, HF, NOx and CO	F, HF, NOx and CO	F, HF, NOx and CO	F, HF, NOx and CO	F, HF, NOx and CO
TMXW		NOx and CO				

End Of Revised Emissions Testing Section

In addition to all of the comments and responses provided thus far in this Response to Comments document, there were several organizations and one individual who provided comments specifically related to technical elements of Intel's draft air quality permit. Due to the technical nature of the comments, DEQ is providing responses directly within the comments submitted so both comments and responses remain intact. They include:

- EPA Region 10
- NW Environmental Defense Center, Neighbors for Clean Air, Green Energy Institute at Lewis & Clark Law School, Verde, 1000 Friends of Oregon, Oregon Environmental Council, Oregon League of Conservation Voters, Beyond Toxics, Oregon Physicians for Social Responsibility, Save Helvetia, and the Sierra Club.
- Mr. Gary Andes

18.0 EPA COMMENTS

EPA R10 Comment:
Inability of Public to Review Emission Calculations
In its July 7, 2023, submission, Intel provides both a redacted and unredacted version of the application. Intel is claiming that detailed facility process descriptions and production data are confidential business information and therefore not subject to public review. The information Intel claimed as confidential business information appears to include emissions calculations necessary for the public to understand and comment on ODEQ's draft permit. See OAR 340-209-0040(1)(c). Emissions information relied upon for a SIP-approved permitting decision cannot be confidential business information per section 114(b) and (c) of the federal Clean Air Act and 40 CFR 2.301. Furthermore, it is unacceptable for Intel to simply state their emissions and withhold the calculations, underlying assumptions and data such that no one, including the EPA, can check the numbers. ODEQ needs to determine whether this information meets the definition of "trade secret" under ORS 192.345(2) and, if not, disclose it as part of the permit process.

DEQ Response:
DEQ consulted with the Oregon Department of Justice (DOJ) in July, 2023, regarding Intel's request to treat the emissions calculations in question as Confidential Business Information (CBI); that is, to treat the emissions as "trade secret". Intel stated in their request that production rate information and emissions details could be used by their competitors to reverse-engineer their products, thereby providing a competitive advantage to their competitors. After consulting with DOJ, DEQ concluded that the request met the requirements for trade secret under ORS 192.345(2) and therefore the information in question has been treated as CBI and withheld from the public.

DEQ notes that only one person, Dr. Ranajit Sahu representing NEDC et al.*, requested access to the CBI in question and was granted access by Intel after signing a non-disclosure agreement.

* NEDC et al. means:
Mary Stites, Northwest Environmental Defense Center

Carra Sahler, Green Energy Institute at Lewis & Clark Law School
Mary Peveto, Neighbors for Clean Air
Xitlali Torres, Verde
Sam Diaz, 1000 Friends of Oregon
Jamie Pang, Oregon Environmental Council
Julia DeGraw, Oregon League of Conservation Voters
Lisa Arkin, Beyond Toxics 11
Samantha Hernandez, Oregon Physicians for Social Responsibility
Damon Motz-Storey, Sierra Club Oregon Chapter
Faun Hosey, Robert Bailey, Allen Amabisca, Linda de Boer, Save Helvatia

EPA R10 Comment:

Applicability
Various Conditions in Draft ACDP. OAR 340-224-0030(4) state:

> *For Major NSR and State NSR permit actions, an ACDP that approves construction must require construction to commence within 18 months of issuance. Construction approval terminates and is invalid if construction is not commenced within 18 months after DEQ issues such approval, or by the deadline approved by DEQ in an extension under section (5). Construction approval also terminates and is invalid if construction is discontinued for a period of 18 months or more or if construction is not completed within 18 months of the scheduled time. An ACDP may approve a phased construction project with separate construction approval dates for each subsequent phase and, for purposes of applying this section, the construction approval date for the second and subsequent phases will be treated as the construction approval issuance date.*

Eight years has now passed since issuance of the January 22, 2016, ACDP 34-2681-ST-01 (which we assume has been administratively extended) authorizing several emission units (EU) that have not yet been constructed. The 18-month deadline to commence construction (after pre-construction permit issuance) exists presumably to (1) avoid best available control technology (BACT) determinations from becoming stale, (2) address national ambient air quality standards (NAAQS) becoming more stringent over time, and (3) facilitate proper airshed management. In other words, the 18-month clock prohibits permittees who are "sitting on" permitted but untimely projects from impeding economic development of others in the airshed seeking authorization for projects with timely construction schedules. Although the draft ACDP approves construction of various EU and associated downstream air pollution control devices (APCD), the requirement referenced above is not included in either the January 2016 final ACDP or the January 2024 draft ACDP.

DEQ Response:
ACDP 34-2681-ST-01, issued to Intel on January 22, 2016, was administratively extended under OAR 340-216-0082(1)(a)(B), which reads in relevant part:

> (1) Expiration.
> (a) A source may not be operated after the expiration date of a permit, unless any of the following occur prior to the expiration date of the permit:
> (A) …; or
> (B) Another type of permit, ACDP or Oregon Title V Operating Permit, has been applied for or issued authorizing operation of the source.

Intel applied for a Title V permit in 2016 and updated the application in 2020. A further update will be required by the permit that is the subject of these comments and responses.

DEQ acknowledges that the requirements of OAR 340-224-0030(4) (copied below) were mistakenly omitted from the ACDP issued in 2016 and the draft permit. A condition has been added to the final permit to implement OAR 340-224-0030(4).

OAR 340-224-0030(4) reads:

> For Major NSR and State NSR permit actions, an ACDP that approves construction must require construction to commence within 18 months of issuance. Construction approval terminates and is invalid if construction is not commenced within 18 months after DEQ issues such approval, or by the deadline approved by DEQ in an extension under section (5). Construction approval also terminates and is invalid if construction is discontinued for a period of 18 months or more or if construction is not completed within 18 months of the scheduled time.

DEQ notes that the microprocessor production industry is unlike many traditional industries which tend to construct production and support facilities and then operate and maintain these facilities more-or-less unchanged for many years or even decades. In contrast to such traditional industries, the semiconductor industry is characterized by rapid development of products and production processes, resulting in similarly rapid replacement of production “tools”, with significant changes occurring roughly every two years. High global demand for microchips also leads to rapid expansion of production and support facilities.

Another factor pertaining to construction is that because of the rapid rate of change in the semiconductor industry, when Intel applies for a permit it must project what and how much it might be producing and emitting at the end of the requested permit term or beyond. It is expected that by the end of the permit term, the production tools in use today will have been replaced, that there will be more production space and tools, and that there will be more support facilities including pollution control equipment. However, these changes don’t occur all in one large step change; instead, these changes occur continually in many smaller steps. The end result is constant change and with associated constant construction activity.

ACDP 34-2681-ST-01, issued to Intel on January 22, 2016, approved the construction and operation of the “D1X project” (DEQ’s term) which included, but was not limited to, the D1X production facilities (cleanroom space and production tools), process support facilities, and pollution control systems. At DEQ’s request, Intel provided information that shows a constant process of change and construction at the permitted facilities since the issuance of that permit.

Because BACT determinations may become more stringent over time, one purpose of OAR 340-224-0030(4) is to ensure that a facility cannot keep a past, less stringent BACT

determination in effect indefinitely. While DEQ's position is that the construction authorized by the 2016 permit commenced within 18 months of permit issuance and has continued without any 18 month breaks, it is of interest to note that the BACT determinations in the 2016 permit applied only to NOx and CO and BACT for NOx and CO has not changed in the permit issued in 2024.

EPA R10 Comment:
Is ODEQ in this draft permit action proposing to authorize construction of any EU (formerly authorized in January 2016) that Intel did not construct by the deadlines specified in OAR 340-224-0030(4)? If "re-permitting" is unnecessary, please clarify in the review report your basis that the 2016 permit authorization remains valid for construction of EU and associated APCD for which construction has not yet commenced. However, if authorization to construct any EU and associated APCD has expired and is being "re-permitted" in this action, any previous BACT determination is not valid and a new BACT determination is needed.

DEQ Response:
Any emissions units or pollution control devices that were approved under the 2016 NSR permit but were not constructed by the date this permit was applied for (July 7, 2023) were "re-permitted" in this action and were subject to a new BACT determination.

EPA R10 Comment:
Draft Review Report Section 67 on page 24 of 79. The facility as a whole is not an existing federal major source for PSD because the facility's current potential emissions are less than 250 tons per year. However, existing fossil fuel boilers together would be an existing federal major source for PSD if the boilers' current potential regulated NSR pollutant emissions are at least 100 tons per year. The boilers are a "nested source" or "source within a source." See March 25, 1995, EPA Region 3 guidance on this subject. The 100 ton-per-year threshold is applicable because the combined heat input of the boilers is more than 250 million British thermal units per hour. See OAR 340-200-0020(66)(a)(A) and (c)(X). The fossil fuel boilers' potential CO emissions would be equal to or greater than 100 tons per year assuming 8,760 hours of operation per year at maximum rated capacity, However, the potential CO emissions reported for existing boilers in Appendix B of Intel's application ("Boilers" sheet) consider a 30% utilization factor. The January 2016 ACDP does not include a permit condition restricting Intel from utilizing more than 30% of each boiler's heat input capacity over any 12-month rolling period nor does it document a physical constraint on the operating capacity of the boilers. The January 2016 ACDP does not limit the boilers' emissions to less than 100 tons per year, and the CO PSEL is 229 tons per year. If it is appropriate to calculate boilers' PTE using a 30% utilization factor, clarify the basis for that in the review report.

DEQ Response:
Intel requested 99 tons per year limits for NOx and CO in their application for the 2016 permit; however, for reasons unknown at this time, such limits were not put in the permit.

DEQ requested additional information from Intel about the boilers, and Intel replied that there are physical limitations on boiler operation[5] that effectively limit the boilers' PTE to less than 100 tons per year for NOx and CO.

Excerpt from Intel's letter:

> Intel's fabrication facilities (fabs) require heat to serve the process tools and the HVAC temperature control system. This heat is provided by natural gas fired industrial hot water heaters and, in the newer fabs, heat recovery systems. Each hot water system is a closed loop system that does not allow for any ability to "waste" heat. If for some reason the closed loop hot water system were to over heat, the recirculating water would become hotter and hotter until the hot water system temperature hits between 208 and 210 degrees Fahrenheit (°F). Once this high temperature condition occurs, the boilers automatically shut down due to hard interlocks within the boilers designed to protect equipment and the safety of employees. There are multiple hard interlocks based on 1) high operating temperature limit, 2) boiler high temperature interlock, and 3) boiler high pressure interlock. These interlocks and safeguards are compliant to ASME and NFPA standards.

Based on this information, DEQ concludes that the fossil fuel boilers at Intel did not constitute a "nested" federal major source in 2016, and Intel was not subject to PSD.

EPA R10 Comment:

Synthetic Minor Source for Hazardous Air Pollutants (HAP)

Draft ACDP Condition 75 & Associated Testing, Monitoring and Recordkeeping. Pursuant to Condition 75, Intel shall not emit more than 9.49 tons of an individual HAP or more than 24.49 tons of HAP combined in any 12- month rolling period (9.49 rounds down to 9, 24.49 rounds down to 24). A stationary source of HAPs meets the definition of major source if it has the potential emit 10 tons per year of any individual HAP or 25 tons per year of combined HAP. See CAA Section 112(a)(1), 40 CFR 63.2. Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the stationary source to emit a 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 enforceable. EPA articulated the criteria for practical enforceability in the preamble to the proposed rule Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act. 84 FR 36304, 36317 (July 26, 2019). One such criteria is monitoring, recordkeeping, and reporting. 84 FR at 36319. Therefore, if the source's HAP PTE is limited to 9.49 of any single HAP and 24.49 combined HAP, the source does not meet the definition of major source and this is not subject to certain NESHAPs appliable only to major sources of HAP, including (40 CFR part 63, subpart BBBBB) and (40 CFR part 63, subpart DDDDD) The HAP synthetic minor source emission limits were

[5] Letter from Rafe Christopherson, Intel, to George Davis, DEQ, dated Feb 26, 2024

established in the January 2016 ACDP at the request of Intel, and the draft ACDP proposes to extend the limits to cover additional emission units Intel is requesting authorization to construct and operate.

According to Appendix B to Intel's application, hydrogen fluoride (HF) and hydrogen chloride (HCl, otherwise known as hydrochloric acid) are primarily emitted by acid gas scrubbers (EXSC) with minor contributions from ammonia scrubbers (EXAM) and rotor concentrator thermal oxidizers (RCTO). EXSC and EXAM are packed-bed wet chemical scrubbers (air pollution control devices) described in Section 3.2.2 of Intel's application. The exhaust from some EXSC and RCTO are routed to wet electrostatic precipitators (WESP) which presumably provide no additional HF or HCl reduction. See Appendix B to Intel's application for identity of which EXSC and RCTO exhaust to WESPs.

According to ODEQ's 2020 Air Toxics Emissions Inventory for Intel, the two HAP emitted in greatest amount are HF and HCl. In 2020, Intel emitted 4.85 tons of HF and 1.2 tons of HCl according to ODEQ. The document does not explain how emissions were calculated. There is no information in the review report stating Intel's HF and HCl emissions for 2021, 2022 and 2023. Knowing the proximity of actual emissions to applicable emission limits is useful at gauging the degree of testing, monitoring and recordkeeping necessary to assure compliance. It is important to have confidence that emissions are not being underreported.

Intel is allowed to emit up to 9.49 tons of HF within any rolling 12-month period. If the compliance demonstration allows for underreporting of HF by 6%, that effectively increases allowable emissions to 10.0 tons per year (9.49 · 1.06 = 10.0), the HAP major source threshold that Intel does not intend to equal or exceed. Condition 83.b (Condition 59.b.ii in current ACDP) requires the calculation of monthly HAP emissions by multiplying either monthly production or chemical usage by an uncontrolled emission factor and acid gas scrubber pollutant-specific removal efficiency. The permit condition does not specify in detail (and the review report does not explain the basis of) the monthly production parameters, chemical usage rates, uncontrolled emission factors, and APCD removal efficiency. Appendix B of Intel's application ("OR Assumptions" sheet) specifies uncontrolled emission factors (that the facility claims to be confidential business information) and a 90% removal efficiency.

Please explain in the review report whether Intel is using those values from Appendix B to calculate monthly emissions. And if the specified uncontrolled emission factors are being used, explain in the review report how those values are representative during any one-month period considering operational variability in the semiconductor manufacturing industry.

DEQ Response: Synthetic Minor Source (NEIC)

Intel provided the following Response:

> "In response to concerns regarding how Intel tracks its HAP emissions, and, more specifically, its HF and HCl emissions from the EXSC scrubbers, Intel understands that the draft permit includes substantially more frequent and comprehensive stack testing in comparison to Intel's current 2016 ACDP permit. This testing includes annual testing of all operating EXSC and EXAM scrubbers for Fluorides, HF, and HCl along with other pollutants. With the number of operating scrubbers across both the Ronler Acres and Aloha campuses, this testing campaign is expected to last for approximately 5 months

> and will consist of approximately 750 hours of stack testing due to the fact that each test will be about 4 hours in length and will be repeated three times per sampling location (triplicate 4-hour tests). The significant number of annual sampling hours over an extended period of time will generate data for use in establishing the emission factors that, after DEQ approval, will be used to determine compliance with HAP synthetic minor limits as specified in condition 83.b. By collecting a large quantity of data over a five-month period annually, Intel will capture any potential process variation.
> The emission factors in the permit application are engineering estimates to demonstrate to DEQ and the public that there is a reasonable basis to conclude that the facility will be able to operate at its desired levels and maintain actual emissions below the limits. However, the emission factors used to determine compliance with the synthetic minor limits will be verified using the actual stack test results. Regular stack testing (which has been enhanced in response to comments) will ensure that the emission factors are current and that actual emissions are maintained below the synthetic minor limits."
>
> *End of Intel's Response*

With regard to Intel's HF PTE being close to the single HAP major source threshold, Intel submitted a letter with attachments to DEQ on March 20, 2024, which included the following paragraph:

> "Enclosed please find the cover letter and attachments that were provided to the EPA[6] on November 17, 2023 to validate Intel Corporation ("Intel's") area source HAP determination. In this study, Intel used FTIR data collected as part of two DEQ-approved source tests to calculate HF and HCl production-based emission factors. These factors were used in combination with actual production values (highly confidential) to generate rolling 12-month emission totals for the period from December 2020 through June 2023. The highest 12-month rolling total HF and HCl emissions were 4.1 and 2.5 tons per year, respectively. Intel believes that the FTIR-derived emission factors overstate emissions, in part due to the treatment of non-detect values. However, the FTIR-derived emission factors conclusively demonstrate that Intel's HF and HCl emissions are less than half of the major source thresholds."

In addition to the above, DEQ reviewed two past source test results for HF testing and estimated emissions from these tests below.

6 The letter and attachments were provided to EPA's National Enforcement Investigation Center (NEIC) following an inspection by NEIC.

The first test reviewed was done in August of 2014. The results for the EXSC scrubbers are shown below:

FAB	EXSC Scrubber ID			HF Emissions lb/hr	HF Emissions lb/hr
F20	SC 133 1 100		less than or equal to	0.0132	
RB1	SC 133 1 101		less than or equal to	0.0063	
RB1	SC 133 8 100		less than or equal to	0.0076	
RB1	SC 133 4 100			0.0118	0.0118
D1X	SC 133 1 100	OUTLET		0.0437	0.0437
D1X	SC 133 3 100	OUTLET		0.0191	0.0191
D1D	SC 133 1 100	OUTLET		0.0470	0.0470
D1D	SC 133 3 100	OUTLET		0.0345	0.0345
D1D	SC 133 4 100	OUTLET		0.0626	0.0626
D1C	SC 133 1 100	OUTLET		0.0470	0.0470
D1C	SC 133 4 100	OUTLET		0.0401	0.0401
RP1	EF 133 2 111	OUTLET		0.00626	0.00626
F15	SC 7 1 1	OUTLET		0.0193	0.0193
F15	SC 7 1 3	OUTLET		0.0239	0.0239
F15	SC 7 1 5	OUTLET		0.0238	0.0238
			Average of all values*	0.0271	
				Average of all values**	0.0316

* Average of all values in this column, including values reported as less than or equal to
** Average of all values in this column, which excludes values reported as less than or equal to

The results for the EXAM scrubbers are shown below:

FAB	EXAM Scrubber ID			HF Emissions lb/hr	HF Emissions lb/hr
RB1	SC 142 1 100		less than or equal to	0.0063	
D1X	SC 142 2 100	OUTLET	less than or equal to	0.0091	
D1X	SC 142 3 100	OUTLET	less than or equal to	0.0101	
D1D	SC 142 3/4/5 100	OUTLET		0.00819	0.00819
D1D	SC 142 21 100	OUTLET		0.00320	0.00320
D1D	SC 142 23 100	OUTLET		0.00327	0.00327
D1C	EF 142 4 111	OUTLET		0.00588	0.00588
D1C	EF 142 5 111	OUTLET		0.00729	0.00729
			Average of all values*	0.0067	
				Average of all values**	0.0056

* Average of all values in this column, including values reported as less than or equal to
** Average of all values in this column, which excludes values reported as less than or equal to

The second test reviewed was received in June of 2023 for testing in 2022. The results for the EXSC scrubbers are shown below:

FAB	EXSC Scrubber ID			HF Emissions lb/hr	HF Emissions lb/hr
D1X MOD1	SC 133 1 100		less than or equal to	0.021	
D1X MOD1	SC 133 5 100		less than or equal to	0.022	
D1X MOD2	SC 133 2 100			0.021	0.021
D1X MOD2	SC 133 3 100		less than or equal to	0.021	
D1X MOD2	SC 133 4 100		less than or equal to	0.016	
D1X MOD2	SC 133 5 100		less than or equal to	0.017	
D1X MOD3	SC 133 1 100		less than or equal to	0.021	
D1X MOD3	SC 133 2 100		less than or equal to	0.022	
D1X MOD3	SC 133 3 100		less than or equal to	0.022	
			Average of all values*	0.020	
			Average of all values**		0.021

* Average of all values in this column, including values reported as less than or equal to
** Average of all values in this column, which excludes values reported as less than or equal to

The results for the EXAM scrubbers are shown below:

FAB	EXAM Scrubber ID			HF Emissions lb/hr	HF Emissions lb/hr
D1X MOD1	SC 133 1 100			0.002	
D1X MOD1	SC 133 5 100			0.003	
D1X MOD1	SC 133 2 100			0.001	
D1X MOD2	SC 133 3 100			0.004	
D1X MOD2	SC 133 4 100			0.004	
D1X MOD3	SC 133 5 100			0.002	
D1X MOD3	SC 133 1 100			0.006	
			Average of all values*	0.0031	
			Average of all values**		

* Average of all values in this column, including values reported as less than or equal to
** Average of all values in this column, which excludes values reported as less than or equal to

In the 2023 permit application, Intel lists 52 EXSC scrubbers and 32 EXAM scrubbers. DEQ estimated HF emissions from the EXSC and EXAM scrubbers for the 2023 permit application using the test results above and the number of scrubbers listed in the application. DEQ made the estimates as follows:

- DEQ assumed that all scrubbers emit at the higher of the two calculated average test result rates for each set of test results, regardless of whether the average includes or excludes *less than or equal to* values.
- The average of the lb/hr/scrubber emission rates was multiplied by the number of scrubbers listed in the 2023 application, then by 8,760 hours per year, then divided by 2,000 to convert pounds to tons.

In the table below, the calculation results above were then compared to the scrubber emission rates in the permit application.

Test year and scrubber type	Lb HF/hr/ scrubber	Number of scrubbers and calculation constants	Ton HF/yr, Calculated	Ton HF/yr from the permit application
2016 EXSC	0.0316	x 52 scrubbers x 8,760 hr/yr / 2,000 lb/ton	7.20	8.79
2016 EXAM	0.0067	x 32 scrubbers x 8,760 hr/yr / 2,000 lb/ton	0.93	0.04
		Total of EXSC and EXAM emissions	8.13	8.83
2023 EXSC	0.021	x 52 scrubbers x 8,760 hr/yr / 2,000 lb/ton	4.78	8.79
2016 EXAM	0.0031	x 32 scrubbers x 8,760 hr/yr / 2,000 lb/ton	0.43	0.04
		Total of EXSC and EXAM emissions	5.21	8.83

DEQ considers these estimates conservative (that is, the calculations are not biased toward a low estimate) for the following reasons:

- In cases where two averages were calculated, the higher average was used to estimate emissions; and
- All scrubbers are assumed to be operating at all times, whereas Intel states that scrubbers are shut down periodically for maintenance.

DEQ also considers these estimates to be inexact for the following reason:

- The data used represents only a few of the EXSC and EXAM scrubbers, but was assumed to apply to all scrubbers of each type without any information to support such an assumption.

Examination of the results suggests that:

- Intel's emissions calculations for the EXSC scrubbers do not underestimate HF emissions;
- Intel's emissions calculations for the EXAM scrubbers do underestimate HF emissions; and
- The sum of Intel's emissions calculations for both the EXSC and EXAM scrubbers do not underestimate HF emissions.

Despite the inexact nature of DEQ's estimates, these estimates in combination with the information provided to EPA's NEIC, indicate that Intel's HF emissions calculations for the EXSC and EXAM scrubbers tend to not underestimate HF emissions and provide a degree of validation for Intel's claim that it is not a major HAP source.

HF, NOx and CO Emissions Variability

One of the attachments submitted with the letter cited above was a study report that included the HF and HCl emissions calculations showing the highest 12-month rolling HF and HCl emissions rates cited above. The study report included the results of source testing a number of scrubbers. DEQ reviewed the source test results and noted the following:

Source testing period	9/25/19 to 11/19/19
Scrubbers tested	33
Lowest flow rate measured	4,605.2 dscfm
Highest flow rate measured	49,555.2 dscfm
Lowest numerical HF emission rate, ignoring non-detect	<2.0x10-3 lb/hr
Highest HF emission rate	8.0x10-2 lb/hr

Source testing period	9/22/22 to 11/1/22
Scrubbers tested	16
Lowest flow rate measured	30,554.0 dscfm
Highest flow rate measured	69,032.9 dscfm
Lowest numerical HF emission rate, ignoring non-detect	≤8.0x10-3 lb/hr
Highest HF emission rate	≤2.24x10-2 lb/hr

In 2019, over the approximately 6 week testing period and 33 scrubbers, the highest flow rate is 10 times the lowest flow rate and the highest emission rate is 40 times the lowest emission rate.

In 2022, over the approximately 5-6 week testing period and 16 scrubbers, the highest flow rate is 2.3 times the lowest flow rate and the highest emission rate is 2.8 times the lowest emission rate.

The data from 2019 exhibits a significantly larger range of values than the 2022 data, although the 2019 data is also from approximately half as many tests as in 2022. DEQ has no explanation for this difference and can draw no conclusions from it, other than those below.

From this information, DEQ concludes that:

- Intel's HF emissions can vary significantly from scrubber stack to scrubber stack, from year to year, and most likely from day to day;
- special testing programs, such as 30 day tests, intended to gain an understanding of Intel's emissions variability are not necessary;
- no subset of scrubbers can represent all scrubbers; that is, to draw reasonable conclusions about emissions from all scrubbers requires testing all scrubbers;
- emissions will likely change over the next few years because of production increases; and
- annual testing of all scrubbers for HF is required.

At DEQ's request Intel had their source test contractor review FTIR spectral data from tests run in 2019 and 2022 to extract NOx and CO information. The testing included a total of 44

scrubbers at the Ronler Acres campus and 5 scrubbers at the Aloha campus, with different scrubbers tested in each of the two years.

The original tests that produced this data were only for HF and there was no quality assurance/quality control for other pollutants such as NOx and CO. DEQ therefore regards the data as unverified and unreliable, but it still suggests that NOx and CO emissions can vary considerably from scrubber to scrubber. The ranges of emissions rates are shown in the table below:

	EXSC Scrubbers				EXAM Scrubbers	
	CO Ton/yr	NOx Ton/yr			CO Ton/yr	NOx Ton/yr
Maximum	19.81	18.38			0.49	3.86
Minimum	0.03	0.14			0.01	0.38
Average	5.12	3.83			0.13	1.18

From this information, DEQ concludes that:

- Intel's NOx and CO emissions can vary significantly from scrubber stack to scrubber stack;
- Special testing programs, such as 30 day tests, intended to gain an understanding of Intel's emissions variability are not necessary;
- no subset of scrubbers can represent all scrubbers; that is, to draw reasonable conclusions about emissions from all scrubbers requires testing all scrubbers;
- emissions will likely change over the next few years because of production increases; and
- annual testing of all scrubbers for NOx and CO is required.

Since the draft permit included annual testing of all scrubbers for HF, HCl (EXSC only), Fluorides, NOx, and CO, DEQ has retained this testing in the final permit. This is discussed further in the section entitled "Revised Source Testing Requirements" on page 50.

EPA R10 Comment:
Based on information in the administrative record for this permitting action, Intel has undertaken over 5,000 new tool installations in D1X 1/2/3, RA4, MSB on EXSC, EXAM, EXVO and EXSP since issuance of January 2016 ACDP. Condition 46.c.i (Condition 41.c in current ACDP) requires annual testing of EXSC exhaust gas HF concentrations. It is unclear how, or if, the source test information will be used by Intel to calculate monthly emissions. Please explain in the review report how, or if, Intel is required to use the information generated by source testing. If the source test information is required to be used, explain how annual testing accounts for operational variability.

DEQ Response:
Intel is not required to use source testing information for HF emissions reporting.

Much of Intel's emissions reporting is based on emission estimates and algorithms that Intel considers Confidential Business Information. Although the permit may specify or allow various emissions reporting requirements, including updating emission factors using source test results,

it is ultimately Intel's responsibility to report emissions in a manner that does not underestimate actual emissions. DEQ's purpose behind much of the source testing required in the permit is to verify that Intel's emissions calculations *do not underestimate emissions*.

DEQ has determined that Intel's HF emissions are highly variable, which is apparent from reviewing some past source test results. DEQ determined that annual testing of all EXSC scrubbers for HF (and other pollutants) is the best way to verify Intel's emissions calculations. (See *HF, NOx and CO Emissions Variability* on page 69; also see "Revised Emissions Testing Requirements (Source Testing)" on page 50.

EPA R10 Comment:
Wet scrubber solution pH, hydrofluoric acid concentration, liquid temperature and recirculation flow rate influence wet scrubber HF control efficiency. Explain in the review report how monitoring in the permit assures control efficiency greater than 90%. Condition 50.b requires Intel take expeditious action in the event pH falls 1.0 below set point of Intel's choosing. Consider establishing action thresholds for the other operating variables discussed above.

Please consider sharing in the review report wet scrubber source test results along with values for operating variables recorded for each source test. This information will provide basis (or not) for the 90% control efficiency assumption,

DEQ Response:
The permit does not require Intel to maintain a control efficiency (also called DRE, destruction and removal efficiency) for the wet scrubbers.

In general, Intel calculates production process HF emissions using internal algorithms that Intel considers extremely sensitive Confidential Business Information that if obtained by a competitor would provide that competitor with a competitive advantage. Therefore these algorithms are highly guarded and are not provided to DEQ. These algorithms are used to calculate pre-scrubber emissions, which are then multiplied by (1 minus the scrubber destruction and removal efficiency (DRE)) to calculate HF emissions to atmosphere. Thus, Intel's HF emissions calculation can be expressed as:

(pre-scrubber emission rate) x (1-DRE) = emission rate to atmosphere

DEQ's regulatory interest lies on the right side of this equation, the emission rate to atmosphere. In typical permitting situations, DEQ would want to verify the pre-scrubber emission rate and the DRE as an on-going means of verifying the emission rate to atmosphere; however, in Intel's case, the pre-scrubber emission rate cannot be determined by source testing as explained elsewhere in this Response to Comments. Multiplying an unknown value by (1-DRE) is still an unknown value. This leaves source testing of the emission rate to atmosphere (the right side of the equation) as the only means of verifying Intel's emissions calculations and makes knowing the DRE unnecessary since testing the emission rate to atmosphere (the right side of the equation) verifies the entire left side of the equation.

In short, the specific scrubber DRE value is by itself unimportant so long as the entire calculation (left side of the equation) gives results that do not underestimate HF emissions, which is verifiable by source testing. DEQ has not set a 90% (or any other) DRE requirement on

the scrubbers for the reasons explained above. It is Intel's choice to use a 90% DRE, and if Intel's emissions calculations (which include the DRE) underestimate emissions, then Intel alone is responsible.

However, this does not mean that DEQ has no interest at all in the scrubber DRE. Regardless of the need to comply with the emissions limits in the permit, the permittee must also minimize emissions at all times by operating the scrubbers so as to maximize scrubber efficiency at all times. Therefore, DEQ agrees that appropriate scrubber operating parameters should be monitored and maintained at the proper levels to ensure efficient operation.

As pointed out by the commenter, wet scrubber solution pH, hydrofluoric acid concentration, liquid temperature and recirculation flow rate influence wet scrubber HF control efficiency.

- Monitoring of scrubber solution pH is already required in the draft permit, and a minimum pH level must be maintained.

- DEQ does not agree that it is necessary to monitor the liquid temperature. The temperature of the air treated by the scrubbers is approximately room temperature, and the scrubbing liquid is not heated. Because of the intimate contact between the air and scrubbing liquid, and disregarding any possible evaporative cooling effects, the temperature of the air and the scrubbing liquid should be relatively constant and approximately the same as room temperature; i.e., about 65 to 70 degrees F.

- DEQ agrees that scrubbing liquid recirculation flow rate should be monitored and maintained at or above a minimum flow rate, and has added these requirements to the permit.

EPA R10 Comment:
Although the ACDP contains testing, monitoring and recordkeeping intended to assure compliance with the synthetic minor source emission limits, the review report does not explain ODEQ's case-specific compliance demonstration methodology. Because the regulations do not (and cannot be expected to) specify case-specific compliance demonstration methodologies, it is appropriate for ODEQ to explain in the review report why the selected methodology was chosen over alternatives (e.g., CERMS). State of Oregon rules regarding PSEL compliance in OAR 340-222-0080(4) states:

> *The applicant must specify in the permit application the method that will be used to determine compliance with the PSEL. DEQ will review the method and approve or modify, as necessary, to assure compliance with the PSEL. DEQ will include PSEL compliance monitoring methods in all permits that contain PSELs. Depending on source operations, one or more of the following methods may be acceptable:*
>
> *(a) Continuous emissions monitors;*
> *(b) Material balance calculations;*
> *(c) Emissions calculations using approved emission factors and process information;*
> *(d) Alternative production or process limits; and*
> *(e) Other methods approved by DEQ.*

Please explain in the review report why the selected methodology was chosen over alternatives (if others were considered).

DEQ Response:
The compliance demonstration methods listed in the comment above are considered below:

Method	Comments
Continuous emissions monitors;	EPA staff have verbally informed DEQ that there are no approved CEMS for HF. Even if an HF CEMS were available, Intel has so many emissions points to monitor that operating an HF CEMS on each applicable emissions point might be unreasonably burdensome. This is true for other pollutants as well.
Material balance calculations;	HF is largely produced in production processes via the breakdown and recombination of fluorine-containing gases; Pollutants emitted from scrubbers are from natural gas combustion plus breakdown and recombination of gases in the production process; Pollutants emitted from RCTOs are from natural gas combustion, VOC combustion and oxidation of compounds emitted from the production process; None of the above can be calculated by mass balance. Fugitive VOC emissions from production tool cleaning can be, and is, calculated by mass balance.
Emissions calculations using approved emission factors and process information;	This is the method used in past permits and will continue to be used. This is the most practical method for emissions reporting; however, based on the comments we have received, DEQ has determined that additional information based on source testing is needed to verify that emission calculations do not underestimate emissions of HF and other pollutants. This is discussed further in the section entitled “Revised Emissions Testing Requirements (Source Testing)”, page 50.
Alternative production or process limits; and	Because production of microprocessors requires hundreds or thousands of process steps that vary depending on the final product and that change over time, DEQ does not consider production or process limits a practical way to monitor or limit emissions.
Other methods approved by DEQ.	DEQ has been told anecdotally that Intel has FTIR monitors “all over the place”. If that were indeed true, such monitors might be able to function in a parametric monitoring role. However, Intel has informed DEQ that they do not have FTIR monitors “all over the place”. Intel does have approximately 6 portable FTIR monitors that are moved from place-to-place for various internal purposes. As with CEMS, DEQ is not pursuing this possibility.

DEQ has reconsidered the testing, monitoring and recordkeeping requirements and has revised them in response to comments. This is discussed further in the section entitled “Revised Emissions Testing Requirements (Source Testing)”, page 50.

EPA R10 Comment:
If ODEQ decides to continue with requiring the use of emission factors to calculate emissions, please consider whether to require Intel to calculate emissions based on use of a source-test-derived post-control emission factor. Explain in the review report the benefits and disadvantages of that methodology.

DEQ Response:
DEQ has found that Intel's emissions exhibit significant variability, and expects that other pollutants originating from microprocessor production processes will exhibit similar variability. In particular, DEQ has found that no single annual set of source tests can reliably predict emissions for other years. (See *HF, NOx and CO Emissions Variability* on page 69.)

If DEQ were to require the use of source test results to update emission factors, this could result in Intel being required to use emission factors that underestimate emissions. While this may or may not hinder compliance determinations, it could place DEQ in the position of appearing to require underreporting, and DEQ cannot place itself in that position. DEQ finds that it is best to leave revising emission factors up to Intel (subject to DEQ approval) and to use increased source testing to verify emissions calculations. Increased source testing is discussed in "Revised Emissions Testing Requirements (Source Testing)" on page 50.

EPA R10 Comment:
There is no discussion in the review report regarding the degree to which semiconductor manufacturing operations vary, and how that perceived variability influences HF emissions. Whether ODEQ chooses to require use of pre- or post-control emission factors to calculate emissions, consider whether to require Intel to periodically (e.g., annually) conduct long-term (e.g., month-long) post-control source testing, one fab at a time, to verify the accuracy of the emission calculation methodology required in the permit. If month-long measured emissions are appreciably different from calculated emissions (using methodology prescribed by the permit), R10 recommends ODEQ consult with Intel (and the public) to re-open the permit to improve the accuracy of the emission calculation methodology.

DEQ Response:
The following are copied from the *HF, NOx and CO Emissions Variability* discussion on page 69 of this Response to Comments:

- Intel's HF emissions can vary significantly from scrubber stack to scrubber stack, from year to year, and most likely from day to day;
- Special testing programs, such as 30 day tests, intended to gain an understanding of Intel's emissions variability, are not necessary;
- No subset of scrubbers can represent all scrubbers; that is, to draw reasonable conclusions about emissions from all scrubbers requires testing all scrubbers;
- Since Intel plans to increase production over the next few years, it is not possible to rely on test results from one year to represent emissions for another year; and
- On-going annual testing of all scrubbers for HF is needed.

Since the draft permit included annual testing of EXSC scrubbers for HF (and HCl, Fluorides, NOx, and CO), DEQ has retained this testing in the final permit and expanded it to include similar testing (excluding for HCl) of the EXAM scrubbers. This is discussed further in the

section entitled “Revised Source Testing Requirements” on page 50.

Intel provided the following Response

> “In response to concerns regarding how Intel tracks its HAP emissions, and, more specifically, its HF and HCl emissions from the EXSC scrubbers, Intel understands that the draft permit includes substantially more frequent and comprehensive stack testing in comparison to Intel’s current 2016 ACDP permit. This testing includes annual testing of all operating EXSC and EXAM scrubbers for Fluorides, HF, and HCl along with other pollutants. With the number of operating scrubbers across both the Ronler Acres and Aloha campuses, this testing campaign is expected to last for approximately 5 months and will consist of approximately 750 hours of stack testing due to the fact that each test will be about 4 hours in length and will be repeated three times per sampling location (triplicate 4-hour tests). The significant number of annual sampling hours over an extended period of time will generate data for use in establishing the emission factors that, after DEQ approval, will be used to determine compliance with HAP synthetic minor limits as specified in condition 83.b. By collecting a large quantity of data over a five-month period annually, Intel will capture any potential process variation.
>
> The emission factors in the permit application are engineering estimates to demonstrate to DEQ and the public that there is a reasonable basis to conclude that the facility will be able to operate at its desired levels and maintain actual emissions below the limits. However, the emission factors used to determine compliance with the synthetic minor limits will be verified using the actual stack test results. Regular stack testing (which has been enhanced in response to comments) will ensure that the emission factors are current and that actual emissions are maintained below the synthetic minor limits.”
>
> *End of Intel’s Response*

EPA R10 Comment:

Applicability

Draft Review Report Section 62 on page 23 of 79. PM is a regulated air pollutant as defined in OAR 340-200- 0020(133). See subparagraph (133)(a)(C). PM is a pollutant subject to at least one New Source Performance Standard promulgated under Clean Air Act Section 111. None of the exceptions in OAR 340-200-0020(133)(b), (c) and (d) apply. EPA suggests ODEQ revise the draft review report to correct statements that indicate that PM is not a regulated air pollutant. EPA further suggests ODEQ determine whether any changes to the permit are necessary given that PM is a regulated pollutant and, if so, made such changes.

DEQ Response:

DEQ has corrected the Review Report to indicate that PM is a regulated air pollutant. A review of the draft permit indicates that no additional changes were necessary in this regard.

EPA R10 Comment:

Air Quality Analysis

Ambient air boundary determination. The ambient air quality analysis relied on a proposed ambient air boundary, specified in Appendix D – Air Quality Impact Assessment of the air permit application. A review of the proposed boundary was not discussed in the Major NSR Review Report. The EPA recommends ODEQ include an addendum analysis of the ambient air boundary, disclosing the general information provided by the source to demonstrate the measures taken to preclude public access. Such measures may include use of fences, other

physical barriers, or security measures to ensure public access is precluded from these areas, as specified in EPA's Dec. 2nd, 2019, Revised Policy on Exclusions from Ambient Air. A diagram showing the physical measures used at each part of the facility to preclude public access along with a high-level description of the signage, video surveillance, and security patrols should be included in the record.

DEQ Response:
An analysis of the ambient air boundary has been prepared by Intel in concert with DEQ. A general description of the physical and security measures that are in place to limit public access are provided in a memorandum to the record that will be incorporated into the project files maintained by DEQ. More detailed information, which supplements the general description, has been provided to EPA R10 for review and will be maintained for reference as Confidential Business Information by DEQ.

EPA R10 Comment:
References to OAR 340-218 Requirements in Draft ACDP and Review Report
Draft ACDP and Review Report. Intel is a title V source that has submitted a timely title V application. ODEQ has not yet issued the title V permit. The draft ACDP is acting on an ACDP application separate and apart from the title V application. It is unclear why the draft ACDP and review report include numerous references to ODEQ's title V operating permit program requirements as if the ACDP is the title V permit. Please clarify in the review report the basis for citing OAR 340-218 in an ACDP.

DEQ Response:
Intel is a major source and is subject to Division 218, Oregon Title V Operating Permits, as stated in OAR 340-218-0020, Applicability:

> "(1) Except as provided in section (4), this division applies to the following sources:
> (a) Any major source;".

Therefore, Division 218 rules may be cited in the ACDP.

EPA R10 Comment:
Emission Limits Demonstrating NAAQS Compliance. According to OAR 340-225-0040, "All modeled estimates of ambient concentrations required under this division must be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR part 51, Appendix W, "Guidelines on Air Quality Models
(Revised)." Section 8.2.2(c) of Appendix W to Part 51 – Guideline on Air Quality Models states:

> *For the purposes of demonstrating NAAQS compliance in a PSD assessment, the regulatory modeling of inert pollutants shall use the emissions input data shown in Table 8–2 for short and long-term NAAQS. The new or modifying stationary point source shall be modeled with "allowable" emissions in the regulatory dispersion modeling.*

Please clarify in the review report that allowable emissions from the project were modeled consistent with Section 8.2.2(c) of Appendix W.

DEQ Response:
A description and clarification on the use of allowable emissions for the modeling of boilers in the air quality analysis has been provided in a memorandum to the record that will be incorporated into the project files maintained by DEQ. The clarification shows that, as described in the modeling report of July 2023, annual boiler operation has a physical capacity limit of 30% of short-term hourly emission rates. However, for modeling purposes the allowable maximum hourly emission rates were used. As a result, there is no requirement for operational limits on the boilers in the permit. This information was discussed with R10 on a conference call on February 24, 2024.

EPA R10 Comment:
Draft ACDP and Review Report. EXAM, EXSC, PSSS and RCTO are APCD. See EPA November 27, 1995, letter to Intel. There are instances in the draft permit and review report where APCD are referenced as EU (e.g., "EU- EXSC"). In the interest of avoiding confusion, please consider consistently labeling APCD as APCD (e.g., "APCD- EXSC") in the final permit and review report.

DEQ Response:
DEQ has added "(APCD)" to EU-EXSC and EU-EXAM (i.e., EU-EXSC (APCD) and EU-EXAM (APCD)) and EU-RCTOS (i.e., EU-RCTOS (APCD)). However, (APCD) was not added where EXSC and EXAM scrubbers or RCTOs are mentioned without the "EU-" prefix, as doing so would make the permit very difficult to read.

DEQ also did not add (APCD) to other air pollution control device names, as DEQ considers the names self-explanatory. For example, "(APCD)" has not been added to Diesel Particulate Filter or Specialty Exhaust filter because the names clearly indicate that the devices in question are APCDs.

Details for Tier I BACT Comment

EPA R10 Comment:
1. The calculations related to the many Best Available Control Technology (BACT) analyses have not been provided in native format (Excel spreadsheets), with all formulas included, data inputs cited/provided, and assumptions documented. The calculations and associated basis information must be provided in order for reviewing agencies to conduct rigorous technical review of the BACT analyses. This comment specifically applies to all cost effectiveness calculations and all calculations for emissions reduced in each analysis.

2. According to the 1990 Draft New Source Review Workshop Manual (p. B.35), "Total cost estimates of options developed for BACT analyses should be on order of plus or minus 30 percent accuracy." Cost estimates should also be site specific. No vendor quotes, actual cost documentation or other cost information of +/- 30% "study level" accuracy could be located within the materials provided. Some analyses cite "*2021 cost estimated for Intel Ocotillo*" but associated detailed documentation could not be located. Many analyses appear

to use the generic cost estimation spreadsheets published on EPA's Air Pollution Control Cost Manual web page, but only pdf versions have been provided, so the calculations cannot be verified. EPA Region 10 advises that cost effectiveness analyses conducted for purposes of BACT should be based on site-specific cost information of at least +/- 30% "study level" accuracy. Some examples of appropriate cost information include site-specific vendor quotes for purchased equipment costs or documented actual cost information from past control equipment installation projects. The spreadsheets published on the Cost Manual webpage are generic. While they are intended to provide a useful tool to the public for producing generic cost estimates for air pollution control devices, they are not intended to completely supplant site-specific cost information for the purpose of BACT analyses.

DEQ Response:
DEQ asked Intel to revise and resubmit several of the BACT control cost calculations, focusing on the calculations for NOx and PM controls that originally gave lower control cost values, as any adjustments or revisions to these would have the greatest likelihood of changing the BACT determination. Adjustments or revisions to the higher original cost estimates have little or no likelihood of changing the BACT determination.

For the revised calculations, DEQ asked that they be provided in their native format (Excel). Intel provided the requested calculations in their native (Excel) format and they were forwarded to EPA R10.

For the revised calculations, DEQ asked that the calculations be revised to use actual vendor quotes or actual costs. Intel provided the requested vendor quotes or actual costs from similar projects at Intel facilities, and revised the calculations to use the vendor quotes or actual costs instead of the generic costs used in the EPA control cost worksheets. The revised calculations were forwarded to EPA R10. Because vendor quotes or actual costs were used along with EPA's approved cost calculation methodology, the control costs should be on the order of plus or minus 30 percent accuracy, with one exception: Intel stated that the equipment cost for a NaClO2 scrubber system to reduce NOx emissions from EXSC scrubber was on the order of plus or minus 50 percent. The revised control cost estimate for a NaClO2 scrubber system was estimated to be $812,330 per ton of NOx reduced; plus or minus 50 percent of that value is still far above the $20,000 per ton control cost threshold that DEQ asked Intel to use.

Vendor quote sheets stated that the quotes are confidential, and Intel's actual costs are considered confidential by Intel. Intel asked and DEQ concluded that all such information be treated as Confidential Business Information.

DEQ reviewed several revised control cost calculations with Intel staff. In all cases but one the control cost increased when vendor quotes or actual Intel costs were used. The control cost that was lower is summarized below:

Ultra-Low NOx RCTO Burner Retrofit Cost Analysis, comparison of original and revised cost analyses

> The total capital investment was based on 2021 cost estimate for Intel Ocotillo. The original NOx reduced was based on uncontrolled (low-NOx burner) NOx emissions of 0.8590 tpy and assumed an additional 10% NOx reduction by replacing the low-NOx burner with an ultra-low-NOx burner.

The estimated amount of NOx reduced was less than 0.1 tpy.
The original control cost was $245,701.30 per ton of NOx reduced.

Revisions to the control cost calculations:
A different RCTO with higher NOx emissions was considered, with total capital investment 1.74 times higher than the original and NOx emissions 4.00 times higher than the original.
The total capital investment was based on a 2022 supplier quote for Intel Ocotillo.
The estimated amount of NOx reduced was 5 times higher than the original, based on data from Intel Arizona.
Equipment lifetime was changed from 15 years to 25 years.
The revised control cost was $58,389.58 per tpy, which is higher than $20,000 per ton.

DEQ considered whether this control cost calculation could be considered an incremental cost calculation, and concluded that it should not be considered incremental for the following reason:

This analysis considers replacement of an existing, functional low-NOx burner with an ultra-low-NOx (ULN) burner. In this case, the additional amount of NOx reduced would only be the difference between the amount reduced by the existing low-NOx burner and the amount reduced by the ULN burner. Although this might be called an incremental reduction, the situation is equivalent to keeping the existing low-NOx burner and adding an aftercontrol device that achieves the same reduction. A control cost analysis of the aftercontrol would consider only the reduction achieved by the aftercontrol device. For this example, the control cost calculation must also consider only the additional NOx reduction that would be achieved by replacing a functioning low-NOx burner with an ULN burner.

In all cases where the BACT control cost calculations were revised as indicated in these responses, including but not limited to use of vendor quotes or Intel's actual costs; use of a cost effectiveness threshold of $20,000 per ton; and longer equipment lifetimes; the revised control cost calculations did not change any BACT determinations.

Intel Provided the Following Response:

"As explained in response to the prior comment, retrofit BACT is a unique aspect of the Oregon PSD program. DEQ requested and Intel provided a detailed description of the basis underlying the retrofit factor. As Intel explained, the unique environment of a semiconductor manufacturing facility, including, but not limited to, constrained space, limited access, multi-story buildings with utilities woven throughout, contribute to the cost of retrofitting controls onto existing equipment. In addition, semiconductor manufacturing facilities are extremely complex integrated systems where the failure of a single system can result in a cascade of production stoppage. Intel has further pointed out that unlike many other industries where downtime can be obtained for upgrades and service, all work must be performed on live systems, greatly increasing the complexity of operations. Cost unique to the semiconductor industry include additional engineering and construction for temporary utilities as well as special considerations around means-and-methods for control of vibration and any potential contamination which could impact the integrity of the cleanroom environment. Intel documented to DEQ that a multi-layered approach is necessary to prevent interruptions to production, adding cost and

complexity to retrofitting of existing facilities.
As Intel documented in the record, as part of retrofitting controls engineering must frequently re-engineer existing structures and systems to ensure that they can continue to operate safely with retrofit additions while maintaining the same level of service. As Intel has noted, layers of complexity ultimately lead to higher trade prices. Insurance and bonding add even more to cover the significant liability in case an impact to production occurs."

End of Intel's Response

EPA R10 Comment:

3. Region 10 encourages ODEQ to reconsider the use of a specific cost threshold (e.g., $10,000 per ton of pollutant removed) as discussed in Section 72 on page 28 of the Review Report. In our own reviews of BACT cost effectiveness in the Region 10 office, and in accordance with long standing EPA policy, we do not establish cost thresholds. Every BACT determination is considered on a case-specific basis, which is consistent with the guidance in the draft NSR workshop manual. As cost estimates account for the time value of money and inflation, and should be stated in the year dollars for which they are estimated, we consider these factors in determining
whether specific control options should be considered cost effective under BACT. EPA Region 10 understands that ODEQ permitting staff have been applying an upper bound cost effectiveness threshold of $10,000 per ton of pollutant removed as a "rule of thumb" when reviewing a BACT analysis. EPA Region 10 further understands from discussions with ODEQ staff that ODEQ began applying this threshold of $10,000 per ton 20 or more years ago. While EPA does not set cost effectiveness thresholds for BACT, we recognize that many air agencies do rely on them in order to inform their decision making for control technology reviews such as BACT. EPA expects these thresholds to increase over time as the capital and operating and maintenance costs for air pollution control equipment increase due to general price inflation and the time value of money. However, this does not appear to be the case for ODEQ, as the cost threshold used by ODEQ has remained the same for many years. An effect of not updating an agency's cost effectiveness threshold to reflect current day or, at least, more up to date dollars is a degradation in BACT stringency. Specifically, controls that cost less in the past and perhaps were, at the time, cost effective when compared with the rule of thumb upper bound threshold would likely be more expensive today and potentially eliminated as BACT when compared to the same upper bound threshold, not adjusted for inflation.

DEQ Response:

The concept of an upper cost effectiveness threshold has been used in many BACT analyses across the nation. EPA itself used $10,000 per ton as a BACT upper cost effectiveness threshold in a January 19, 2001 memo7. In view of the fact that BACT determinations take cost into account, and that technically feasible control techniques can be rejected if they are found to be not cost effective, DEQ considers the use of an upper cost effectiveness threshold to be a legitimate means of determining cost effectiveness.

---

[7] Subject: BACT and LAER for Emissions of Nitrogen Oxides and Volatile Organic Compounds at Tier 2/Gasoline Sulfur Refinery Projects, From: John S. Seitz, Director, Office of Air Quality Planning and Standards (MD-10) at BACT and LAER for Emissions of Nitrogen Oxides and Volatile Organic Compounds at Tier 2/Gasoline Sulfur Refinery Projects (epa.gov)

However, DEQ understands EPA R10's concern about using a cost effectiveness threshold value that was (apparently) established in or before 2001 without taking inflation into account. DEQ has asked Intel to use a cost effectiveness threshold of $20,0008 per ton in revised BACT calculations. This request to Intel was made on an unofficial and one-time basis and is not intended to establish a revised cost effectiveness threshold for other BACT determinations made in Oregon.

In all cases where the BACT control cost calculations were revised as indicated in these responses, including but not limited to use of vendor quotes or Intel's actual costs; use of a cost effectiveness threshold of $20,000 per ton; and longer equipment lifetimes; the revised control cost calculations did not change any BACT determinations.

EPA R10 Comment:
Across the large number of BACT analyses conducted as part of this permitting action, it appears that the cost effectiveness analyses are a mix of average cost effectiveness analyses, incremental cost analyses, and retrofit cost effectiveness analyses. The type of cost analysis is not specified for each, and without access to the native calculations in spreadsheet format, it is not possible to determine. In general, the vast majority of BACT analyses should be average cost effectiveness analyses. There are certain circumstances where incremental or retrofit analyses are appropriate, but these instances should be clearly identified and the basis for using incremental or retrofit rather than average should be explained in detail.

DEQ Response:
Intel Provided the Following Response:

> In evaluating retrofit BACT, as well as non-retrofit BACT, average cost-effectiveness was the sole basis for evaluating controls. Incremental cost, as that term is defined in EPA's New Source Review Workshop Manual (Oct. 1990), was not the basis for any BACT conclusion. Costs were based upon a combination of vendor quotes, EPA guidance, and independent engineering judgment and cost-effectiveness calculated using the EPA methodology. In response to comments, alternative equipment lifetimes were considered as well as alternative cost-effectiveness thresholds and these did not alter final conclusions as to what constitutes BACT. All calculations were reviewed in their native Excel format and DEQ concurred with the methodologies in the application except as noted in the Review Report."
>
> *End of Intel's Response*

DEQ understands that incremental costs might be calculated as follows:

- Control A reduces a pollutant by 8 tons and costs X dollars.
- Control B reduces the pollutant by 12 tons and costs Y dollars, where Y is greater than X.
- Both Control A and Control B meet the control cost criterion and one of them must be installed.
- The incremental cost to install Control B is calculated as the entire cost of Control B (i.e.,

[8] DEQ understands that CEPCI is EPA R10's preferred source for inflation adjustment, but DEQ does not have a subscription to CEPCI and instead used the U.S. Bureau of Labor Statistics CPI inflation calculator at CPI Inflation Calculator (bls.gov) . Starting with $10,000 in January 2001, the calculator returned a value of $17,722.79 for January 2024.

cost = Y) divided by the incremental improvement offered by Control B over Control A; i.e., Y/(12-8). This calculation uses the wrong pollutant reduction amount and improperly inflates the control cost of Control B by a factor of 3 in this example.

- A source could use this incorrect calculation to argue that Control B should be rejected and the lower cost Control A should be BACT.

DEQ reviewed Intel's control cost analyses independently and with Intel staff, and finds that none of Intel's BACT cost effectiveness analyses are for incremental costs, although DEQ understands that it may appear some are because of the relatively small emissions reductions used in the denominator of the control cost calculation. Many of Intel's BACT analyses considered adding a new control device to the outlet of an existing control device, while keeping and continuing to operate the existing control device. In this situation, the new control device under consideration would be controlling only the emissions from the existing control device. Since emissions from the existing control device are very low in many cases, it might appear that an attempt was made to inflate the control cost calculation by using an incremental cost calculation. However, DEQ has reviewed the control cost calculations and finds that incremental cost calculations were not used and that appropriate emissions reductions were used in the denominators of the control cost calculations.

EPA R10 Comment:

•EPA Region 10 notes that many cost effectiveness analyses in the submittal use a retrofit factor of 1.5, reflecting the most difficult retrofit scenario contemplated in the EPA Air Pollution Control Cost Manual (US EPA Air Pollution Control Cost Manual, Section 1, Chapter 2 – Cost Estimation: Concepts and Methodology, November 2017, Section 2.6.4.2 Retrofit Cost Considerations). In addition to providing the basis for why a retrofit cost analysis should be used in place of an average cost effectiveness analysis, the basis for the retrofit factors used must be provided on a unit-specific basis.

DEQ Response:

Intel Provided the Following Response:

> "As explained in response to the prior comment, retrofit BACT is a unique aspect of the Oregon PSD program. DEQ requested and Intel provided a detailed description of the basis underlying the retrofit factor. As Intel explained, the unique environment of a semiconductor manufacturing facility, including, but not limited to, constrained space, limited access, multi-story buildings with utilities woven throughout, contribute to the cost of retrofitting controls onto existing equipment. In addition, semiconductor manufacturing facilities are extremely complex integrated systems where the failure of a single system can result in a cascade of production stoppage. Intel has further pointed out that unlike many other industries where downtime can be obtained for upgrades and service, all work must be performed on live systems, greatly increasing the complexity of operations. Cost unique to the semiconductor industry include additional engineering and construction for temporary utilities as well as special considerations around means-and-methods for control of vibration and any potential contamination which could impact the integrity of the cleanroom environment. Intel documented to DEQ that a multi-layered approach is necessary to prevent interruptions to production, adding cost and complexity to retrofitting of existing facilities.

As Intel documented in the record, as part of retrofitting controls engineering must frequently re-engineer existing structures and systems to ensure that they can continue to operate safely with retrofit additions while maintaining the same level of service. As Intel has noted, layers of complexity ultimately lead to higher trade prices. Insurance and bonding add even more to cover the significant liability in case an impact to production occurs.

Based on the complexity of logistics, space, process, and worker safety, it was considered reasonable to apply a 1.5 retrofit cost multiplier to account for higher administrative and engineering burden for a retrofit project relative to new-construction work."

End of Intel's Response

DEQ has reviewed Intel's response above and a letter from Intel to DEQ dated February 26, 2024 in which Intel provides justification for the use of the 1.5 retrofit factor in more detail. DEQ staff have been on site and observed multiple scrubbers and RCTOs. These devices are closely packed in and among each other and multiple exhaust duct systems and other piping and conduits. These devices are sometimes located on ground level, but are also installed two or three levels above ground where ground space was not available. In at least one instance an additional control device, needed to treat increased exhaust flow, was added one level above the previously installed group of devices. DEQ agrees that Intel represents a facility with "constrained space, limited access, multi-story buildings with utilities woven throughout" and agrees that Intel has provide sufficient justification for the use of the 1.5 retrofit factor.

EPA R10 Comment:

4. According to the EPA Air Pollution Control Cost Manual (cost manual), the analysis should be based on the expected design or operational life of the control equipment[1]. Many of the cost effectiveness analyses in the permit materials use an equipment lifetime of 15 years, which is on the low end for many control devices. EPA Region 10 advises that justification for the shorter equipment life is needed, otherwise a more representative equipment lifetime of 20 years (oxidizers) or 30 years (NOx controls) should be used in the analyses.

DEQ Response:

DEQ asked Intel to revise the cost calculations using longer equipment lifetimes. Intel submitted alternative average cost-effectiveness analyses based on a 25-year equipment life for oxidizers and 30-year equipment life for NOx controls and the change did not alter the conclusions of the BACT analyses.

In all cases where the BACT control cost calculations were revised as indicated in these responses, including but not limited to use of vendor quotes or Intel's actual costs; use of a cost effectiveness threshold of $20,000 per ton; and longer equipment lifetimes; the revised control cost calculations did not change any BACT determinations.

EPA R10 Comment:

5. In Section 2.1 of the BACT report prepared by ERM are several tables outlining hundreds of BACT applicability determinations by specific emission unit and pollutant. The tables simply include a "yes" or "no" determination as to whether that emission unit is subject to BACT for that pollutant. Region 10 could not locate the underlying detailed applicability

analyses that form the basis for each individual BACT applicability determinations. The detailed underlying analyses should be submitted for review.

DEQ Response:
DEQ asked Intel to respond to this comment. Intel's response follows:

> "Appendix C of Intel's application contains the BACT analysis. Section 2 of the BACT analysis includes the methodology used to determine BACT applicability that is the justification for the yes/no determinations for the various emission units. This methodology is repeated below for reference:
>
> Existing Equipment:
>
> - Emission units installed prior to 2016 are generally not subject to NOx and CO BACT review as part of this permit application because those emissions were included in the most recent netting basis established for those regulated pollutants. However, retroactive BACT could be triggered for these units for NOx and CO, based on whether the emissions unit contributed to the current emissions increase.
> - Existing emission units installed after 1978 are subject to retroactive BACT review for VOC, PM10, and Fluorides, as part of this permit application because those emission units are not included in the most recent netting basis. This is because, for those pollutants, the netting basis equals the baseline emission rate.
> - Emission units installed prior to 2010 are not subject to GHG BACT review as part of this permit application because those emission units are included in the most recent GHG netting basis, but retroactive BACT could be triggered based on whether the emissions unit contributed to the current emissions increase.
> - Emission units installed prior to 2011 are not subject to PM2.5 BACT review as part of this permit application because those emission units are included in the most recent PM2.5 netting basis, but retroactive BACT could be triggered based on whether the emissions unit contributed to the current emissions increase.
> - Equipment that has yet to be installed and will be installed at a later date: These units are permitted and the flexibility for installation is allowed under previous permitting. These emissions units are subject to retroactive BACT review as part of this permit application.
> - New additional equipment associated with the current major modification: These proposed emissions units are subject to BACT review as part of this permit application.
>
> This methodology is consistent with the requirements of OAR 340-224-0070(2)."
>
> *End of Intel's Response*

EPA R10 Comment:

6. *Draft ACDP Conditions 45.a and 45.b*. These permit conditions include BACT limits for fluorides applicable to APCD EXCS and EXAM. The BACT limit is a work practice standard as follows, "Maintain good work practices in operation of the Fab Plants for BACT including

maintaining the wet scrubber per best management practices." EPA states the following in its draft October 1990 NSR Workshop Manual on page 131 of 322:

To complete the BACT process, the reviewing agency must establish an enforceable emission limit for each subject emission unit at the source and for each pollutant subject to review that is emitted from the source. If technological or economic limitations in the application of a measurement methodology to a particular emission unit would make an emissions limit infeasible, a design, equipment, work practice, operation standard, or combination thereof, may be prescribed. Also, the technology upon which the BACT emissions limit is based should be specified in the permit. These requirements should be written in the permit so that they are specific to the individual emission unit(s) subject to PSD review.

The emissions limits must be included in the proposed permit submitted for public comment, as well as the final permit. BACT emission limits or conditions must be met on a continual basis at all levels of operation (e.g., limits written in pounds/MMbtu or percent reduction achieved), demonstrate protection of short term ambient standards (limits written in pounds/hour) and be enforceable as a practical matter (contain appropriate averaging times, compliance verification procedures and recordkeeping requirements).

OAR 340-200-0020(17) defines BACT as an emission limitation. The provision states, "If an emission limitation is not feasible, a design, equipment, work practice, or operational standard, or combination thereof, may be required." Appendix B to Intel's application assumes a fluorides control efficiency of 60% across the EXSC wet scrubbers. Specify in the ACDP either (a) a control efficiency across the wet scrubber, or (b) an exhaust gas concentration. Include testing, monitoring and recordkeeping to assure compliance. If a basis exits for not requiring a fluorides emission limit, please clarify that in the review report.

[1] https://www.epa.gov/sites/production/files/2017-12/documents/epaccmcostestimationmethodchapter_7thedition_2017.pdf See page 22.

DEQ Response:

Intel Provided the Following Response:

> "The BACT limit for Fluorides applicable to the wet scrubbers is in the form of a work practice since an emission limitation is not a feasible option. A scrubber control efficiency was determined to not be feasible due to the fact that in most cases, isokinetic test locations are not available for accurate inlet testing for Fluorides. Even where there might be the option to perform isokinetic testing on both the inlet and outlet of the scrubber, Intel identified that there are technical challenges with the references methods used for testing of Fluorides (total fluorides minus HF) where an accurate comparison of inlet and outlet results of Fluorides would not be possible due to detection limitations. An exhaust gas concentration limit was also determined not to be a feasible option for a semiconductor manufacturing facility since flow rates from the process and through the scrubbers do not scale with production and associated emissions. Therefore, the work practice was determined to be an appropriate BACT limit."
>
> *End of Intel's Response*

DEQ staff, including a Source Test Coordinator, went on site on March 18, 2024 and observed three exhaust systems and several sets of scrubbers. The inlet ducts to the observed scrubbers are rectangular in cross section, are sharply curved, and are connected at right angles to the circular in cross section side exhaust header that carries exhaust gases from the main header to the scrubber sets, confirming that accurate inlet testing is very difficult if not impossible (see *Arrangement of Exhaust Systems* on page 50). DEQ concludes from this that a control efficiency BACT limit is impractical and unenforceable.

DEQ also considered the emissions variability of HF, which is discussed on page 69 under *HF, NOx and CO Emissions Variability*. Although this Comment and Response pertain to Fluorides, DEQ considers the variability of HF emissions to be indicative of the Fluorides emissions variability for the following reasons:

Fluorides and HF both originate from the use of fluorine-containing gases in the semiconductor manufacturing tools. In the tools these gases break down into their constituent parts which subsequently recombine with other constituents, forming HF and fluorides. Many tools include Point of Use abatement devices with thermal oxidizers that cause additional break downs and recombinations. Since HF and fluorides have the same origins and are produced by the same chemical-physical processes, DEQ considers that the variability of HF emissions also indicates the variability of Fluorides emissions.

As noted on page 69 under *HF, NOx and CO Emissions Variability*, HF emissions can vary widely, indicating that Fluorides emissions can also vary widely. This wide range of variability makes establishing any kind of numerical emission limit very problematic in that any such limit would have to take into account the normal wide range of emissions variability and might have to be so high as to be essentially meaningless.

DEQ therefore concludes that BACT limits in terms of control efficiency or numerical emissions limits are not practical and stands by the determination that BACT is a work practice.

EPA R10 Comment:

7. *Draft ACDP Condition 31.* CO and NOX BACT limits for multiple EU (for CO/NOX)/APCD (for VOC) RCTO in a common group are expressed as an average emission rate across the group in units of "lb/hr." Each individual RCTO is not required to comply with the

limits. Instead, compliance with the limits is demonstrated by averaging emissions across all RCTO in a group. Please consider clarifying in the review report how the lb/hr limits were derived and why that form (mass/time) alone was selected to express BACT. The permit should also require installation and operation of either low NOX burners or ultra-low NOX burners, as applicable. Alternatively, the BACT limits can be expressed as maximum "lb/mmBtu," maximum "lb/unit production", or a maximum exhaust gas pollutant concentration, where compliance cannot be achieved by conceivably just throttling back production. Also, please consider clarifying why emission averaging across multiple RCTO is allowed.

DEQ Response:

Intel provided the following Response:

> "The use of BACT limits for a group of equipment is appropriate as a group of RCTOs are controlling emissions from the same fab emission unit through a common header. In addition, NOx emissions from RCTOs are both from natural gas combustion and from the oxidation of some VOCs that contain N (e.g. HMDS). For these reasons it is appropriate to consider compliance with the BACT requirement across the group of controls.
>
> A pound per hour limit is appropriate in this context as BACT because flow rates from the process and through the RCTOs do not scale with production. Having the BACT limit stated on a pound per hour basis also allows easy comparability of actual emissions to the emission rates modeled to demonstrate compliance with NAAQS. To the extent that there is a concern that compliance could be achieved with a pound per hour limit by throttling back production, this is not possible given that mandatory minimum production levels are required during the periodic stack tests used to demonstrate compliance.
>
> Low NOx burners (LNB) and ultra-low NOx burners (ULNB) were identified and evaluated in Section 6.2 of the BACT analysis. LNB were determined to be technically feasible. ULNB were identified as technically feasible for new RCTOs but likely not feasible for retrofit due to size/space constraints. Nonetheless both technologies were assessed as technically feasible. ULNB were determined to constitute BACT for new RCTOs but were eliminated based on cost-effectiveness for existing RCTOs. LNB were determined to constitute BACT for existing RCTOs."
>
> *End of Intel's Response*

RCTOs reduce VOC emissions by introducing VOC-laden air into a combustion chamber where the VOC is combusted. The combustion chamber is heated by a combination of heat from a natural gas-fired burner and heat produced by combustion of the VOC. Burner operation varies with the VOC heat input; for example, as heat input from the VOCs increases, heat input from the burner decreases and vice versa.

Combusting VOC in addition to natural gas introduces an unknown, variable and largely uncontrollable fuel source with unknown and variable NOx and CO emissions. This results in overall variable emissions that are a natural consequence of an RCTO's purpose, which is to destroy VOC by combustion. As shown elsewhere in this Response to Comments, HF emissions from EXSC scrubbers can be significantly variable (see HF, NOx and CO Emissions Variability, page 69, and DEQ expects the same kind of variability from RCTOs. Any RCTO BACT limit has to allow for a possibly wide range of emissions, otherwise the facility would be in jeopardy of violating the limit during normal and otherwise compliant operation.

Conversely, setting excessively high BACT limits is unacceptable. The ideal BACT limits for RCTOs should be high enough to account for normal emissions variability without being so high that exceeding the limits is impossible. Since knowing the absolute upper bound of emissions variability is impossible in this case, absent better information a certain amount of judgement is required instead.

BACT for CO

For the 2016 permit, Intel submitted an amendment to the original application that included the following:

> Section 3.3.2 of the original Type 4 permit application provided a discussion of RCTO natural gas combustion emissions and a sample calculation. Detailed calculations were provided in Appendix C. Intel is submitting this amendment with modifications to the emission factors used to calculate CO emissions from the RCTOs. Firstly, CO emission factors for two of the "project" RCTOs were incorrectly identified in the original permit application and overestimated emissions. Secondly, subsequent to submitting the original permit application, Intel has been working with RCTO manufacturers to better characterize CO emission rates from these unique combustion units. The original Type 4 application indicated a CO emission factor for the new project RCTOs of 50 pounds per million cubic feet (lb/MMCF). This emission rate was Intel's best estimate based on the information available at the time of application submittal. In subsequent discussions with the manufacturers, Intel has learned that this emission factor is not appropriate for these units. This amendment to the application modifies the CO emission factor to a more appropriate value of 69 lb/MMCF as recommended by the manufacturers. Intel notes that this emission rate is still lower than the CO emission rate associated with natural gas combustion in a properly tuned boiler (84 lb/MMCF).

The discussion above applies to newer RCTOs. Intel had at the time and still has several older RCTOs. Intel has stated that the older RCTOs were designed with smaller combustion chambers that do not provide enough residence time for conversion of carbon all the way to carbon dioxide, resulting in significantly higher emissions of CO. Intel has stated that these emission factors are based on source test results.

DEQ considers these to be reasonable basis for the CO BACT limits in the permit. The CO lb/hr limits were calculated by multiplying the selected emission factors by the burner Btu/hr rating for each RCTO. These limits have been retained in the permit.

BACT for NOx

A maximum lb/mmBtu limit based on natural gas usage alone would underestimate emissions. Lb/mmBtu limits based on natural gas usage but adjusted up to account for the additional NOx and CO produced by combustion of the VOC would have to be high enough to account for the highest possible NOx and CO emission rates. A lb/unit production limit would similarly have to be high enough to account for the highest possible NOx emission rate.

The BACT NOx limits in the 2016 permit are based on AP-42 emission factors for small natural gas-fired boilers (<100 mmBtu/hr, AP-42 Table 1.4-1). The uncontrolled emission factor is 100 lb/mmscf and the controlled low NOx burner emission factor is 50 lb/mmscf. Although the RCTOs are equipped with low-NOx burners, the burner NOx control only applies to the combustion of natural gas; the VOC combustion occurs outside the burner(s) and is therefore uncontrolled. Intel has also stated that some VOCs contain nitrogen. To account for

uncontrolled combustion as well as nitrogen present in some of the VOCs, the uncontrolled emissions factor of 100 lb/mmscf was selected. The NOx lb/hr limits were calculated by multiplying the selected emission factors by the burner Btu/hr rating for each RCTO. These limits have been retained in the permit.

These limits may appear to be chosen somewhat arbitrarily, but DEQ notes that NOx and CO emissions from RCTOs without add-on control systems are essentially uncontrollable in the regulatory sense. Without any real ability to control emissions, numerical BACT limits are questionable, and a design, equipment, work practice, operation standard, or combination thereof makes more sense. However, the numerical emission limits have been in place since 2016 and DEQ does not propose to change them. Further, these limits provide an incentive to operate and maintain the RCTOs properly so as to minimize NOx and CO emissions, which is ultimately the purpose of BACT.

Finally, throttling back production to reduce emissions for source tests does not appear to be practical. Intel has informed DEQ and EPA R10 that production of microprocessors takes from one to four months, and a large number of wafers are in various stages of processing at all times. Throttling back production would therefore require months of lead time and would significantly reduce annual production rates. It is doubtful that Intel's management and shareholders would find that acceptable.

EPA R10 Comment:

8. *Draft ACDP Condition 41.g*. For EU/APCD RCTO, the permit does not appear to require Intel to demonstrate compliance with "lb/hr" CO and NOX BACT/NAAQS-based emission limits except through source testing. Condition 41.g allows Intel to conduct source testing while operating at 80% or more of the average production rate during the two months preceding the source test. Operating at 80% of the average production rate does not appear to be the most challenging condition under which to determine compliance with a "lb/hr" emission limit. R10 recommends ODEQ consider requiring source testing to derive an emission factor in units of lb/mmBtu heat input, hourly monitoring of natural gas usage (dscf/hr), and periodic sampling/analysis of natural gas to determine its heating value (mmbtu/dscf). Consider requiring Intel to calculate hourly CO and NOX emissions using the above information to demonstrate compliance (at frequency of daily, weekly or monthly) with the hourly emission limits. Please explain the basis for the compliance demonstration (selected by ODEQ) in the review report.

DEQ Response:

Intel Provided the Following Response:

> "Stack testing is a well-established means of demonstrating compliance with a BACT limit. Requiring testing at a production rate reflecting 80% or more of the average production rate during the two months immediately prior to the stack test ensures that any recent increases in production are reflected in the stack test conditions. DEQ's normal requirement is that a source operate at the 90th percentile or higher of the average hourly operating rate during a 12-month period immediately prior to the test. This requirement is appropriate for a source that is operating at a steady state as opposed to a source that is expanding its operations. The intent is to capture a production period that reflects the most current operating levels. In order to reflect variability over such a short period, the requirement is to ensure production is 80% or greater of the average production rate.
>
> In regard to the suggestion that emissions be tracked based on pounds of CO or NOx emitted per million Btus of heat input of natural gas, this is not appropriate for Intel's

RCTOs because the rotary concentrators convert the high-volume low concentration exhaust stream to a low volume high concentration inlet feed to the thermal oxidizers. As a result, the amount of natural gas combusted in the thermal oxidizer varies with the amount of process gas being routed to an RCTO as well as the stage of operation (e.g., startup). Therefore, a natural gas-based emission factor would potentially understate actual emissions."

End of Intel's Response

DEQ agrees with Intel's response and adds the following:

DEQ understands that production of semiconductor wafers, as described elsewhere in this Response to Comments, involves many wafers moving from tool to tool over a one to four month period, with wafers continually starting and completing the production process at various times that overlap with other wafers in various stages of production. This process cannot be started, stopped or run at a high rate in the same way as more traditional emissions units such as boilers can be. The number of wafers in process at any time is also a function of market demand, which may cause production to ramp up or down. In effect, the production rate at any time is dictated by factors beyond the control of environmental staff or source testers, and the 80% production rate requirement allows for this kind of operational variability and inability to turn to process rate up for testing.

EPA R10 Comment:

9. *Draft ACDP Condition 46.c.i*. For APCD wet scrubber EXSC, the permit requires Intel to calculate monthly CO and NOX emissions pursuant to Condition 84.c. Condition 84.c states that emission factors are derived from source testing for Option 1 emissions calculation methodology. Condition 46.c.i requires Intel to conduct source testing to determine exhaust gas CO and NOX concentration. Given that the emission factor must be in the form of "lb/production unit" for Option 1, Intel must also be required to measure exhaust gas flow rate in order to determine mass emissions. Please finalize Condition 46.c.i to require EXSC wet scrubbers be tested for exhaust gas mass emission rate of CO and NOX.

DEQ Response:

DEQ has added measurement of exhaust gas flow to the source test requirements.

END OF EPA COMMENTS

19.0 NEDC ET AL. COMMENTS

NEDC et al. means:

Mary Stites, Northwest Environmental Defense Center
Carra Sahler, Green Energy Institute at Lewis & Clark Law School
Mary Peveto, Neighbors for Clean Air
Xitlali Torres, Verde
Sam Diaz, 1000 Friends of Oregon
Jamie Pang, Oregon Environmental Council
Julia DeGraw, Oregon League of Conservation Voters
Lisa Arkin, Beyond Toxics 11
Samantha Hernandez, Oregon Physicians for Social Responsibility
Damon Motz-Storey, Sierra Club Oregon Chapter
Faun Hosey, Robert Bailey, Allen Amabisca, Linda de Boer, Save Helvetia

Oregon Department of Environmental Quality ("DEQ") proposes to issue an Air Contaminant Discharge Permit ("ACDP") (hereinafter "Draft Permit") to the Intel Corporation ("applicant"), combining two permitting actions.[1] The Draft Permit will facilitate Intel's increased production of semiconductor products at two facilities in Washington County: the Ronler Acres campus in Hillsboro, and the Aloha campus in Aloha. The proposed Permit will allow for a significant increase in production capacity. However, with this expansion comes a substantial increase in emissions.[2] Intel's requested Plant Site Emissions Limits ("PSELs") include increases as follows: approximately 27 tons per year ("tpy") for Particulate Matter ("PM"), 27 tpy in PM10, 29 tpy in PM2.5, 369 tpy in Carbon Monoxide ("CO"), 216 tpy in Nitrogen Oxides ("NOx"), 173 tpy of Volatile Organic Compounds ("VOCs"), and 906,560 tpy of greenhouse gases ("GHGs").[3] While commenters are appreciative of opportunities to engage with Intel and DEQ, it is imperative that DEQ utilize its authority to increase monitoring and emission verification requirements in order to ensure that increases in Intel's production does not come at the expense of public health, environmental quality, or commitment to Oregon's climate goals. Indeed, Commenters believe DEQ may not issue this ACDP without increased source testing, monitoring obligations, and emissions verification systems integrated into the final Permit.

The Northwest Environmental Defense Center, Neighbors for Clean Air, Green Energy Institute at Lewis & Clark Law School, Oregon Environmental Council, Beyond Toxics, Verde,

---

[1] Oregon Department of Environmental Quality, Air Contaminant Discharge Permit Draft No. 34-2681- ST-02 (hereinafter "Draft Permit").

[2] DEQ, Air Contaminant Discharge Permit- Major New Source Review, Review Report for Intel Corporation (hereinafter "Review Report") at 5.

[3] Review Report at 5.

Oregon League of Conservation Voters, Oregon Physicians for Social Responsibility, 1000 Friends of Oregon, Save Helvetia and the Sierra Club (collectively, "Commenters") submit these comments urging DEQ to take a closer look at Intel's projected emissions and provided modeling, and to impose more stringent monitoring and verification requirements necessary to ensure compliance with state and federal law. Below you will find a substantive discussion of the Draft Permit submitted by Commenters, as well as Technical Comments prepared by Commenters' Air Quality Consultant expert, Dr. Ranajit (Ron) Sahu.[4] His comments are incorporated herein, referenced throughout, and attached as Exhibit 1.

Commenters have significant interests in protecting air quality throughout the state, as well as ensuring that DEQ meets Oregon's commitments to climate resiliency and public health. Commenters have members and supporters who work, visit, recreate, or live near the Intel sites at issue. Commenters also have members throughout the state that are deeply concerned with the integrity of Cleaner Air Oregon ("CAO") and the Climate Protection Program ("CPP").

Commenters are concerned that this Permit, if not strengthened, will have considerable adverse impacts on the air quality of the region, as well as the entire state of Oregon. As a major emitter of various pollutants, and a source of hazardous air pollutants, the facility will adversely impact the air quality of the local air shed, the health of the surrounding community and environment, the global climate, and will thwart progress towards reaching the goals of the CPP and CAO.

Commenters point out, as an initial matter, that minimizing emissions from semiconductor production is imperative to uphold a commitment to a just transition. As the global demand for semiconductors surges, so does the environmental and public health impact of their production. The semiconductor manufacturing process is characterized by high-energy consumption, use of hazardous materials, and significant greenhouse gas emissions. A just transition necessitates addressing these emissions at the front end to mitigate the impacts that are disproportionately borne by surrounding, and oftentimes frontline, communities. It is simply not enough to solely divest from fossil fuels without paying credence to the disproportionate impacts that historical consumption has thrust upon marginalized communities. While commenters recognize that semiconductors play a crucial role in transitioning towards a green economy, as well as provide promising economic opportunities for the state, this process must prioritize equitable opportunities that protect the health and well-being of communities. A just transition is one that redresses past harms, creates new relationships of power and prioritizes uplifting communities that have historically borne the brunt of environmental degradation. To facilitate a just transition—one that aligns with Oregon's own policies—DEQ must ensure that

[4] Dr. Ranajit Sahu, Technical Comments on DEQ's Proposed Permit No. 34-2681-ST-02, R-03 Issued to Intel Corporation, Aloha Campus (Application No. 034907/034188) (hereinafter "Exhibit 1").

Intel's emissions are stringently minimized, monitored, and verified. Broadly speaking, if DEQ is not equipped to ensure production does not increase at the expense of Oregon's communities and environment, it is not equipped to reap the benefits of this expansion. Commenters urge DEQ to analyze next steps in a manner that prioritizes principals of a just transition, to ensure that communities and environmental quality are placed at the forefront.

It is important to note that Intel has poured resources into this permitting process. This is seen in the use of the Receipts Authority and the rapid development of the Permit. More concerning, however, is how Intel has utilized its leverage to bar meaningful and accessible review of emissions data and modeling analysis. Intel also failed to provide a reasonable explanation of how emissions and air quality impacts were calculated and substantiated for the purposes of compliance with state and federal law. This has substantially hindered the public's ability to engage with and verify the provided materials. Further, with its considerable economic influence and technical expertise, Intel often holds significant leverage in negotiations with regulatory bodies and engagement with the public when it comes to developing emissions standards and limits. This level of autonomy comes at the expense of meaningful public engagement, as well as public trust in the regulatory process. Such a scenario underscores the importance of robust regulatory oversight to ensure that corporations like Intel adhere to stringent environmental quality and public health standards and prioritize the well-being of communities affected by its operations. These commitments will also help Intel reach its own climate articulated climate goals. As such, Commenters strongly urge DEQ to ensure that proper emissions verification and monitoring procedures are in place before this Permit is issued.

DEQ Response:
DEQ appreciates the importance of centering the manner in which Oregon addresses climate pollution on equity and a just transition. In 2021 when DEQ proposed rules that became Oregon's Climate Protection Program, they included the following priorities: 1) achieve deep reductions in climate pollution in Oregon, 2) moderate costs to Oregonians, and 3) ensure an equitable clean energy transition that benefits Oregon's environmental justice communities. DEQ is in the process of re-establishing its climate program, after the CPP was invalidated based on a procedural deficiency during the adoption process, and will again make equity a key focus for the new climate program and other environmental regulatory work.

DISCUSSION

It is the public policy of the State of Oregon "[t]o restore and maintain the quality of the air resources of the state in a condition as free from air pollution as is practicable, consistent with the overall public welfare of the state." ORS 468A.010(1)(a). The purpose of Oregon's air pollution laws is "to safeguard the air resources of the state by controlling, abating and preventing air pollution under a program which shall be consistent with the declaration of policy in this section." Given the significant increases in criteria pollutants, GHGs, and Hazardous Air Pollutants ("HAPs"), DEQ must require more stringent monitoring to ensure proper verification of Intel's emissions, to both ensure compliance with state and federal law, and ensure that communities and the environment are protected to the maximum extent practicable. This is especially so in light of Intel's plans to operate in a fundamentally different manner moving forward.

Historically, Intel has used these facilities to produce semiconductor chips for its own products. However, Intel has announced that it plans to operate as a "foundry" in the future, producing chips for its own products, as well as for other companies.[5] The ACDP presumes that processes and corresponding emissions for contract manufacturing will be substantially similar. However, this presumption must be supported and verified. This is so because market demands and consumer needs may result in different "recipes" and steps in the manufacturing processes, which could produce emissions variances. This drastic shift in operational plans is not adequately reflected in the Draft Permit's conditions. Indeed, the Permit grants Intel substantial latitude to modify its operations, including the ability to make modifications to manufacturing processes, without prior notification to DEQ.[6] This latitude, if not properly monitored, could lend itself to operational changes that jeopardize compliance with the federal Clean Air Act programs.

This deficiency can be remedied by imposing, in the Permit, more comprehensive monitoring obligations to ensure that Intel does in fact comply with the proposed Permit's PSELs, and all relevant NAAQS, under all future market-driven operational changes. With Oregon's state policy, as well as Intel's future operational changes in mind, Commenters urge DEQ to impose more stringent monitoring and verification processes for the reasons outlined below. Commenters also point out that Intel seeks to substantially increase emissions of a number of its criteria pollutants in a manner that is presumably proportionate to its increases in production.[7] However, its HAPs emissions do not increase from the previous permit. Commenters have been unable to access information to substantiate how it is possible to facilitate such an increase of criteria pollutants with no increase in HAPs emissions.

Accordingly, Commenters urge DEQ to verify these PSELs both for accuracy, but also to ensure that the Applicant is properly classified as an area or minor source, rather than a major source of HAPs.

---

[5] *See, e.g.*, https://www.bizjournals.com/portland/news/2024/02/21/intel-foundry-microsoft.html

[6] Draft Permit at 8.

[7] *See* Exhibit 1 at 2.

Table Sahu-1: Intel's PSEL Breakdown and Major Sources Contributing to Respective PSELs

RA and Aloha PSEL Summary (tpy)	NOx		CO		VOC		PM	PM10	PM2.5		Fluorides		HAPs	
Boilers	19.69	4.8%	58.64	9.8%	8.55	2.4%	3.89	3.89	3.89	6.6%	-		0.14	0.7%
EGENs	52.46	12.7%	4.28	0.7%	0.96	0.3%	0.48	0.48	0.48	0.8%	-		0.35	1.7%
RCTOs	80.73	19.6%	106.28	17.8%	150.01	42.8%	19.05	19.05	19.05	32.2%	0.002	0.0%	0.13	0.6%
EXSC Scrubbers	192.68	46.7%	327.92	54.8%	36.92	10.5%	28.11	27.17	25.65	43.3%	12.13	97.0%	17.47	84.6%
EXAM Scrubbers	43.45	10.5%	81.51	13.6%	86.51	24.7%	13.55	8.54	8.27	14.0%	0.04	0.3%	0.04	0.2%
PSSS Scrubbers	-		-		-		0.71	0.44	0	0.0%	-		-	
Fugitive VOCs	-		-		65.82	18.8%	-	-	-		-		-	
Heaters	10.41	2.5%	17.13	2.9%	0.57	0.2%	0.26	0.26	0.26	0.4%	-		0.02	0.1%
TMXW	12.23	3.0%	1.1	0.2%	0.2	0.1%	0.09	0.09	0.09	0.2%	-		0.004	0.0%
Lime Silos	-		-		-		0.44	0.44	0.44	0.7%	-		-	
Cooling Towers	-		-		-		8.81	7.19	0.03	0.1%	-		-	
Aggregate Insignificant Activities	1	0.2%	1	0.2%	1	0.3%	1	1	1	1.7%	0.3	2.4%	2.5	12.1%
Paved Road Emissions	-		-		-		0.75	0.15	0.04	0.1%	-		-	
Total	**412.64**		**597.86**		**350.54**		**77.16**	**68.71**	**59.21**		**12.5**		**20.65**	
Current PSEL	197		229		178		41	35	31		6		24	
Requested PSEL	413		598		351		68	62	60		12.5		24	
% Increase Requested	*110%*		*161%*		*97%*		*66%*	*77%*	*94%*		*108%*		*0%*	
		89.5%		96.1%		78.0%				89.5%		97.0%		84.6%

Table 1: The yellow highlighted items, for each pollutant, show the major contributors to that pollutant, with the sums of just the yellow-highlighted contributions tallied in the last row.[8]

NEDC Comment:

1. The information provided fails to provide a reasonable basis for many assumptions

An applicant is required to submit "all information necessary to perform any analysis or make any determination required under" the air quality analysis rules.[9] Assumptions used in Intel's modeling, which form the basis of PSELs and an ultimate determination of Clean Air Act ("CAA") compliance, must be submitted to DEQ. However, DEQ accepted many of the Intel's assumptions without questioning their basis. The ability of DEQ, the public, and Dr. Sahu to assess these assumptions has been further limited by Intel's consistent claims of business confidentiality.[10] Ultimately, the fundamental assumptions that formed the emissions estimates have not been made available to the public, and Intel routinely rejected inquiries for clarity on the technical assumptions that form the basis for emissions calculations.

Given the repeated claims of business confidentiality, it is unclear how Intel reached its emissions calculations. The public is left to wonder how the applicant or DEQ arrived at their conclusions and if those conclusions are supported. This lack of information and justification is problematic, as the assumptions behind Intel's emissions estimates ultimately form the basis for DEQ's determination that the permitted activity will not cause or contribute to the violation of National Ambient Air Quality Standards ("NAAQS") or a Prevention of Significant Deterioration ("PDS") increment. Further, this failure to provide essential information to DEQ and the public is contrary to the requirements of OAR 340-225-0030 and public policies that are to facilitate meaningful

[8] This table is also included in Exhibit 1 at page 4.

[9] OAR 340-225-0030(2).

[10] *See, e.g.*, Exhibit 1 at page 3.

public involvement in the permitting process. The confidential interests of Intel can still be met, while ensuring that Intel's emissions projections are accurate through the integration of substantial verification measures. In light of the aforementioned deficiencies in Intel's provided information, additional monitoring and verification measures are necessary before the Permit may be issued.

DEQ Response:
In general, emissions information may be provided in the following ways:

"Front end" information	"Back end" information
Emissions can be projected or predicted using production information, process knowledge, emission factors or mass balance.	Emissions can be verified by emissions testing.

In most permitting actions, DEQ and the public have access to more front end information than is the case with Intel. Intel claims that their process, production and certain emissions calculations are Confidential Business Information (CBI) and therefore are exempt from public disclosure. DEQ reviewed this claim, and after consultation with the Oregon Department of Justice, DEQ concluded that the claimed information does qualify as CBI.

While this creates an information gap on the front end of emissions calculations, DEQ has authority to require emissions testing to provide information on the back end. Based on comments, DEQ has reconsidered and revised the emissions testing requirements in the permit to provide more and better information on the back end. This is discussed further in the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50.

NEDC Comment:

2. DEQ Improperly Bifurcated Cleaner Air Oregon, Climate Protection Program, and Clean Air Act Processes

Cleaner Air Oregon

The Draft Permit contains little to no analysis of the types of air toxics or HAPs that will be emitted during manufacturing processes.[11] Commenters' discussions with Intel surrounding air toxics and emissions inventories to substantiate HAPs PSELs have been largely circular: Intel claims that it will verify compliance with obligations pertaining to air toxics emissions when it goes through the Cleaner Air Oregon Process. This is inappropriate for two reasons: First, Intel and DEQ cannot rely on a state program—CAO—that has not happened yet in order to demonstrate compliance with federal obligations regarding toxic air pollutant emissions. Second, while CAO inventories are eventually integrated into a Title V permit, they are not binding on the permittee until the permittee has been called into the CAO program. This has yet to happen, and the process takes multiple years to complete. Intel cannot rely on a process that is so far in the future to satisfy obligations as they pertain to hazardous air pollutants. With these considerations in mind, Intel cannot collapse future CAO obligations with its existing obligations under the Clean Air Act.

[11] *See also,* Exhibit 1 at 3.

Climate Protection Program

Intel proposes to increase its GHG emissions by 906,560 tons per year, more than doubling the emissions from these facilities. This has major implications for the decarbonization goals of the state of Oregon and for Intel's own stated goal of achieving net-zero greenhouse gas emissions by 2040.[12] The doubling of emissions requires deeper scrutiny from DEQ, particularly as the stated GHG control measures in the permit refer only to current processes and Intel's plans for the facilities include operating as a "foundry" with potential different processes.

The intent of the CPP is to "to reduce greenhouse gas emissions from sources in Oregon, achieve co-benefits from reduced emissions of other air contaminants, and enhance public welfare for Oregon communities, particularly environmental justice communities disproportionately burdened by the effects of climate change and air contamination."[13] While the Oregon Court of Appeals invalidated the rule on a procedural technicality in December 2023,[14] DEQ announced its intention to take the shortest path to reinstating the program by initiating a new rulemaking process,[15] to be completed by the end of the year. There is nothing to suggest that the replacement rules will look different from the CPP.

The CPP rules make Intel's manufacturing facilities covered stationary sources,[16] subject to a Best Available Emissions Reduction ("BAER") assessment within nine months of notice from DEQ. Given DEQ's intention to reinstate the CPP program as quickly as possible, Intel should proceed as though it is subject to the CPP and look to the language of the program for guidance to facilitate a more thorough examination of its GHG emissions and ways to reduce them. Undertaking this process now will help Intel make progress toward its net-zero goals and avoid a duplication of efforts when the reinstated CPP rules take effect. This thorough examination should include future processes that may be included in "foundry" operations as much as possible.

One of the important requirements of the original CPP rules is the "[i]dentification and description of **all** available fuels, processes, equipment, technology, systems, actions, and other strategies, methods, and techniques for reducing covered emissions "[17] Intel has identified only two feasible Best Available Control Technology ("BACT") methods to reduce GHG emissions from boiler and RCTO operations in this permit application: use of low-carbon fuel and utilization of design and operational efficiency

---

12 Intel Newsroom. April 13, 2022. Intel Commits to Net-Zero Greenhouse Gas Emissions in its Global Operations by 2040. https://www.intel.com/content/www/us/en/newsroom/home.html#gs.542wuj

[13] OAR 340-271-0010(3) (invalidated by Northwest Natural Gas Co. v. Environ. Qual. Comm'n, 329 Or. App. 648 (2023)).
[14] Northwest Natural Gas Co. v. Environ. Qual. Comm'n, 329 Or. App. 648 (2023).
[15] State of Oregon Newsroom, *DEQ moves to re-establish the Climate Protection Program in wake of recent court ruling,* (Jan. 22, 2024), https://www.oregon.gov/newsroom/Pages/NewsDetail.aspx?newsid=215174
[16] OAR 340-271-0110(5)(a)(A).
[17] OAR 340-271-0310(2)(c) (emphasis added).

consistent with the manufacturer's specifications.[18] For reduction of GHG emissions from wet scrubbers, Intel identified two technically feasible methods: process chemical optimization and chemical substitution.[19] Intel's analysis provided one technically feasible method for emergency generator and pump operations: use of design and operational energy efficiency consistent with the manufacturer's specifications.[20]

Notably, the permit application states that these are all actions that Intel currently takes; **no new efforts to reduce GHG emissions are being proposed.** Given the significant increase in GHG emissions proposed in this permit application and the fact that these facilities will be subject to the final rules of the CPP, the goal of which is to reduce GHG emissions over time, Intel should be looking beyond its established measures for methods to reduce GHG emissions. Intel has touted that it is making progress toward its net-zero goals through a variety of initiatives, including collaboration across their supply chain.[21] This seems to indicate that it has or will have more options to reduce emissions than the methods that it currently uses. DEQ should require Intel to investigate other options before approving this Permit.

It is imperative that DEQ require compliance with the goals and objectives of CAO and the CPP prior to issuing the Permit. In doing so, Intel and DEQ will avoid duplicative inquiries later down the road while also having the opportunity to assure proactive compliance with Oregon's public health and climate policies.

DEQ Response:
Upon receipt of Intel's air quality permit application, DEQ analyzed all applicable requirements. For Clean Air Act compliance, the type of application met the criteria for Major New Source Review (NSR). The Cleaner Air Oregon rules, at OAR 340-245-0050(1)(a), require the following: "When notified in writing by DEQ, at DEQ's discretion, the owner or operator of an existing source with an operating permit must either demonstrate that it is an exempt source …" or the source must assess risk under OAR 340-245-0050(1)(a)(A) or (B). DEQ exercised its discretion to not notify Intel that it must either demonstrate that it is an exempt source or must assess risk.

Intel has complied with the CAO program rules (OAR 340-245-0050(1)(b)) that require submission of a CAO Emissions Inventory for review, as Intel is subject to Major New Source Review. DEQ reviewed and approved the inventory noting increased emissions in Toxic Air

[18] Review Report at 32, Condition 78.d, *see also,* Review Report at 36, Condition 80f.

[19] *Id*. at 38, 81.f

[20] *Id*. at. 40 and 41, 82.g

[21] Intel Newsroom, *Our Progress Toward Net-Zero Greenhouse Gas Emissions*, (Apr. 18, 2023), https://www.intel.com/content/www/us/en/newsroom/opinion/progress-toward-net-zero-greenhouse-gas- emissions.html

Contaminants. Based on DEQ's review of that inventory and its assessment of the information provided by Intel throughout this permitting process, DEQ affirms its original CAO call-in prioritization for Intel. Intel will be called into the program in early 2025."

With respect to the Climate Protection Program, DEQ has begun the process to reinstate the program for Oregon in place of the recently invalidated rules that had established the Climate Protection Program. The Oregon Court of Appeals decided that DEQ did not fully comply with notice requirements during the rulemaking process for the CPP, thereby invalidating the final rules and the program. The court's ruling did not impact the Environmental Quality Commission's underlying authority to establish and enforce the Climate Protection Program. DEQ is beginning a rulemaking process, which is expected to conclude before the end of 2024. Intel's facility was one of just over a dozen facilities across the state for which the "Best Available Emissions Reduction" component of the Climate Protection Program rules applied.

In summary, DEQ's determination to sequence the implementation of the applicable requirements under the Clean Air Act, Cleaner Air Oregon and the Climate Protection Program was conducted appropriately.

NEDC Comment:

3. Intel has failed to demonstrate compliance with NAAQS and NESHAPS

The airshed impacted by this permitting process is in attainment. However, Intel's own projected emissions are close to the relevant air quality standards, warranting further verification and review. Both emissions limits—for criteria pollutants, as well as HAPs—are close enough to their respective thresholds that DEQ must impose more stringent regulations. These emissions levels should be closely analyzed and scrutinized. As such, close verification of emissions levels is necessary to make sure that the air shed remains in attainment.

NAAQS

New Source Review ("NSR") programming under the CAA helps to attain and maintain the National Ambient Air Quality Standards by preventing degradation of air quality for those airsheds which are considered to be in attainment with NAAQs. Major sources emitting criteria pollutants in an attainment area are regulated under the Prevention of Significant Deterioration ("PSD") program.[22] Per PSD requirements, a source is required to perform air quality modeling to demonstrate that the facility will not cause or contribute to an exceedance of any applicable NAAQS or air quality increment[23] and install BACT.[24] Pursuant to OAR 340-224-0070, a modified source subject to PSD review must demonstrate that the ambient impacts with the construction and operation of the proposed source, combined with other applicable emissions increases and decreases from existing sources, will not cause or contribute to a violation of any NAAQS or air quality PSD increment. However, Intel's analysis is flawed, and cannot support conclusions required by OAR 340-224-0070(3)(a)(C).

[22] 42 U.S.C. §§ 7470-7479.

[23] EPA, *New Source Review Workshop Manual*, p. C.1 (Oct. 1990 draft); *See* 40 C.F.R. § 52.21(k).

[24] 42 U.S.C. § 7475(a), 7479(3).

In its own analysis, Intel's NAAQs modeling reveals that multiple criteria pollutants are substantially close to the National Ambient Air Quality Standards.[25] Of particular concern are the PSELs for NOx (NO2) and PM2.5.[26] For NOx, the NAAQS is 188 ug/m^3. Intel's modeling using EPA Method 163.54 projects a total emissions of 163.54 ug/m^3 while the Monte Carlo Method projects an emissions rate of 170.89 ug/m^3. Commenters point out that Intel's own analysis does not seem to include background emissions rates. This is fundamentally flawed because PSD analysis requires that baseline, existing ambient concentration levels be determined.[27] It is unclear why there are no background rates in the modeling. This is especially troubling considering how close Intel's proposed individual emissions will be to the NAAQS. Given Intel's emissions rates, coupled with the lack of background analysis in the model, DEQ should heavily scrutinize this model and undertake further inquiry as to whether or not Intel's operations will comply with NAAQS for NOx.[28]

Similar deficiencies exist in the PM2.5 modeling. While this model does include background analysis, Intel's total proposed PM2.5 emissions are close enough to federal limits to warrant further scrutiny. Intel's total annual PM2.5 emissions of 8.35 ug/m^3 is nearly 70% of the NAAQS. The EPA has proposed that the annual PM2.5 concentration be lowered to a range between 9-10 ug/m^3. Going further, PM2.5 monitoring information shows that Washington County actually exceeded the federal fine particulate matter standards in 2011 and 2013.[29] While the area did not surpass the three-year average to trigger a nonattainment designation, the area remains at risk of continuing to exceed the PM2.5 standard in the future.[30] Indeed, the potential to violate NAAQS and trigger a nonattainment designation prompted Intel to contribute $250,000 to Washington County's wood stove exchange program.[31] After six years, 606 wood stove exchanges have prevented over 311 tons of particulate matter, pollutants, and gases from entering the airshed.[32] Intel's increased particulate matter emissions frustrate the progress of the wood stove program. The existing thin margin for compliance, the active efforts to maintain attainment for particulate matter criteria, coupled with the aforementioned uncertainties that form the basis of these models underscore that Intel's materials are not sufficient to ensure compliance with state and federal air quality standards.[33] Because Intel has not submitted information necessary for DEQ to make the determination that proposed operations will comply with all NAAQS, DEQ may not issue the ACDP as written.

---

[25] Review Report at 56. *See also,* Exhibit 1 at 6.
[26] *Id.*
[27] 42 U.S.C. § 7479(4).
[28] Dr. Sahu provides further technical discussion on this matter in Exhibit 1 at 5-7.
[29] DEQ, *Particulate Pollution in Washington County,* at 1, https://www.oregon.gov/deq/FilterDocs/HIllsboroPM2point5QA.pdf
[30] *Id.*
[31] Washington County, Oregon, *Wood Stove Exchange: Year Six Report* (June 2022), *https://www.washingtoncountyor.gov/commdev/wood-stove-exchange-program*.
[32] *Id.* at 14.
[33] *See also*, Exhibit 1 at 7.

DEQ Response:
N-1 Response: This assertion is incorrect. Background concentrations in ug/m3 were included in the modeling. Footnotes in Table 18 specifically state that for the 1-hr NO2[9] modeling, seasonal background concentrations were incorporated into the model itself. As a point of information, concentrations, whether as modeled from source emissions, background concentrations, or total concentrations from all contributions, are expressed in terms of ug/m3, while emissions, as from stacks, are in lbs/hr or tons/year.

NEDC Comment
HAPs

DEQ should scrutinize and verify Intel's purported HAP emission estimates. The CAA regulates the emission of HAPs from stationary sources under the National Emission Standards for Hazardous Air Pollutants ("NESHAPs") program.[34] The CAA defines HAPs as any air pollutant listed under § 112(b) of the CAA.[35] A HAP is a pollutant that is not covered by NAAQs and which "causes or contributes to air pollution that may reasonably be anticipated to result in an increase in mortality or an increase in serious, irreversible or incapacitating illness."[36] The CAA defines a "major source" as "any stationary source or group of stationary sources" that "emits or has the potential to emit considering controls in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants."[37] A minor source or "area source" is a stationary source that emits less than 10 tpy of any individual HAP or less than 25 tpy of all combined HAPs.[38] This distinction is key because major sources of HAPs are required to "maximum achievable control technology" standards ("MACT"), which are more stringent than the minor source counterpart of "generally available control technologies" ("GACT"), the latter of which is less stringent.[39]

---

[34] 42 U.S.C. § 7412(a)(6).

[35] 42 U.S.C. § 7412(a)(6).

[36] *U.S. v. Walsh,* 783 F.Supp. 546, 552 (W.D. Wash. 1991).

[37] 42 U.S.C. § 7412(a)(1).

[38] 42 U.S.C. § 7412(a)(2).

[39] 42 U.S.C. § 7412(d)(2).

---

[9] NOx is a mixture of gases, principally NO2 and NO. Of these, NO2 is regulated by EPA and assigned a NAAQS based on health criteria. Emissions are given in terms of NOx because the levels of NO2 at the point of generation can't be determined in a practical way.

Intel's claim to be a minor source for HAPs, which has been largely unsubstantiated, is troubling for three key reasons. First, as articulated above,[40] it is unclear how Intel can substantially increase production *and* emissions of criteria pollutants, without increasing their emissions of HAPs. Absent justification and further verification, DEQ should not accept this conclusion without scrutiny. Second, Intel is only 1 tpy short of being considered a major source, which would implicate more stringent MACT standards.[41] DEQ should not accept such a substantial deviation in regulatory obligations without critical analysis, as it is contrary to state and federal law. Third, the majority of HAP emissions stem from the use of EXSC Scrubbers.[42] Commenters point out that the EXSC Wet Scrubber Conditions contemplate an event of "excess emissions"[43] from these HAP emitting scrubbers. Commenters can imagine a situation where Intel is emitting more than its HAP PSELs and only implementing GACT, which is not sufficient to protect human health. Taking these conditions into consideration, coupled with the fact that Intel claims to only be 1 tpy below the "major source" threshold for combined HAPs, and 1.1 tpy short of an individual HAP,[44] DEQ must verify the HAP emissions claims through bolstered source testing and continuous monitoring obligations.

DEQ Response:
In 2023, Intel was inspected by EPA's National Enforcement Investigations Center. As part of that inspection, EPA requested information to validate Intel's claim that they are not a major source of HAPs. The information Intel provided to EPA indicated that:

- HF and HCl comprise essentially 100% of Intel's HAP emissions. Intel identified other HAPs in its application, but these estimated quantities are very low and are below source test detection limits.
- Based on the results of source tests performed in 2019 and 2022, Intel's maximum HAP emissions from December 2020 through June 2023 on a 12-month rolling total basis were 6.6 tons per year, with maximum HF and HCl emissions of 4.1 and 2.5 tons per year, respectively.

DEQ independently estimated the maximum HF emissions from the EXSC and EXAM scrubbers using the results of two source tests conducted in 2014 and 2022. The estimates are 8.13 tons of HF per year using the 2014 test results and 4.78 tons of HF per year using the 2022 test results.

These results help to substantiate Intel's claim that it is not a major HAP source. For further information, please see the **DEQ Response: Synthetic Minor Source (NEIC)** on page 64.

In addition, the permit requires Intel to perform source testing for HF and HCl annually. This annual testing will provide additional information to verify Intel's HF and HCl emissions calculations. This is discussed further in the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50.

---

[40] *See* discussion *supra* p. 3.

[41] Commenters also point out that the projected levels for Hydrogen Fluoride, a HAP, are projected at 8.9 tpy, just 1.1 tpy short of the major source threshold for an individual pollutant.

[42] Review Report at 14, see also Exhibit 1 at 4.

[43] Draft Permit at 35 Condition 51.c, 51.d; *see also Id*. at 73 Condition 98

[44] Review Report at 59.

NEDC Comment

1. Obligations of the NOx pilot program should be bolstered

Commenters acknowledge that Intel is engaging in a voluntary pilot to test a NOx emissions reduction program. However, it is unclear what happens to PSELS if the pilot program fails, as condition 6.b.v of the Draft Permit contemplates a reality that the program may be abandoned.[45]

Recognizing that Intel's proposed NOx concentrations are already significantly close to ambient air quality standards, it is unclear how compliance with NAAQS is guaranteed in the event that the pilot fails. Moreover, the language of the Permit gives Intel incredible latitude to abandon the pilot. NOx emissions pose significant risks to air quality and can exacerbate respiratory issues of surrounding communities. In order for Intel to significantly expand its production in an equitable manner, it is imperative that it is held accountable to fulfill its commitments to pilot initiatives. In light of Intel's considerable contributions to the existing ambient air backgrounds for NOx, DEQ must ensure that PSELs are accurate even in the event of pilot project failure. Further, DEQ should utilize this opportunity to require stronger measures that will ensure compliance with state and federal law, as well as Oregon's policies to facilitate a just transition and build climate resiliency.

DEQ Response:

The NOx pilot test is a voluntary action taken by Intel that DEQ does not have authority to require. Under this permitting action, DEQ had authority to require Intel to perform a BACT analysis, and to require upgrading emissions control systems if any new BACT requirements were identified (they were not). The NOx pilot test has not been brought into action yet, and in fact could not be brought into action until this permit was issued; therefore, it has not been proven in practice and cannot be considered BACT. Under this permitting action, DEQ does not have the authority to require more than BACT.

With respect to PSELs, the NOx pilot test was not taken into consideration and all PSELs were established as if the NOx pilot test did not exist. Whether the pilot test is successful or unsuccessful, it will not change the NOx PSEL.

---

[45] Draft Permit at 5: "Intel is proposing to install and pilot test a new NO_X emissions reduction system…. The proposed system is a "first of kind" system and has not been pilot tested before. If the pilot test is successful, Intel may install it on additional exhausts at the facilities covered by the proposed Permit. If unsuccessful, it will be abandoned."

CONCLUSION

For the aforementioned reasons, Commenters have significant questions regarding Intel's PSELs, its modeling analysis, and how Intel's presumptions are sufficient to ensure compliance with state and federal law. DEQ can remedy these defects and ensure that adverse impacts to air quality are avoided by bolstering monitoring and emissions verification obligations. First, DEQ should require continuous monitoring where technically feasible for pollutants, including NOx, CO, VOC, and PM2.5. Second, this data should be made publicly available, and should be accessible so that entities can verify PSEL compliance, and ensure that the actual emissions comply with federal air quality standards. Finally, DEQ should critically evaluate Intel's modeling to ensure that the models do in fact provide a reasonable basis to ensure compliance with air quality standards.

Thank you for your time and consideration.

Sincerely,

Mary Stites, Northwest Environmental Defense Center
Carra Sahler, Green Energy Institute at Lewis & Clark Law School
Mary Peveto, Neighbors for Clean Air
Xitlali Torres, Verde
Sam Diaz, 1000 Friends of Oregon
Jamie Pang, Oregon Environmental Council
Julia DeGraw, Oregon League of Conservation Voters
Lisa Arkin, Beyond Toxics

Technical Comments on DEQ's Proposed Permit No. 34-2681-ST-02, R-05 Issued to Intel Corporation, Aloha Campus (Application No.

034907/034188)

by

Dr. Ranajit (Ron) Sahu, Consultant[1]

These comments address some of the more significant technical issues in relation to the proposed Air Contaminant Discharge Permit (ACDP)/Major New Source Review, proposed to be issued by the Oregon DEQ to Intel for modifications at its Ronler Acres and Aloha campuses. These comments do not provide a comprehensive list of all technical deficiencies, including several that have been discussed with DEQ over the last many months.

These comments are based on my review of the publicly available materials, including the permit application, the modeling report, the redacted emissions inventory, as well as DEQ's proposed permit and review report, various discussions with DEQ staff, as well as a site visit and discussions with Intel staff at the RA/Aloha campus. While noting the deficiencies below, which I believe should be addressed in order to make the final permit stronger that what DEQ has proposed, I wanted to express my sincere appreciation to both Intel and the DEQ for the opportunities to have multiple discussions over the last several months.

Introduction

In order to avoid duplication, I will not repeat introductory material in connection with this proposed permit that is readily available in the permit application as well as DEQ's Review Report accompanying this proposed action. However, it is worth noting that the changes that Intel has proposed are substantial and, as a result, the increase in the emissions of various pollutants that will result from the proposed modification are also substantial. I excerpt below Table 4-1 from the permit application. The "difference" column shows the increase in pollutants (in tons/year) as a result of the proposed modifications. While the table below confirms that New Source Review will be triggered for all of the pollutants below, I will focus my comments on the increases in NOx and PM2.5 emissions, as examples, for reasons that I explain later in these comments.

[1] Resume available, if requested.

Table 4-1 Facility Emission Rates (tpy)

Pollutant	Totals[a]	Netting Basis	Difference	SER
PM	78	0	68	25
PM_{10}	69	0	62	15
$PM_{2.5}$	60	0	60	10
CO	598	229	369	100
NO_x as Ozone Precursor	413	197	216	40
NO_x as NO_2 criteria pollutant	413	197	216	40
NO_x as $PM_{2.5}$ Precursor	413	197	216	40
SO_2	36	14	22	40
SO_2 as $PM_{2.5}$ Precursor	36	14	22	40
VOC	351	139	212	40
VOC as Ozone Precursor	351	139	212	40
Fluorides	13	0.5	11.7	3
GHG (CO_2e)[b]	1,722,804	227,000	1,495,804	75,000

[a] Reflects the sum of the emissions (including categorically insignificant activites), rounded up to the nearest whole number (see Table 3-1). Categorically insignificant activity emissions are not included for PSEL computation, but they are included for the determination of PSD applicability (OAR 340-222-0035(5)).

[b] GHG CO2e is in Short Tons

General Comments

NEDC-Sahu Comment:

1. Intel, as a company, has officially announced that it will operate fundamentally differently in the future (i.e., after the proposed modifications) than in the past. While in the past, Intel has used the RA/Aloha facilities to manufacture semiconductor chips for its own products, Intel has announced that in the future it will function as a "foundry" and make chips not just for its own products but also as a contract manufacturer for other companies.[2]

The relevance of this fundamental change in business purpose and orientation as far as the ACDP is concerned is the fact that, while the permit application makes no mention of this change and simply presumes that future emissions profiles will be similar to those in the past, that presumption needs to be supported and validated. It is not clear, for example, that, operating as a foundry, Intel may need to use different "recipes" and steps in the manufacturing processes, dictated by customer needs, which could be different that Intel's own recipes. Since process emissions and pollutants, as well as emissions from air pollution controls, are fundamentally generated from the use of

[2] See, for example, https://www.bizjournals.com/portland/news/2024/02/21/intel-foundry-microsoft.html

chemicals in the manufacturing processes, changes in the chemical types and mix that can occur, will affect emissions.

There is no reason to therefore simply ignore, as the proposed permitting action has done, this basic change in Intel's business purpose, as the DEQ has done to date. DEQ should forthrightly acknowledge this and discuss the implications and/or limitations of its proposed permit, and how it should therefore strengthen the proposed permit, such as via more comprehensive monitoring than what is currently proposed.

DEQ Response:

DEQ acknowledges that Intel may operate as a "foundry"; that is, may produce microchips for other companies. While such operation may be part of the reason for increased production and emissions, the production processes are the same for all microchips and operation as a foundry does not change the nature of Intel's processes or emissions.

DEQ does not agree with this comment. Intel has provided the following response to this comment:

> "Intel will be required to operate under all permit conditions including monitoring requirements regardless of whether it operates as a "foundry" or not. Regardless of whether a semiconductor chip is designed by Intel or not, the manufacturing process steps are the same. The main difference is how the integrated circuits are organized and interconnected. The process of building up those circuits on the semiconductor chip does not change depending on who designed the circuit patterns. Since the manufacturing process steps are the same, the physical and chemical processes employed which result in emissions do not materially vary. Minor variations in chemical use will be accounted for in Intel's emissions monitoring procedures. Whether Intel's processes are generating a foundry wafer or an Intel wafer, the monitoring of process emissions remains consistent."
>
> *End of Intel's Response*

Specific Comments

NEDC-Sahu Comment:

2. As a result of Intel's claims regarding business confidentiality, the fundamental bases of the emissions estimates summarized in the excerpted table above are not publicly available. While Intel attempted to address this via one-on-one discussions about the bases of the emissions calculations, and how they relate to the underlying processes at Intel's operations, it should be made clear that Intel could not and did not provide any clarity for the technical assumptions that underlie its emissions calculations. Its use of certain emission factors (i.e., mass of pollutants per unit of production) remain opaque even after all of the discussions – both to the public and to DEQ. DEQ participated in the one-on-one discussions and asked for the same level of clarity about emission factors and Intel could not or chose not to provide

that clarity.

It is clear that the DEQ has based its proposed permit on what is presented in the permit application, without any ability to understand the basis for the emissions presented. The emissions are therefore unsupported.

There is only one logical recourse as a result. That is to include substantial verification – i.e., emissions measurements and testing – such that, mindful of the confidentiality needs of Intel, the public can still verify the actual levels of pollutants that are emitted at Intel's plant.

Table Sahu-1 below, taken from Intel's own emissions detail sheet, shows the PSEL summaries for NOx, CO, VOC, PM2.5, Fluorides, and HAPs, from the various sources of these pollutants, along with the percentages of the total (for each pollutant) contributed by various sources.

Table Sahu-1: Intel's PSEL Breakdown and Major Sources Contribu[illegible]ng to Respec[illegible]ve PSELs

RA and Aloha PSEL Summary (tpy	NOx		C		VOC		PM	PM10	PM2.5		Fluorides		HA s	
Boilers	19.69	4.8%	58.64	9.8%	8.55	2.4%	3.89	3.89	3.89	6.6%	-		0.14	0.7%
EGENs	52.46	12.7%	4.28	0.7%	0.96	0.3%	0.48	0.48	0.48	0.8%	-		0.35	1.7%
RCTOs	80.73	19.6%	106.28	17.8%	150.01	42.8%	19.05	19.05	19.05	32.2%	0.002	0.0%	0.13	0.6%
EXSC Scrubbers	192.68	46.7%	327.92	54.8%	36.92	10.5%	28.11	27.17	25.65	43.3%	12.13	97.0%	17.47	84.6%
EXAM Scrubbers	43.45	10.5%	81.51	13.6%	86.51	24.7%	13.55	8.54	8.27	14.0%	0.04	0.3%	0.04	0.2%
PSSS Scrubbers	-		-		-		0.71	0.44	0	0.0%	-		-	
Fugitive VOCs	-		-		65.82	18.8%	-	-	-		-		-	
Heaters	10.41	2.5%	17.13	2.9%	0.57	0.2%	0.26	0.26	0.26	0.4%	-		0.02	0.1%
TMXW	12.23	3.0%	1.1	0.2%	0.2	0.1%	0.09	0.09	0.09	0.2%	-		0.004	0.0%
Lime Silos	-		-		-		0.44	0.44	0.44	0.7%	-		-	
Cooling Towers	-		-		-		8.81	7.19	0.03	0.1%	-		-	
Aggregate Insignificant Activities	1	0.2%	1	0.2%	1	0.3%	1	1	1	1.7%	0.3	2.4%	2.5	12.1%
Paved Road Emissions	-		-		-		0.75	0.15	0.04	0.1%	-		-	
Total	**412.64**		**597.86**		**350.54**		**77.16**	**68.71**	**59.21**		**12.5**		**20.65**	
Current PSEL	197		229		178		41	35	31		6		24	
Requested PSEL	413		598		35		68	62	60		12.5		24	
% Increase Requested	*110%*		*161%*		*97%*		*66%*	*77%*	*94%*		*108%*		*0%*	
		89.5%		96.1%		78.0%				89.5%		97.0%		84.6%

The yellow highlighted items, for each pollutant, show the major contributors to that pollutant, with the sums of just the yellow-highlighted contributions tallied in the last row. Thus, 89.5% of the NOx PSEL is from just four source types – the EGENs (emergency generators), at 12.7%; the RCTOs (Rotor Concentrator Thermal Oxidizers, a type of VOC destruction device), at 19.6%; the EXSC (acid scrubbers), at 46.7%; and the EXAM (ammonia scrubbers), at 10.5%. Of these, just the EXSC scrubbers account for almost 193 tons/year of NOx.

Table Sahu-1 confirms that the majority of each pollutant is emitted by a small number of sources. Sahu-1 also shows two items in orange highlighting – these reflect the high contribution of fugitive emissions to the VOC PSEL and the high contribution of aggregate insignificant activities to the HAP PSEL. While the latter may simply be an artifact (based on unsupported assumptions that aggregate insignificant HAPs are 2.5 tons/year, the fugitive VOCs are substantial.

The purpose of Table Sahu-1 is to prioritize those source/pollutant combinations that need extra scrutiny, both from an emissions estimation as well as verification purpose. Since, as noted prior, Intel cannot or will not provide support for its emissions estimates, based on confidentiality, it is only logical that the proposed permit focus on verification (i.e., testing, monitoring, etc.) to provide assurances that the emissions estimated are not erroneous.

While in a perfect scenario, all sources would be monitored for all pollutants, on a continuous basis, I recognize that that is impractical. Therefore, Table Sahu-1 provide a roadmap to monitor just the yellow-highlighted sources for each pollutant.

Specifically, the monitoring should be based on the following hierarchy: (i) first, if continuous monitoring (i.e., CEMS) is technically feasible – as is the case for NO_x, CO, VOC, and filterable $PM_{2.5}$, that should be the first choice – for each (or a representative number of) emission point(s) associated with the yellow-highlighted line items and (ii) next, only if CEMS are not feasible, such as for condensable $PM_{2.5}$, fluorides, HAPs – then periodic testing should be required at each or a representative number of emission points under representative process conditions.[3] For the orange-highlighted items, DEQ should require a better estimate for the HAP place-holder and DEQ should require Intel to support its fugitive VOC estimate either by periodic testing or mass-balance or some other approach that is technically sound.

Sadly, the proposed permit does not contain anywhere close to the type of testing/verification that is minimally appropriate, given the complete lack of basis/support/transparency for the PSEL values shown in excerpted Table 4-1 shown earlier or Table Sahu-1 above.

DEQ Response:

Based on a number of similar comments, DEQ has revised the emissions testing (source testing) requirements in the permit to provide more and better information to verify Intel's emissions. DEQ has considered different monitoring methods, including CEMS, and has decided that the annual monitoring required by the permit is sufficient to verify and characterize Intel's emissions. The revised monitoring is discussed further in the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50. The fugitive VOC emissions are already calculated by mass balance.

---

[3] Given Intel's penchant for secrecy, establishing representativeness of underlying process conditions (i.e., the sources and origin of the pollutants from the manufacturing processes themselves) is a fraught exercise – and not reliable. This is not to accuse Intel of any nefarious intent, but to simply recognize the fact that the public (and DEQ) simply has no idea if the underlying process is running in a representative or normal fashion during a scheduled periodic stack test. For this reason, the use of CEMS is essential, and stack testing is only a last resort if CEMS are simply not technically feasible.

Intel responded to this comment as well:

> "More stringent monitoring and verification requirements were added to the final permit in response to public comments asking for enhanced verification of the emission estimates. Intel originally was required to conduct compliance stack testing once every five (5) calendar years for HF, F (Wet Acid Scrubbers), and NOx, CO, and VOC DRE (RCTOs). Intel understands that the final permit will require the company to conduct compliance stack testing every calendar year for HF, F, HCl, NOx and CO for the wet scrubbers. We further understand that every two years Intel will be required to conduct compliance stack testing for NOx, CO, and VOC for the RCTOs. Additionally, we understand that the final permit will require Intel to stack test particulate matter emissions. This increase in testing requirements provides additional monitoring and verification measures to ensure compliance with NAAQS and PSD as well as providing a basis to check the accuracy of the emission estimates in the permit application. As such, it is ensured that the limits in the permit are practically enforceable."
>
> *End of Intel's Response*

NEDC-Sahu Comment:

3. The need for robust monitoring is made clear by the example of the 193 tons/year of NOx PSEL from the EXSC scrubbers. Till this application was provided, the DEQ had no idea that the EXSC scrubbers were NOx sources to begin with. That was based on the assumption that these scrubbers are air pollution control devices to remove primarily VOCs (and also certain particulates) using an acidic scrubbant liquid. They are not combustion devices and therefore ordinarily would produce no NOx. It became clear, in discussions with Intel, that the NOx is present in the exhaust gases routed to these EXSC scrubbers and that NOx originates from hundreds of individual point-of-use abatement devices (combustion devices) scattered throughout Intel's operations. To date, Intel has not provided any further details about these hundreds of devices, their NOx emissions calculation methodology, or any other process details. Thus, the public (and DEQ) have no idea how the 193 tons/year of NOx PSEL from the EXSC scrubbers was developed, other than to simply accept Intel's representation that that is the case.

This is untenable, and is a prime example of why DEQ needs to require Intel to install NOx CEMS at the exhaust of each EXSC scrubber (or groups of such exhausts, where they are commonly routed to the atmosphere). These CEMS data should be publicly available and, over time, can provide clarity on the appropriateness of the now-hidden NOx emission factors Intel has used in developing its emissions estimate. The NOx CEMS will also provide data on the variability of the NOx emissions over time, from the EXSC scrubbers – something that cannot be ascertained by doing periodic stack testing, under process conditions that Intel alone controls, with no transparency about the representativeness of any test conditions.

DEQ Response:

Based on a number of similar comments, DEQ has revised the emissions testing (source testing) requirements in the permit to provide more and better information to verify Intel's emissions. DEQ has considered different monitoring methods, including CEMS, and has decided that the annual monitoring required by the permit is sufficient to verify and characterize Intel's emissions. The revised monitoring is discussed further in the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50. The fugitive VOC emissions are already calculated by mass balance.

Intel Provided the Following Response:

> In response to comments, DEQ has modified the permit to significantly increase Intel's monitoring and emissions verification obligations. Intel originally was required to conduct compliance stack testing once every five (5) calendar years for HF, F (Wet Acid Scrubbers), and NOx, CO, and VOC DRE (RCTOs). Intel understands that the final permit will require the company to conduct compliance stack testing every calendar year for HF, F, HCl, NOx and CO for the wet scrubbers. We further understand that every two years Intel will be required to conduct compliance stack testing for NOx, CO, and VOC for the RCTOs. This increased monitoring and emissions verification to an annual/biennial cadence to include HF, F, HCl, NOx and CO on wet scrubbers and NOx, CO, and VOC DRE on RCTOs will ensure actual emissions comply with federal and state air quality standards.
>
> *End of Intel's Response*

NEDC-Sahu Comment:

4. I have noted previously that NOx and PM2.5 are especially important. The reason for this is clear when one reviews the results of air dispersion modeling provided by Intel itself. Below, I have excerpted (except the notes following the table), Table 18 from the modeling report, with a couple of red-box highlights.

Table 18 Intel Facility Sources (New+Existing) Modeling Results					
Pollutant	**Averaging Period**	**Modeled Concentration (µg/m³)**	**Background (µg/m³)**	**Total (µg/m³)**	**National Ambient Air Quality Standards (µg/m³)**
NO_2	1-hr 5-yr Avg of 98th%	EPA Method 163.54 [a]	-	163.54	188
	1-hr 5-yr Avg of 98th%	Monte Carlo 170.89 [b]	-	170.89	188
	Annual Max	13.25	35.6	48.85	100
SO_2	1-hr 5-yr Avg of 99th%	39.97	7.0	46.97	196
	24-hr Avg	18.38	4.7	23.08	1,300
	Annual Max	3.83	1.1	4.93	80
PM-10	24-hour H6H	7.78	39.0	46.78	150
PM-2.5 [c]	24-hr 5-yr Avg of 98th%	4.50	20.7	25.38	35
	5-yr Avg of Ann Conc's	1.73	6.6	8.35	12.0

First, it is clear that for NOx (NO2), the results of the modeling show that depending on the approach used, the total NOx (i.e., 163.54 – 170.89 ug/m^3) is remarkably close to the NAAQS of 188 ug/m^3 (i.e., even the lower part of the range is 87% of the NAAQS). Similarly, for PM2.5, the annual total PM2.5 concentration of 8.35 ug/m3 is already almost 70% of the NAAQS. In fact, EPA has proposed that the annual PM2.5 NAAQS be lowered to a range of between 9-10 ug/m3.[4] If the revised NAAQS is set at 10 ug/m3, the total PM2.5 annual value, per Intel's own analysis will be 83.5% of the new NAAQS. If the revised NAAQS is set at 9 ug/m3, Intel's total PM2.5 impact will be almost 93% of the new NAAQS. These thin margins for potentially exceeding the NOx (1- hour) and PM2.5 (annual) NAAQS warrant extra care and consideration, beginning with not just the emissions estimates (alluded to previously) but also additional verification.

[4] https://www.epa.gov/pm-pollution/proposed-decision-reconsideration-national-ambient-air-quality-standards-particulate

To that end, first, I reiterate that, since Intel refuses to provide any support for its emissions estimates, DEQ has to include far more robust source monitoring (i.e., CEMS for NOx and filterable PM2.5, plus frequent stack testing for condensable PM2.5) – for all NOx and PM2.5 sources.

DEQ Response:

The commenter stated "Till this application was provided, the DEQ had no idea that the EXSC scrubbers were NOx sources to begin with." That is incorrect. The detail sheets for the permit issued in 2016 include approximately 60 tpy of NOx emissions attributed to the scrubbers.

In its response to other comments, DEQ has concluded that the annual NOx source testing for scrubbers and RCTOs proposed in the draft permit along with the use of standard emission factors for NOx from natural gas combustion sources are adequate to verify Intel's NOx emissions estimates and has not required installation of any CEMS.

With regard to PM2.5, DEQ has concluded in its response to other comments that PM2.5 emissions factors for scrubbers are conservative and do include condensables. In addition, DEQ has added a permit requirement to perform a PM emissions study. This is discussed further in the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50.

NEDC-Sahu Comment:

Second, specifically for NOx, Intel has conducted a Monte-Carlo analysis for its engine (EGEN) emissions, which as Table Sahu-1 shows do, collectively, contribute substantially (at 12.7% of the NOx PSEL). But that Monte Carlo analysis makes a number of assumptions about engine (or engine group) operating hours, and times – with no support. Yet, since most of these engines already exist, DEQ should provide factual data from historic engine operations (and modified by expected future changes, if needed) to support this analysis. It has not done so.

Third, and glaringly, DEQ is aware that Intel's cumulative analysis (required since Intel's own impacts exceed regulatory thresholds) of its NOx emissions, by taking into account other NOx emitters present nearby, does not include additional emergency engines, which have been permitted but have not yet begin operation (or had begun operation when the modeling was conducted in 2022). Since these engines will be operating by 2026, when Intel's proposed modifications occur, there is no rational basis, whatsoever, to exclude these additional, known sources of NOx emissions – especially given the already thin margin for NAAQS compliance.

DEQ Response:

N-4 Response: The list of cumulative sources and their emissions is considered complete at

the time of the permit application using information as it is available in DEQ's permitted-source database. This information is updated as new data is available on a periodic basis. By necessity, the inventory is a snapshot in time of permitted source emissions, and the inventory may include emissions from sources that have not completed construction or are not fully operational. In addition, it will be years before Intel completes its expansion and emits at the levels defined by the permit. If a concern arises that ambient air quality standards were being exceeded or pollution levels were trending upwards because of emissions not captured in the initial modeling inventory, DEQ could request additional modeling at that time. The most recent Emissions Inventory year is 2020, which is the snapshot in time mentioned above. Addressing the data centers directly, all data centers that had permits in 2020 were included in the Intel competing source inventory, however, many of the data centers in the Hillsboro area were not permitted in 2020. Because many of the data centers permitted since 2020 are still in various stages of construction, we will not have a clear emissions picture until the 2023 and 2026 emissions inventories are complete.

NEDC-Sahu Comment:

Fourth, Intel's PM2.5 emissions estimates are not only weak as a result of Intel's claim of confidentiality, but, in addition, due to dubious assumptions. As an example, Intel simply uses an emission factor for PM (and its fractions) for combustion based on prior DEQ approval, but no one (including DEQ) could confirm if that emission factor is accurate or not. I ask the DEQ to specifically address the accuracy (and the basis) of the combustion PM (and PM2.5) emission factor since Intel has relied on DEQ's approved factor.[5] As another example, Intel assumes, with no basis at all, that the speciation (i.e., size fractions) of PM, including PM2.5 from its EXSC scrubbers is the same as that from cooling towers. While there is a single technical paper that forms the basis of the cooling tower PM2.5 fraction, there is no technical basis that the same technical paper can also support the PM2.5 fraction from the EXSC scrubbers.

Collectively, I have pointed to examples of significant issues with the NOx and PM2.5 emissions that DEQ needs to address, given the small margin for NAAQS non-compliance of these two pollutants.

[5] I note that the emission factor that Intel uses might in fact be only for filterable $PM_{2.5}$ and exclude all condensable $PM_{2.5}$, but it is not clear. I ask DEQ to provide a transparent record on this.

DEQ Response: PM2.5

Based on discussions with Intel staff, the sources of PM/PM10/PM2.5 emissions from wet scrubbers are:

- Natural gas combustion in POU devices;
- PM generated in the semiconductor manufacturing process from various chemistries; and
- Scrubber drift.

Each of these is accounted for in Intel's calculations.

Natural gas combustion in POU devices

POUs are integral part of many of the production tools used by Intel, and in most cases consist of a small thermal oxidizer followed by a small scrubber. Based on discussions with Intel staff, the POUs combust natural gas at all times to ensure abatement of fluorinated GHGs and for worker safety when tools operates.

Intel uses a DEQ emission factor for PM/PM10/PM2.5 of 2.5 lb/MMscf. This emission factor is based on a source test for a natural gas-fired boiler that returned a result of 1.27 lb/MMscf (filterable plus condensable). DEQ doubled this result to establish a conservative emission factor of 2.5 lb/MMscf.

EPA's natural gas PM emission factors for natural gas combustion from EPA's 2014 National Emission Inventory (NEI), for various boiler sizes including <10 MMBtu/hr, 10-100 MMBtu/hr, and >100 MMBtu/hr are:

0.52 lb/MMscf for PM10 primary

0.43 lb/MMscf for PM2.5 primary

PM10 primary generally equals PM10 filterable plus PM10 condensable, and similarly for PM2.5 primary. EPA stated the following on its website at How do the different parts of particulate matter (PM) fit together? | US EPA:

> "… the best measure in the NEI of actual total PM is PM10-PRI, since it includes PM25-PRI and PM-PRI is not complete and therefore not provided."

The DEQ emission factor for PM, PM10 and PM2.5 used by Intel for natural gas combustion are all equal to 2.5 lb/MMdscf. Relative to the PM10 primary emission factor from the 2014 NEI, the DEQ emission factor is approximately five times higher and is therefore very conservative. The DEQ emission factor includes condensable PM, as do the NEI emission factors.

Semiconductor Manufacturing Process Generated PM

(Intel provided the following information.)

> "Various chemistries are used in the semiconductor manufacturing process that have the potential for generating filterable PM. One example of chemistries used and routed to the EXSC scrubber system is silane. Silane is used within the deposition process steps. Not all of the silane used within the process tools are consumed by the process and some is exhausted to the EXSC exhaust system and is also converted into SiO2. Material balance can be used to generate this process PM emission factor from silane use. Another example chemistry is tungsten hexafluoride that is used to form thin

tungsten films. Similar to silane, not all of the tungsten is deposited as a thin film and the excess tungsten hexafluoride is emitted through the EXSC system and is converted into tungsten oxide which will be emitted as a filterable PM."

Scrubber drift

(Intel provided the following information.)

"Scrubber drift emissions result from the evaporation of small water droplets emitted from scrubbers. Scrubber drift emissions are reduced by the used of chevron style mist eliminators. Any solids dissolved in the water remain in the air after evaporation of the water, resulting in PM emissions."

End of Intel's Response

In the Detail Sheet for EXSC Scrubbers, Intel stated: "Particulate matter emissions from wet scrubber drift loss are based on EPA's "Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources," also known at AP-42, Chapter 13.4 - Wet Cooling Towers. PM10 and PM2.5 fractions (Table 4) are calculated based on Joel Reisman and Gordon Frisbie's "Calculating Realistic PM10 Emissions from Cooling Towers", Abstract No. 216 Session No. AM-1b." DEQ notes that these sources do not discuss whether the resulting PM is filterable or condensable, but since PM from scrubber drift is derived from dissolved solids, DEQ considers it is reasonable to assume that that scrubber drift PM is filterable only.

DEQ concludes that Intel's calculations of PM/PM10/PM2.5 emissions from natural gas-fired combustion devices and EXSC and EXAM scrubbers are likely to be conservative. Further, the calculations include condensable PM. Since natural gas combustion is likely to be the only source of condensable emissions, condensable PM emissions are likely to be fully accounted for by DEQ's conservative natural gas emission factor.

Finally, Intel Provided the Following Response:

"Emissions of PM from the EXSC scrubbers are a combination of both scrubber drift PM and PM generated from the process during the semiconductor manufacturing process. Process PM is the majority of the PM emissions emitted through the EXSC scrubbers. All process PM is assumed to be in the PM2.5 size fraction. The scrubber drift PM size fraction is treated the same as cooling tower size fractions as that reflects the best engineering information available and is considered reasonable. This assumption is appropriate since both scrubbers and cooling towers utilize Chevron style mist eliminators with similar total drift values leading to similar droplet removal efficiencies."

End of Intel Response

NEDC-Sahu Comment:

5. In an attempt to address the potential NAAQS non-compliance, the proposed permit suggest some ambient monitoring. While ambient monitoring can provide useful data, DEQ should explain how its proposed ambient monitoring (at just a few locations), can provide reliable data

to discern potential NAAQS violations, at least for NOx and PM2.5, given their small margins to not exceed their respective NAAQS, now and in the future (for PM2.5, as noted prior).

DEQ Response:

DEQ has required ambient NO2 and PM2.5 monitoring to help ensure that Intel's emissions will not cause or contribute to an exceedance of a NAAQS. The required monitoring station or stations is/are to be located at the Ronler Acres site at or near Intel's property boundary, and in a location or locations that are downwind of Intel's most significant emissions sources and where the dispersion modeling predicts the likelihood of high concentrations.

DEQ recognizes that ambient monitoring has limitations, but the only way that NAAQS exceedances can be detected is by ambient monitoring. DEQ does not expect any NAAQS exceedances as a result of Intel's increased emissions, but the required ambient monitoring should provide more certainty of that.

END OF NEDC et al. COMMENTS

20.0 MR. GARY ANDES' COMMENTS

Overall Comments

GA Comment:

For this permit action, Category IV public notice procedures in OAR 340 Division 209 must be followed or the permit action will be invalid.

DEQ Response:

Category IV public notice procedures in OAR 340 Division 209 are shown below and DEQ's actions are described:

Category IV procedures	DEQ's actions
OAR 340-209-0030(3)(d) Category IV — Once an application is considered complete under OAR 340-216-0040, DEQ will: (A)(i) Provide notice of the completed application and requested permit action; and	Notice was provided in September, 2023.
(ii) Schedule an informational meeting within the community where the facility will be or is located and provide public notice at least 14 days before the meeting. During the meeting, DEQ will describe the requested permit action and accept comments from the public. DEQ will consider any information gathered in this process in its drafting of the proposed permit, but will not maintain an official record of the meeting and will not provide a written response to the comments;	An informational meeting was held on October 11, 2023, and at least 14 days public notice of the informational meeting was given. DEQ described the requested permit action and accepted questions and comments from the public. DEQ considered this information gathered in this process in its drafting of the proposed permit, but did not maintain an official record of the meeting and did not provide a written response to the comments.
(B) Once a draft permit is completed, provide public notice of the proposed permit and a minimum of 40 days to submit written comments; and	DEQ provided public notice of the proposed permit on January 10, 2024 and a minimum of 52 days to submit written comments (later extended to 59 days).
(C) Schedule a public hearing at a reasonable time and place to allow interested persons to submit oral or written comments and provide a minimum of 30 days public notice for the hearing.	DEQ scheduled a virtual public hearing at 6 pm, February 15, 2024 to allow interested persons to submit oral or written comments and provided 37 days public notice for the hearing.

GA Comment:

The draft documents fail to note or describe how the public notice procedures were followed. The review report should describe in particular how each of the requirements in OAR 340-209-0030(d) and 0050 through 0070 were completed and provide names and dates for each procedure or requirement. If DEQ were to be taken to court over this permit action, these procedures must have to be followed for the permit approval to be valid. These procedures require that EPA be notified of the application and permit action and allowed to comment. A Presiding Officer report must be generated according to OAR 340-209-0070(2)(c) detailing the public comments and DEQ's response to the comments and list changes being made to the permit and review report as a result of comments. In this Presiding Officer report, a description should also be made of what "unofficial" comments and requests were made by the public at the informational meeting held in October 2023 and how DEQ took those into account in drafting the permit.

DEQ Response:

DEQ notes that the Commenter is not alleging that DEQ failed to follow the public notice procedures, and instead is stating that DEQ “should describe in particular how” the procedures were followed. DEQ disagrees. While DEQ must, and did, follow the cited public notice procedures, there are no rules that require DEQ to document how it did so. DEQ keeps records of public notices, who was notified, etc., and it would be relatively easy to show that the procedures were followed if it became necessary to do so.

EPA Region 10 was notified and was allowed to comment. EPA’s comments are included in this Response to Comments.

GA Comment:

A Presiding Officer report must be generated according to OAR 340-209-0070(2)(c) detailing the public comments and DEQ's response to the comments and list changes being made to the permit and review report as a result of comments.

DEQ Response:

Comment noted. This Response to Comments document is the Presiding Officer’s Report and is so labeled. It details the public comments and DEQ's response to the comments, and makes note of changes being made to the permit and review report as a result of comments.

GA Comment:

In this Presiding Officer report, a description should also be made of what “unofficial” comments and requests were made by the public at the informational meeting held in October 2023 and how DEQ took those into account in drafting the permit.

DEQ Response:

DEQ disagrees; there is no requirement to do this. The rule applicable to the informational meeting is OAR 340-209-0030(3)(d)(A)(ii) which reads:

> "Schedule an informational meeting within the community where the facility will be or is located and provide public notice at least 14 days before the meeting. During the meeting, DEQ will describe the requested permit action and accept comments from the public. ***DEQ will consider any information gathered in this process in its drafting of the proposed permit, but will not maintain an official record of the meeting and will not provide a written response to the comments***;" (emphasis added).

GA Comment: BACT re-review

Overall, I believe DEQ staff did a commendable job in analyzing the air quality impacts of the proposed modifications and in determining what was BACT for the new equipment based on the company's detailed and substantive submittal. It appears that DEQ staff dived deep into the AQ analysis and BACT analysis by quality assuring the company's submittals and doing a number of BACT cost analyses. However, even though the proposed permit contains proposed BACT levels, the final BACT determination is not complete until the permit is issued. DEQ staff should do a cursory review of the EPA RACT/BACT/LAER Clearinghouse data during this public notice period to ensure that no more stringent BACT levels have been set since the permit application submittal. Since the company's BACT analysis occurred sometime prior to 7/7/23, it will have been at least 9 months since the last detailed Clearinghouse review and it is possible that new lower BACT limits may now exist for the new equipment. DEQ staff should note in the review report that this was done and the results of the review.

DEQ Response:

The following response was provided by Intel:

> "Intel updated its BACT analysis in March 2024 to ensure that any entries subsequent to application submittal but prior to permit issuance were included. This update, like the original BACT analysis, considered EPA's RACT/BACT/LAER Clearinghouse, California's equivalent Clearinghouses, and BACT determinations and guidelines from Oregon, Washington and other states. In conducting its BACT analysis, Intel did not distinguish between whether a limit was BACT or LAER."
>
> *End of Intel's Response*

DEQ has concluded that Intel's BACT analysis was properly completed.

GA Comment:

In reviewing the overall permit status for this facility, the current ACDP was set to expire on 1/1/21, which means the renewal application should have been submitted to DEQ in the latter part of 2020. However, the review report indicates in Item 1 that the 7/7/23 application was also for the permit renewal. This doesn't seem logical. If Intel did not submit a permit renewal application in late 2020, and in particular before 1/1/21, then the company has been operating without a valid permit since 1/1/21. The review report should discuss this permit renewal situation in more detail and verify that a timely ACDP renewal application was received.

DEQ Response:

DEQ disagrees. OAR 340-216-0082 reads in part:

> (1) Expiration.
>
> (a) A source may not be operated after the expiration date of a permit, unless any of the following occur prior to the expiration date of the permit:
>
> (A) A timely and complete application for renewal or reassignment has been submitted; or
>
> *(B) Another type of permit, ACDP or Oregon Title V Operating Permit, has been applied for or issued authorizing operation of the source* (italics added).
>
> (b) If a timely and complete renewal or reassignment application has been submitted, the existing permit will remain in effect until final action has been taken on the renewal application to issue or deny a permit.

Intel applied for a Title V permit, and under this rule the ACDP remained in effect after the expiration date.

As a practical matter, DEQ staffing shortages are likely to prevent issuance of the Title V permit for some time so it is necessary for the ACDP to remain in effect. However, as a result of this permitting action, there are so many changes to the permit that issuing a permit addendum covering only the changes due to the Major NSR application is impractical. DEQ has chosen to replace the existing ACDP with the Major NSR permit and extend the expiration date, effectively treating the Major NSR permit as a renewal. This has been noted in the permit.

GA Comment:

This facility is also subject to Oregon's Title V permitting requirements in OAR 340 Division 218 and submitted a Title V application in 2012 as discussed in Item 2 of the review report. However, the Title V Operating Permit (which would replace the ACDP) has not yet been issued by DEQ, likely due to staffing shortages. Thus, it has been nearly 12 years since the Title V application was submitted. Intel must now update the original Title V application to include the new equipment in this permit, as well as probably the new equipment approved in the 1/22/16 ACDP permit action. I would request that DEQ retain the staff who are working on this permit action and have them proceed with drafting and issuing the Title V permit. Much of the current proposed permit format is similar to a Title V permit format.

DEQ Response:

DEQ and the staff in question appreciate this suggestion. DEQ cannot say at this time whether or not this suggestion can be implemented.

GA Comment:

The Intel facility is a large facility with many emission points. Although these are somewhat listed in the review report in various sections, the review report should provide a number for the total number of emission points at the facility. It would be good to just make a complete listing of

all the emission points categorized by type (boilers, heaters, EXAM scrubbers, etc.) and maybe separating them by existing and proposed.

DEQ Response:

There is a complete listing of all the emission points categorized by type (boilers, heaters, EXAM scrubbers, etc.) in the Detail Sheets associated with the permit, including information indicating whether they are existing or proposed. DEQ is aware that Commenter was not able to view the Detail Sheets, which are Excel spreadsheets.

Specific Comments on Review Report

GA Comment:

Item 5 indicates that the Jones Farm and Hawthorne Farm campuses are not part of this permit but are subject to other permitting requirements. This should be explained in more detail as to what those permitting requirements are (such as their own ACDPs?).

DEQ Response:

DEQ disagrees; such information is not relevant to the permitting action in question.

GA Comment:

Item 6.a.iii should be modified as follows: Best Available Control Technology (BACT) determination. The company submitted an analysis, DEQ makes a determination.

DEQ Response:

DEQ agrees with the statement that “The company submitted an analysis, DEQ makes a determination,” and acknowledges that this was not made clear in the Review Report. However, DEQ prefers to keep the Review Report as it was written for public notice, and instead to acknowledge changes in this Presiding Officer Report/Response to Comments.

GA Comment:

Item 6.b.iii and other locations. DEQ should state that it agrees with Intel's analysis as to what constitutes BACT.

DEQ Response:

DEQ agrees with Intel's analysis as to what constitutes BACT, and acknowledges that this was not made clear in the Review Report. However, DEQ prefers to keep the Review Report as it was written for public notice, and instead to acknowledge changes in this Presiding Officer Report/Response to Comments.

GA Comment:

Item 6.b.v. Ozone will be injected into the pilot NOx control system. Will there be an ozone "slip" emission if the conversion is not 100% and what would that emission be in terms of tons/year?

DEQ Response:

The pilot NOx control system is located in an exhaust duct that leads to EXSC acid gas wet scrubbers. Ozone slip after the NOx control section may occur, but any “slip” should be significantly reduced or eliminated by the following wet scrubbers.

In addition, Intel Provided the Following Response:

> “The permit authorizes Intel to install a voluntary NOx abatement system pilot project. The permit requires that Intel submit and DEQ approve a monitoring and operation plan for the controls prior to placing them into operation. Intel is required by the permit to establish an ozone injection rate and measure the ozone concentration at the outlet of the NOx abatement system and prior to entering the EXSC system. This will enable ozone slip to be quantified and, if present, minimized. The pilot project is the first of its kind at this size and so until the pilot program is implemented, it cannot be confirmed whether ozone slip will occur. While no de minimis level has been established for ozone, ozone emissions from the pilot project are expected to be materially below the de minimis levels for ozone precursors (1 ton/year).”
>
> *End of Intel’s Response*

GA Comment:

Item 21. Under the 'Type of pollution control device" column it should be noted that Speed Limits for paved roads and TDS control for cooling towers were determined to be BACT also and could be added to the table even though they aren't devices.

DEQ Response:

DEQ agrees that this could have been done, but as stated earlier, DEQ prefers to keep the Review Report as it was written for public notice, and instead to acknowledge changes in this Presiding Officer Report/Response to Comments. DEQ also notes that the requested information is given on pages 54 and 55 of the Review Report.

GA Comment:

Item 22.c. Even though ammonia is not a pollutant regulated by this permit, how many ton/year of ammonia will be emitted from EU-TMXW?

DEQ Response:

Given that ammonia is not a regulated permit, DEQ did not request this information.

GA Comment:

Item 22.e.i. It seems that the word "emissions" should be deleted at the end of the sentence.

DEQ Response:

Item 22.e.i. is an incomplete sentence that apparently was not noticed by the author or reviewers. DEQ does not know exactly what was intended, and the same incomplete sentence is found in earlier drafts. The sentence most likely should have read something like this:

“Emissions from the microprocessor production tools, also referred to as process emissions, fall into three categories: emissions of acid gases routed to acid gas wet scrubbers, emissions of ammonia-containing gases routed to ammonia wet scrubbers, and emissions of VOCs routed to RCTOs (see 22.f.).”

GA Comment:

Item 22.e.v. It would be good to list what the control efficiency or range is for the various types of scrubbers and WESPs in this table.

DEQ Response:

Intel is a unique source in that many emissions are of low concentration and high flow volume, which makes it difficult to obtain quantitative results from source testing, as discussed in the section entitled “Revised Emissions Testing Requirements (Source Testing)” on page 50. Further, the physical arrangement of scrubber and WESP inlets precludes inlet testing, so pollutant control efficiencies cannot be obtained even if quantitative test results could be obtained.

Despite the inability to determine control efficiencies, all emissions control devices must be operated as efficiently and consistently as possible. Parametric monitoring of the scrubber solution pH with emission action levels was required in the draft permit, and scrubber recirculation flow monitoring with emission action levels has been added in response to comments. Parametric monitoring of WESPS with operating voltage requirements was also in the draft permit and has been retained in the final permit.

GA Comment:

Item 22.f. What is the % capture by the concentrating wheels and what is the removal or destruction efficiency of the TO on the VOCs?

DEQ Response:

Intel provided the following response to this comment:

Intel utilizes Rotary Concentrator Thermal Oxidizers (RCTOs) for process volatile organic compound (VOC) destruction across the manufacturing process. Intel is required to perform stack testing and report to DEQ the VOC destruction removal efficiency (DRE) as part of its current operating permit within the first year of operation of new equipment and once every 5 years. With this permit Intel will be required to perform compliance stack testing every two years for all equipment and report VOC DRE as well as NOx and CO emission rates.

The destructive removal efficiency accounts for total VOC emissions from both thermal oxidizer and concentrator outlets. The percent capture efficiency for the concentrating wheels cannot be separately measured. However, such measurement is not necessary as the destruction efficiency measurement takes into account the VOCs in both the thermal oxidizer and rotary concentrator outlets and compares them to the VOCs in the inlet to the RCTO. The VOC DRE values for each of the RCTOs grouped by fab from the most recent testing reviewed and approved by DEQ is provided below:

Intel Fab	% DRE
D1B	99.80 %

Intel Fab	% DRE
D1C	99.52 %
D1D	99.29 %
D1X	99.83 %
F15	99.71 %

GA Comment:

Items 27 and 28. PSELs must include aggregate insignificant (AI) emissions, if applicable. Intel submitted AI activities for some pollutants but not others. I did not have access to the detail sheets to determine what the AI activities entail that Intel submitted. DEQ then added AI values for CO2e, F, total HAPs, and Pb to the PSELs. DEQ needs to justify these AI additions with detail sheets for them. DEQ cannot just add AI values if there is no process emitting a pollutant. In particular, the Pb AI value is quite higher than the total of all the other process Pb emissions so it doesn't make sense that other potential AI processes emit that much Pb.

DEQ Response:

OAR 340-222-0035(6) states that PSELs must include aggregate insignificant emissions, if applicable. DEQ read "if applicable" to mean "if there is a PSEL for the pollutant in question"; that is, DEQ would not add aggregate insignificant emissions for a pollutant for which a PSEL is not established, but for every pollutant for which a PSEL is established, aggregate insignificant emissions must be added.

GA Comment:

Item 28 Table. After discounting paved road and cooling tower emissions, I do not get the same Final PSEL values for PM10 and PM2.5 shown in the table. I get 61.37 which should round to 61 not 62 for PM10 and 59.14 which should round to 59 not 60 for PM2.5.

DEQ Response:

DEQ agrees, this correction has been made.

GA Comment:

Item 28 Table. The table shows a Final PSEL for Total HAPs of 24 but shows a potential to emit of only 20.65 which would round to 21. In previous permits, the HAP PSELs were set at 24/9 as Generic PSEL levels to keep the facility a Synthetic Minor for HAPs. However, DEQ changed its rules to eliminate Generic PSELs since the last permit action. Because of this I believe the Total HAP PSEL must now be set at 21 T/Y as stated in OAR 340-222-0060(2). The individual HAP PSEL would remain at 9 as that is what the potential to emit is when rounded.

DEQ Response:

DEQ agrees. OAR 340-222-0060, Plant Site Emission Limits for Sources of Hazardous Air Pollutants reads in part:

(1) DEQ may establish PSELs for hazardous air pollutants (HAPs) if an owner or operator requests that DEQ create an enforceable PTE limit.

(2) PSELs will be set only for individual or combined HAPs and will not list HAPs by name. The PSEL will be set on a rolling 12 month basis and will be set based on the potential to emit if more than the de minimis emission level and to also comply with OAR chapter 340, division 245.

The permit limit for combined HAPs has been revised to 21 tons per year, which includes 2.5 tons per year for aggregate insignificant activities.

GA Comment:

Item 30. When did Intel submit its original toxic emissions inventory under CAO and has this submittal been updated for this expansion? It could be stated in this section that if the CAO evaluation that DEQ eventually undertakes requires the company to install more control equipment or reduce toxic emissions, that the permit will be reopened at that time to place appropriate conditions into the permit.

DEQ Response:

Intel submitted its original toxic emissions inventory for CAO as part of their permit application on July 7, 2023 and updated the submittal on September 8, 2023.

DEQ did not include information about the CAO program because it operates separately from, and at this time does not affect, the permit being discussed here. As the Commenter stated, the toxics inventory was readily available on the DEQ Permits On-line webpage.

However, the following rule citation is provided to help clarify the CAO permitting procedure:

OAR 340-245-0005(3)(f), Purpose and Overview, reads as follows:

“340-245-0100, Toxic Air Contaminant Permit Addenda, includes the procedural requirements for obtaining a permit addendum or a new operating permit under these rules. A Toxic Air Contaminant Permit Addendum will amend the source’s Air Contaminant Discharge Permit or Title V Operating Permit until the requirements in the addendum can be incorporated into the source’s operating permit…”.

GA Comment:

Item 33. Are all the boilers at the facility subject to NSPS 30 CFR Part 60, Subpart Dc or just some of them? An actual listing of the boilers subject to the NSPS should be placed in the review report. A similar listing should be done for Item 38.

Item 34. Similar to Item 33, a listing of the actual emergency generators and fire pumps subject to 40 CFR Part 60, Subpart IIII should be placed in the review report. A similar listing should be done for Item 36.

DEQ Response:

The Detail Sheets for the permit have been revised to indicate which boilers and emergency engines are subject to subparts Dc or IIII, as appropriate.

GA Comment:

Item 58 Table. Why is there no baseline for PM or PM10? Surely there were some emissions, if only from unpaved roads.

DEQ Response:

Baseline emissions of PM and PM10 were less than 0.5 tons per year, which rounds off to zero.

GA Comment:

Item 70 Table entitled NSR Requirements Summary Table. It could be noted that there is no ambient standard for Fluorides in addition to GHGs.

DEQ Response:

The table in Item 64 states that there are no ambient air quality standards for Fluorides and GHGs.

GA Comment:

Item 74. Were any other clearinghouses such as California's data base reviewed for BACT determinations? Also, the BACT analysis actually begins with LAER (irrespective of costs) as the highest control and proceeds downward to BACT (which must consider costs and other environmental impacts). Were any of the selected BACT levels or controls also considered as LAER in the Clearinghouse? If so, they should be listed and highlighted as Intel has actually installed control equipment better than BACT.

DEQ Response:

Intel provided the following response to this comment:

“Intel updated its BACT analysis in March 2024 to ensure that any entries subsequent to application submittal but prior to permit issuance were included. This update, like the original BACT analysis, considered EPA’s RACT/BACT/LAER Clearinghouse, California’s equivalent Clearinghouses, and BACT determinations and guidelines from Oregon, Washington and other states. In conducting its BACT analysis, Intel did not distinguish between whether a limit was BACT or LAER.”

GA Comment:

Item 79. This indicates that the permit will require boiler tune-ups every six years. However, Condition 25 of the permit only states "no less frequently than the frequency recommended by the boiler manufacturer". This condition should be changed to just state "at least every six years".

DEQ Response:

DEQ agrees, this correction has been made.

GA Comment:

Item 80.c. The footnote at the bottom of the page references a paragraph 0 and should be paragraph 22.f.

DEQ Response:

DEQ agrees, this correction has been made.

GA Comment:

Item 92. This paragraph discusses the Cleaner Air Oregon rules which are applicable to the Intel facility. It indicates that under DEQ's initial analysis that Intel is in the second group of facilities to be called in. However, since the facility is proposing this expansion and I would guess an increase in the toxic emissions, DEQ should reevaluate when Intel should be called in. In addition, it would be good to put the dates that Intel submitted its initial inventory, and revised inventory if that has been done. Also, in the spirit of transparency, DEQ should put the list of air toxics and the quantities that Intel submitted in the inventory into the review report as it is readily available on the DEQ Permits On-line webpage.

DEQ Response:

Intel submitted its original toxic emissions inventory for CAO as part of their permit application on July 7, 2023 and updated the submittal on September 8, 2023. The permit application, including the toxic emissions inventory and update are based on emissions estimates for the entire project proposed in the application. In other words, the application and toxics inventory include both current emissions and expected future emissions, and there is no need to update the inventory at this time.

DEQ did not include information about the CAO program because it operates separately from, and at this time does not affect, the permit being discussed here. As the Commenter stated, the toxics inventory was readily available on the DEQ Permits On-line webpage.

GA Comment:

Item 94. Because of being located in Maintenance Areas for CO and ozone, Intel must obtain offsets for their requested emission increases of CO, VOC and NOx. Rather than obtaining offsets from other sources, Intel can use growth allowances available from DEQ. The table in Item 94.b shows how much offset was obtained in this manner. How much offsets are still available from the growth allowance in DEQ's bank for other sources which may be new in the future or may expand in the future? Did Intel just use up most of the growth allowance which would preclude other sources coming into the area?

DEQ Response:

The original amounts of Growth Allowance released, and the amounts remaining are:

Pollutant	Original Amount Available tons	Amount Available as of June 5, 2023 tons	Amount Requested by Intel for this permit tons	Remaining Amount Available tons
VOC	1,000	514	216	298
NOx	1,000	479	173	306

CO	2,700	2,471	369	2,102

Growth Allowances are granted to permit applicants on a first-come, first-served basis. At this time there appear to be adequate amounts of Growth Allowance still available for other sources.

The Growth Allowances for the Portland AQMA were made available after DEQ's Air Quality Division determined that the AQMA could assimilate the Growth Allowance amounts of pollutants without exceeding the applicable National Ambient Air Quality Standards (NAAQS).

Additional amounts of Growth Allowances may be made available, but before any more may be released, DEQ must first complete an air quality analysis to determine if the Portland AQMA has the capacity to assimilate additional amounts of these pollutants. Continued availability of Growth Allowances is not guaranteed; changing conditions such as lowered NAAQS may reduce or even eliminate Growth Allowances. DEQ's Air Quality Division Planning Section is responsible for making the air quality analysis.

GA Comment:

Item 101. This indicates that the last DEQ inspection was done in 2018. That is over 5 years ago. That is unacceptable. This has been a major Standard ACDP source for many years and, as I recall, such permitted sources were to have a full compliance inspection every three years.

DEQ Response:

DEQ agrees, but has been experiencing staffing shortages and is not always able to conduct inspections on the desired schedule.

GA Comment:

Item 102. Results of the recent EPA inspection should be added into this narrative if the results are available before the permit is issued. When the EPA inspection results become available, DEQ should issue a press release detailing the results so that interested citizens know the findings, as it was a topic of concern by citizens at the public hearing.

DEQ Response:

The results of the 2023 EPA inspection have not been made available as of the issuance date of this permit.

GA Comment:

Item 103. If any additional permit violations have occurred since the public notice or enforcement actions taken against Intel, these should be added to this paragraph.

DEQ Response:

There have been no additional permit violations since the public notice was issued in January, 2024.

GA Comment:

The Compliance History section of most review reports contains a discussion of any complaints received by DEQ about the facility. What is the complaint history for Intel for the last permit cycle

and how were the complaints, if any, investigated and resolved? This section should be added to the review report.

DEQ Response:

The following was provided by DEQ's Northwest Region office:

DEQ receives less than 10 complaints per year about Intel, on average regarding potential odors, emissions or other issues at Intel. These complaints are forwarded to Intel EHS personnel for investigation of operations, and meteorological data at the time of the complaint. Intel has a weather station that includes wind speed, direction, temperature, humidity, etc. Any findings are relayed to DEQ and the complainant if requested.

GA Comment:

Emission Detail Sheets. These were not included in the public notice packet and should be attached to the review report when the final permit is issued and not left as just part of the application packet of materials.

DEQ Response:

Comment noted. Emission Detail Sheet have been provided with the final permit.

GA Comment:

Source Tests. The permit will require that a number of source tests be conducted for various pollutants on numerous equipment at the facility over the next permit term to ascertain emission rates and verify emission factors. It would be good to have a listing of these source test requirements in the review report, which seems to be done in most review reports.

DEQ Response:

Comment noted. A summary of required source tests is provided in this Response to Comments. See the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50.

GA Comment:

In addition, most review reports usually contain a listing of prior source test results on emission points at a facility as these usually provide a basis for the emission factors used to calculate proposed emissions.

DEQ Response:

Comment noted. Some source test results are provided elsewhere in this Response to Comments. See, for example, the section entitled "Revised Emissions Testing Requirements (Source Testing)", page 50.

GA Comment:

EPA Toxics Release Inventory (TRI) and Accidental Release rules. Most ACDP and Title V review reports contain a section describing these rules and the chemicals covered by the TRI program if it is applicable to the facility. Intel is indeed covered by this program as well as the Accidental Release rules in 40 CFR Part 68 and as noted by Condition 9 of the permit must

have a Risk Management Plan in place for such chemicals. Two sections should be added to the review report listing the chemicals subject to each of these programs and the quantities used and emitted by the facility. This was a topic of high importance to several members of the public during the public hearing. The role of DEQ in enforcing EPA's Accidental Release rules should be delineated. Results of any EPA and DEQ inspections concerning compliance with the Risk Management Plan should also be discussed.

DEQ Response:

DEQ disagrees. The TRI and Accidental Release programs are EPA programs administered by EPA, not DEQ. EPA requires DEQ to put a condition in permits and to verify that a Risk Management Plan has been submitted to EPA, but that is all. The final permit meets those requirements.

Specific Comments on Permit

GA Comment:

Condition 9. Is the RMP and 40 CFR Part 68 requirements enforceable by DEQ? I always thought they were Federally only enforceable.

DEQ Response:

Although 40 CFR Part 68 is administered by EPA, DEQ is required to determine if sources subject to 40 CFR Part 68 requirements have submitted an RMP during inspections and perhaps at other times. DEQ has authority to enforce this requirement, in addition to EPA. The condition has not been changed as this allows for enforcement by either DEQ or EPA as appropriate.

GA Comment:

Condition 21 and several others. BACT is being established by DEQ for numerous pieces of equipment at the facility. This condition and others references the application as the applicable requirement basis. The basis is really only OAR 340-224-0070(2). The application and its date have no bearing. It would be good to put the date of 2024 in the reference for this permit action.

Condition 29. Same comments as in Condition 21 above.
Condition 31. Same comments as in Condition 21 above.
Condition 42. Same comments as in Condition 21 above.
Condition 45. Same comments as in Condition 21 above.
Condition 55. Same comments as in Condition 21 above.
Condition 62. Same comments as in Condition 21 above.
Condition 65. Same comments as in Condition 21 above.
Condition 68. Same comments as in Condition 21 above.
Condition 69. Same comments as in Condition 21 concerning the applicable requirement basis, which needs to be added to this condition.

DEQ Response:

DEQ often has to review historical permitting actions and applications that have a bearing on requirements in the permit. For the benefit of any future reviewers, reference to the application has been put in the permit in multiple places to clarify the basis for many conditions. Rather than simply referencing the permit year, DEQ chose to reference the application number and date as these are a more exact reference. For Condition 69 (now renumbered) DEQ agrees that a reference to OAR 340-224-0070 should be added and has added the reference discussed here.

GA Comment:

In addition, some equipment at the facility underwent NSR and BACT in the 2016 issued permit. Those pieces of equipment should be separated from those getting BACT in 2024 in separate tables with 2016 as the reference.

DEQ Response:

Notes were included in the permit indicating which equipment was subject to BACT in the 2016 permit. In addition, there are BACT applicability tables in the permit application.

GA Comment:

Condition 25. As mentioned previously, this condition should specify that the boiler tune-ups occur at least every 6 years.

DEQ Response:

DEQ agrees and has made this correction.

GA Comment:

Condition 74. The ambient NOx monitoring requirement should require the company to initiate the monitoring in 2025 since they are already aware of the requirement and should already be generating a monitoring plan and purchasing equipment.

DEQ Response:

DEQ has reconsidered the ambient NOx monitoring requirement in view of its purpose, which is to help ensure that the 1-hour NOx NAAQS is not exceeded. This permit is for a facility expansion with increased production, so emissions of NOx are expected to be higher toward the end of the permit term and lower at the beginning of the permit term. Since the modeling for the NOx NAAQS was based on the projected emissions at the end of the permit term, there seems little value in beginning the monitoring at the beginning of the permit term.

GA Comment:

Conditions 75.c and 75.d. Since there are no unassigned emissions at the facility, these two sub conditions don't seem needed, In addition, I assume the eventual Title V permit will again examine any unassigned emissions that might be generated after this permit is issued and before the Title V is issued.

DEQ Response:

DEQ has left these sub-conditions in the permit. Inclusion of these sub-conditions, even if not applicable at this time, does not have negative consequences nor places an undue burden on Intel. Further, if Intel did establish unassigned emissions, the conditions would be useful.

GA Comment:

Condition 76. This Major NSR/PSD action establishes new netting basis for all pollutants except SO2 and Pb. These netting basis must be reset to actual emissions 10 years after permit issuance. The 2016 permit also constituted a NSR action for CO and NOx. Should the equipment approved in that permit not also be subject to this reset provision in 2026?

DEQ Response:

The netting basis for NOx and CO were reset in the 2016 permit, but were reset again in the current permit. The condition as written states that the Netting Basis for PM10, PM2.5, CO, NOx, VOC, Fluorides and GHG must be reset as required by the condition. Further, the reset requirement does not apply to or exclude any specific equipment, it applies to the source's total emissions. DEQ sees no need to revise this condition.

GA Comment:

Condition 76.a.i. This sub condition contains a reference to condition 64.a.iii. I believe the correct reference should be 76.a.iii.

DEQ Response:

This correction has been made.

GA Comment:

Monitoring, Recordkeeping, Reporting, and Annual Report Requirements. Can you reference OAR 340 Division 218 as the applicable requirement basis since this is not a Title V permit?

DEQ Response:

Yes. Intel is a major source and is subject to Division 218, Oregon Title V Operating Permits, as stated in OAR 340-218-0020, Applicability (in relevant part):

"(1) Except as provided in section (4), this division applies to the following sources:

(a) Any major source;".

GA Comment:

ACDP Administrative Requirements--Permit Renewal page 78. This indicates that a Title V application is due 120 days after issuance of this modified ACDP. Since a TV application was already received in 2012, the condition should really just require an update to the original application.

DEQ Response:

In the draft permit, condition 3 read in part: “The permittee must submit any necessary revisions to the Title V permit application…”, which is essentially the same requirement as what the commenter suggested.

GA Comments on Air Quality Impact Assessment

GA comment:

A very comprehensive air quality impact assessment was required to be conducted for this proposed modification due to the number of pollutant increases involved, the location of the facility, and the size of the increases proposed. The initial assessment was revised due to specific project design changes described in the revised report and changes to the PM10 and PM2.5 emission factors for the boilers. The emission factor change increased emission of those pollutants by just over 3 tons/year. No other emissions were increased.

1. Possible Culpability Assessment of Intel EUs.

Although the impact assessment doesn't clearly state which sources at the facility contribute most to the ambient concentrations, it would appear based on the Table 1 summary of emissions that the PM is mainly emitted by the RCTOs and EXSC and EXAM scrubbers, while NOx is also mainly emitted by these units plus a significant amount by the EGENs. It would be good in these types of reports to have a narrative that described which sources have the primary impact on ground level concentrations or if multiple sources contribute evenly.

DEQ Response:

A-1.: This information would be useful but was not requested by DEQ nor provided in the modeling report. Intel’s modeling consultant however did state informally the scrubbers were the greatest contributors to total concentrations at the maximum receptor location but due to the large facility layout and distance between emission points there was not significant overlap of high modeled concentrations between different emission sources.

GA comment:

2. PM2.5 – NO2 Background.

Table 7 shows the various DEQ ambient monitoring stations and their data for the last five years. The S. Lafayette site was chosen to represent background concentrations for all pollutants except PM2.5 and I agree with that selection. I also agree that Hare Field should represent the PM2.5 background due to its close proximity to the Intel facility.

2.a Discrepancy Tables 7, 9, 18

However, I am having trouble with the values in Table 9 (which are the selected values to use as background). According to the paragraph above Table 9, except for PM2.5, all the selected values for the other pollutants for all time frames should be the highest value in the last three years. If that is true, the last 5 rows in Table 9 have the wrong values. From Table 7 I get, respectively, 58,13,8,5, and 1.5 rather than the values shown. For the 1-hour NOx value, the footnote may explain why 56.3 was chosen instead of 58. Either the narrative explanation is wrong, or Table 9 values are wrong. The background values (whichever is correct) should then

have been used in Table 18 for the background values. This doesn't seem to have occurred correctly either. While PM10 and PM2.5 background values in Table 18 mirror those in Table 9, the others do not if my values for Table 9 are correct. In particular, the NOx annual background in Table 18 is shown as 35.6 when Table 9 should show either 18.3 or 13.

DEQ Response:

A-2.: In the listings and cross-linkages in tables 7, 9, and 18, there are typos, rounding differences, and mis-labeling. The values in Table 9 that were described as the highest values from Table 7, are in fact the highest values in the form of their respective standards. As noted in Table 9, the 56.3 ug/m3 background for 1-hr NO2 is for reference only, as seasonal hourly values were dynamically used in the AERMOD modeling. The NO2 annual maximum background should be 13 ug/m3, and the 35.6 value in Table 18, and the 18.3 value in Table 9 are typos. With the correction to Table 18, the total modeled plus background concentration for the Annual NO2 should be 30.1 ug/m3 not 52.7 ug/m3, relative to the NAAQS of 100 ug/m3. With the exception of the 35.6 typo, the values in Table 18 and in Table 9 are identical.

In July 2023, when Intel submitted its modeling report, the DEQ annual monitoring report had not been released with 2022 data. In January 2024, DEQ released the updated report. This report includes the removal of days impacted from wildfire. With wildfires removed from each year, the effect of 2022 is less pronounced, and the average background concentration is lower. More discussion about the revised data can be found in a modeling addendum provided by Intel in February 2024, as included in the Intel project files maintained by DEQ.

It should be noted that the PM2.5 and PM10 ambient monitored concentrations in Table 7 show a pronounced increase at all locations in 2022 versus prior years. Does DEQ have an explanation for this increase?

GA comment:

2.b EPA revised PM2.5 and background.

During the public hearing, DEQ announced that EPA had recently (2/7/24) revised the PM2.5 ambient NAAQS and lowered the annual allowable level from 12 to 9 ug/m3. This revision to the ambient standard had been in the works for a while and was proposed on 1/27/23, before the Intel application was received by DEQ. I'm not sure of the legalities of whether the modeling must now compare results to the new standard or not. I understand that the new NAAQS does not take effect until 60 days after publishing in the Federal Register, which would seem to indicate that the current modeling comparison is valid. However, when MACT standards were being developed by EPA, if a source were to avoid (not be subject to) them, the source would have had to become a minor HAP source prior to the MACT proposal date not the promulgation date. I don't know whether this scenario applies to the NAAQS standards. DEQ should discuss this situation with EPA and the AG's office for opinions.

The Intel modeling currently shows that the new 9.0 ug/m3 annual PM2.5 standard would be slightly exceeded at 9.1 ug/m3 (however, Intel and competing source contributions are only 2.5 ug/m3 while background is shown as 6.6 ug/m3). As noted in my previous comments, the PM2.5 background value should be reexamined since 2022 measured ambient concentrations were considerably higher than 2020 and 2021 values. In addition, as also previously

commented, I believe there may actually be double counting when using any background value and then modeling nearby competing sources again. DEQ should reexamine this situation and evaluate whether the current modeling results actually show a potential violation of the new PM2.5 annual NAAQS. Even if the new PM2.5 annual NAAQS is determined to not be in effect for this modeling and permitting effort, in the spirit of transparency, I believe DEQ should pursue and answer whether the future NAAQS value is in jeopardy.

It would be interesting to model the impacts of only the existing Intel sources and the 20 km list of competing sources and compare the calculated ambient concentration for the annual PM2.5 at the Hare Field DEQ monitoring site for 2021 or 2022. The 6.6 ug/m3 value used as background is based on actual emissions from all sources, including industrial (such as Intel and the competing sources), mobile sources, aircraft sources at the airport, commercial sources, and residential sources. It would be interesting to see what the Intel sources impact for 2021 and 2022 was based on the actual Intel emissions for these years which are available in the annual reports on DEQ's On-line Permits website.

DEQ Response:

A-3.: DEQ is aware of and has paid close attention to the closeness of total modeled PM2.5 concentration to the NAAQS, particularly the annual average. A factor in evaluating PM2.5 concentrations in Oregon is the relatively high background concentration, and for the Tualatin Valley and Hillsboro the 24-hr average background is about 60% of the NAAQS. This issue has become even more important with the reduction in the annual PM2.5 NAAQS from 12 ug/m3 to 9 ug/m3, which will become effective on 5/6/2024. Contemporaneous with the EPA action, the DEQ Laboratory was re-evaluating PM2.5 monitored values for Hare Field and in January 2024 issued a revised estimate of background. For the year 2022, the Lab identified and removed from the record those hours of wildfire smoke intrusion that were considered an exceptional event and not part of the regional background. After recalculation, the revised multi-year average background fell from 6.6 to 6.2 ug/m3. Although the Intel permit will have been issued prior to the effective date of the new standard, and not subject, inclusion in the analysis of both the revised NAAQS together with a background-without-wildfires was considered important. The results show a total concentration of 8.7 ug/m3 relative to the revised NAAQS of 9 ug/m3. The summary Table 2 in the modeling report has been revised to show these new concentrations.

GA comment:

2.c Effect of Wildfires.

DEQ should review the PM2.5 and PM10 2022 monitoring data in detail to determine if there were any anomalies or events (wildfires) that skewed this data higher and, if so, redo this assessment with revised values.

DEQ Response:

A-4.: A revision by the DEQ Lab to 2022 monitoring data that removed days with wildfire impacts was released by DEQ in January 2024. This resulted in a revised PM2.5 background concentration that was incorporated into a revision of the PM2.5 analysis in February 2024.

GA Comment:

2.d Use of 2023 data.

At the time the modeling was done and the application submitted, DEQ did not have the results of its 2023 ambient monitoring at the selected sites. The information and data from the 2023 ambient monitoring program is now probably available. DEQ staff should review the ambient monitoring data for 2023 to see if it aligns with the values chosen as background in the submitted air quality impact assessment. I am not advocating to redo the modeling completely based on the 2021-2023 data instead of the 2020-2022 data unless there is a significant change in the recorded values for 2023.

DEQ Response:

A-5.: To the best of its ability DEQ attempts to use the most current data available. Monitoring data requires many analytical and quality assurance/quality control (QA/QC) steps, and a final validated version of the data may not available until a year after acquisition of the raw measurements. In addition, because of the length of time to complete the air quality analysis, typically only data that is available at the time of the permit application is used in the analysis (for example, monitoring and emissions data). However, if revised, reliable data becomes available and its use doesn't impede the progress of the modeling review or permit issuance, it will be considered, an example of which is the use of revised 2022 PM2.5 ambient data after removal of anomalous wildfire effects. In general, the overall increase in ambient levels of PM has been attributed to wildfires, as DEQ has not seen an increase in other sources of PM but will continue to closely monitor for change trends.

GA Comment:

2.e Hare Field double counting.

The background PM2.5 monitored concentrations at the Hare Field site probably already really include the ambient contributions from the existing Intel sources as well as other nearby sources which were used as competing sources in this analysis. Thus, the total calculated ambient concentrations of PM2.5 may be actually double counting the impact of those sources, skewing the total value on the high side. I would ask if DEQ believes this to be the case.

DEQ Response:

A-6.:

The Hare Field PM monitor is located about 4km WSW of Ronler Acres in a residential neighborhood with significant local vehicular traffic. It is true that monitoring will be subject to double counting during certain wind directions, but the dominant influences will be primarily from local sources, including other industrial sources, mobile sources (on-road vehicles), area sources including lawn and garden equipment and residential heating, especially wood heating in season. Double-counting due to the competing source inventory and the background

concentration is common in modeling exercises as a conservative initial assumption. If concentrations were found to exceed NAAQS standards, additional analysis is recommended to address the double counting. This was not needed in this modeling demonstration.

GA Comment:

3. Competing Source EI and Modeling.

Because the modeled sources from the proposed Intel facility alone exceeded the SILs for NOx, PM10, and PM2.5 as shown in Table 15, the impact assessment required that potential competing sources also be modeled to ensure that the combined impacts of all sources do not exceed either the Class II PSD increment or the NAAQS. To accomplish this, DEQ provided a list of competing sources within 50 km for NOx and 20 km for PM. After applying some subjective criteria as described in the second paragraph after Table 20, this competing source list was pared down the 26 facilities listed in Table 22.

Under DEQ rules in OAR 340-225-0020(4) and (5) the competing sources must cause a significant concentration gradient in the vicinity of the source (the value of significant is not defined). However, the determination may take into account factors including the ROI formula, spatial distribution of sources, topography, and meteorology. The modeling appears to have used these factors in reducing the competing source inventory.

3a. SIA and requirements/methods determining significant competing sources:

However, I am not sure how the distance of existing sources with regards to the Significant Impact Areas was determined. The analysis indicates in the second paragraph after Table 19 that the initial inventory included sources within 50 km and 20 km of the Project (Ronler campus). The second paragraph before Table 19 indicates that the sources out to a 50 km radius from the edge of the significant impact area (SIA) also called source impact area were used initially. However, the footnote to Table 21 indicates the distance of the final list of competing sources is based on the distance from the Ronler campus, not the distance from the SIA.

The rules in OAR 340 Division 225 require that the inventory should include sources within a distance that impact the SIA, not the Ronler campus. The SIA for NOx extends a maximum 18.7 km from the Ronler campus as shown in Table 19 and Figure 12.

DEQ Response:

A-7.: The goal of the competing source analysis is to ensure that there are no exceedances of the NAAQS in any area that is significantly impacted by the new or modified source. In addition to the source being permitted, this analysis will incorporate contributions from the surrounding environment including other permitted sources, and a monitored background concentration, which presumably captures emissions from un-permitted sources such as mobile and other small sources.

OAR 340-225-0020 (Definitions) states, in relevant part:

> *"(5) Competing AAQS source impacts" means total modeled concentrations of the subject pollutant resulting from allowable emissions of all other sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration. Determination of significant concentration gradient may take into account*

factors including but not limited to ROI formula, spatial distribution of existing emission sources, topography, and meteorology."

The terms "significant concentration gradient" and "in the vicinity of" are not defined. In practice, screening methods using conservative assumptions have been developed by EPA and others to simplify the analysis, for example, a 50 km radius significance area with potentially an addition 50 km emissions inventory screening area for competing sources, was described in the 1990 NSR Workshop Manual (Puzzle book) and used for many years. However, EPA has moved away from prescriptive methods for developing competing source inventories and now emphasizes the importance of recognizing multiple factors that affect concentration gradients, and to use judgment selecting sources for inclusion in the inventory. Conservative screening steps coupled with case-by-case assessments of some sources can greatly reduce the time needed to compile the inventory, and reduce model run times, while not compromising air quality.

For its part, DEQ has developed its own methodology to screen out competing sources that were not likely to have a significant concentration gradient using a Range of Influence (ROI) approach. Initially the ROI was only applied to emissions from potential competing sources, but this has been modified to now incorporate the emissions from both the competing source and the source under consideration to create a composite ROI that accounts for the mutually declining influence of the two sources as the distance between them increases.

This composite ROI is used as a first step to determine if the combination of the two sources is likely to be significant. If so, other factors are considered, such as topography and the consistency of meteorological conditions between the two source locations. If the ROI and other factors are judged to show that the competing source is significance, it is incorporated into the inventory. DEQ feels that the use of the coupled ROI, which uses distances measured between the source at Ronler Acres-Aloha and the competing source, is a better, dynamic emissions-based screening step than the use of just distance to a static significance-area where at the outer edge the concentration gradient is flat, approaches a slope of one and the gradient is not significant. It is interesting that the outer edge of the significance area, which gets the most attention, is that area with the lowest gradient. It is useful to note the difference between a significance area where concentrations in ug/m3 are greater than the SIL, and the significant concentration gradient in ug/m3/km. For developing the competing source inventory, the coupled emissions-based gradient may be the more important metric for building an inventory as there are no modeled concentrations from the competing sources to compare with the SIA.

GA Comment:

<u>3.b Why not include Covanta for NOX and PM?</u>

Based on my knowledge of emission sources in the Western Region of DEQ, I believe that a significant competing source was not included in the initial DEQ inventory and therefore the modeling. That source is the Covanta-Marion MSW incinerator located at Brooks, Oregon. While this source is about 59 km from the Ronler campus, it is only about 33 km from the edge of the SIA, and I believe should have been included in the modeling as a competing source. It has permitted emissions of 337 T/Y NOx and 16 T/Y of PM. While I don't believe the PM would have any impacts within the PM SIAs, I believe the NOx emissions could have as they account for an additional 79% increase over the total NOx emissions of all the other competing sources (424.5 T/Y) which were modeled. Thus, I believe that the modeling

for NOx should be redone with this competing source, especially since the one-hour NOx modeled concentration is approaching the NAAQS as shown in Table 18.

DEQ Response:

A-8.: The ROI analysis using emissions and distance shows that Covanta is not a significant source. In addition, Covanta lies in the north Willamette plain, which is separated from the Tualatin Valley, where Intel is located, by the Chehalem Mountains. With elevations ranging up to 1500 ft. these hills define two sub-basins. As a result, the Covanta and Intel sources are subject to different meteorological regimes and Gaussian plume modeling is not appropriate. The effects of Covanta emissions on air quality in this case are assumed to be captured by monitored background concentrations.

GA Comment:

3c. Why not include Owens-Brockway, etc. including WA State sources?

In reviewing the original and final competing source lists, several sources stand out by being eliminated despite being large NOx emitters as shown in the attached Table 2. One is Owens Brockway which has 382 tons NOx and over 100 tons PM emissions and is only about 20 miles from the Ronler campus and only about 3 miles from the NOx SIA boundary. Others are Evraz, Willamette Falls Paper, and NW Pipeline. These are major NOx emitters in the vicinity and specific explanations should be given why they were not considered a final competing sources.

From what I can see, only Oregon sources were considered as competing sources for NOx. I suspect that there are numerous sources across the Columbia River in Washington which should have been considered in developing a competing source list. The Camas pulp mill and Longview lumber or pulp mill come to mind. DEQ should obtain a source list from the Southwest Clean Air Agency and then determine if there are any competing sources in Washington and/or provide a rationale or basis for eliminating them.

In fact, it would be good if the impact assessment listed every source in a table with a column as to why the source was eliminated from consideration in the final competing source list. This should be done for both NOx and PM sources. This table could take the place of, or be in addition to, the general narrative explaining reasons facilities were eliminated as competing sources.

DEQ Response:

A-9.: As is true of Covanta, these sources are located in areas that are separated topographically from the Tualatin Valley and Intel. Sources in Portland and Washington State close to the Columbia River will have distinct wind patterns that are unlikely to transport pollution to the Hillsboro region. For the most part, sources in other states have, historically, not been included in competing source inventories.

GA Comment:

3.d What emissions used (actual vs PTE) and discrepancies between tables.

I am also uncertain about the emission rates used for the competing sources. Phil Allen sent me several spreadsheets from the Intel application concerning the competing sources. The

Final EI list from Phil has NOx values equal to those in Table 21 for the major NOx emitting sources.

However, the values from the 50k list Phil sent me do not match those values. Neither do they completely match the PSEL values or detail sheet values in some of the permits from the DEQ On-line Permits page on DEQ's website as shown in Table 1 attached below. I also reviewed annual reports for these facilities and the values do not match the 2022 annual submitted actual emission levels.

The derivation of the emission values used in Table 21 needs to be discussed and explained in more detail regarding how all the emission values in Table 21 were developed.

To my knowledge, the modeling should be based on permitted PSELs for all sources unless the PSEL was a Generic PSEL.

Then I'm not sure what should be used as the permit actually allowed the source to emit up to the Generic PSEL level despite the facility showing a lower PTE in the detail sheets.

DEQ Response:

A-10.: DEQ provided the base level competing source emissions inventory data for the Intel expansion project in response to a request (9/22/2022) from Bridgewater Group, Intel's modeling consultant at the time. These data were reviewed and modified by Bridgewater and by Atmospheric Dynamics, the modeling consultants for Intel, in accordance with discussions with DEQ following EPA guidance in Appendix W for assessing nearby sources. A description of the refining of the inventory can be found on page D-47 of the July 2023 Modeling Report. The competing source data in Tables 21 and 22 of the Modeling Report were used in the dispersion modeling and supersede preliminary data in other tables and spreadsheets. The full air quality analysis process from protocol to final modeling report and approval can take as long as a year or more. As a result, key data and other environmental information must of necessity and convenience be set at the time the modeling protocol is submitted. Although permitting of industrial sources continues, and emissions data is periodically updated, it is not feasible to incorporate these changes into the air quality analysis.

GA comment:

3.e Is priority for NAAQS-Increment based on permit application date or permit issuance?

A modeling issue came up in 2001 at DEQ during the energy crisis when DEQ was receiving numerous applications for new power plants. At that time a major source in Albany made application for a cogen plant at the facility. Shortly thereafter a NG power plant permit application was received for a location in nearby Turner. DEQ made the decision that the NG power plant would have to consider the emissions from the proposed cogen plant as a competing source when doing its modeling even though the modified coven facility permit had not been issued before the NG power plant application was received. In other words, the cogen plant got to consume the NAAQS and increments before the NG power plant could. I am curious how many such applications for nearby plant expansions or new permits have been received by DEQ prior to the Intel permit application date and whether this same "philosophy" still exists. If it does, then DEQ needs to review pending applications with the NW and WR permit coordinators for application dates, particularly those which emit NOx and PM. Such sources, even if they are already being considered as competing sources, may have higher

proposed emission levels than the levels shown in the DEQ competing source list used in the original modeling.

DEQ Response:

A-11.: Given the uncertainties that can occur between permit application and permit issuance, the competing source inventory, and associated PSD Increment consumption, is based on those sources that have received permits and reported emissions in the most recent inventory year.

GA Comment:

3.f As noted in the modeling report, the stack parameters for the existing and proposed Intel sources are shown in Appendix B of the Intel application. Because the modeling results are based on those stack parameters, the permit should contain a condition to require Intel to notify DEQ if any stack parameters change and the company be required to remodel or provide information to indicate that the changes would only decrease ambient impacts. The construction should not be allowed to proceed until this demonstration is made to DEQ's satisfaction.

DEQ Response:

A-12.: Intel is subject to regular inspections and record reviews, and any modifications to emission rates, stack parameters and other changes that would affect modeled concentrations must be reported and approved prior to the change.

End of Mr. Gary Andes' Comments

End of Response to Comments