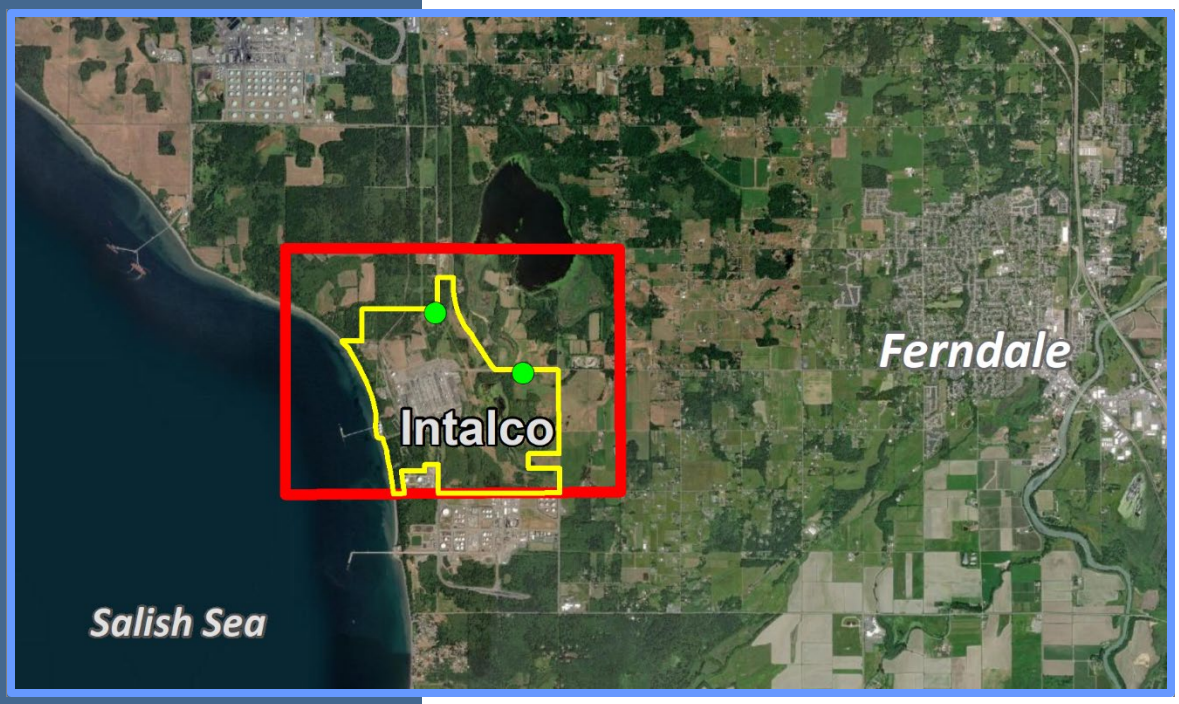

Intalco Sulfur Dioxide Attainment Plan

Washington's Air Quality State Implementation Plan Revision

Air Quality Program

Washington State Department of Ecology

Olympia, Washington

November 2022, Publication No. 2202035

DEPARTMENT OF ECOLOGY
State of Washington

northwest Clean Air agency

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- Clean-up site ID: 2280
- Facility site ID: #16
- WRIA: 1

Relevant documents:

- Publication 15-02-007: Analysis of Sulfur Dioxide (SO_2) Monitoring Data and Meteorology at March and Cherry Points[1]
- Publication 20-02-015: Analysis of Sulfur Dioxide Monitoring Data in Whatcom County: Air Quality Technical Report[2]

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[1] https://apps.ecology.wa.gov/publications/SummaryPages/1502007.html
[2] https://apps.ecology.wa.gov/publications/SummaryPages/2002015.html

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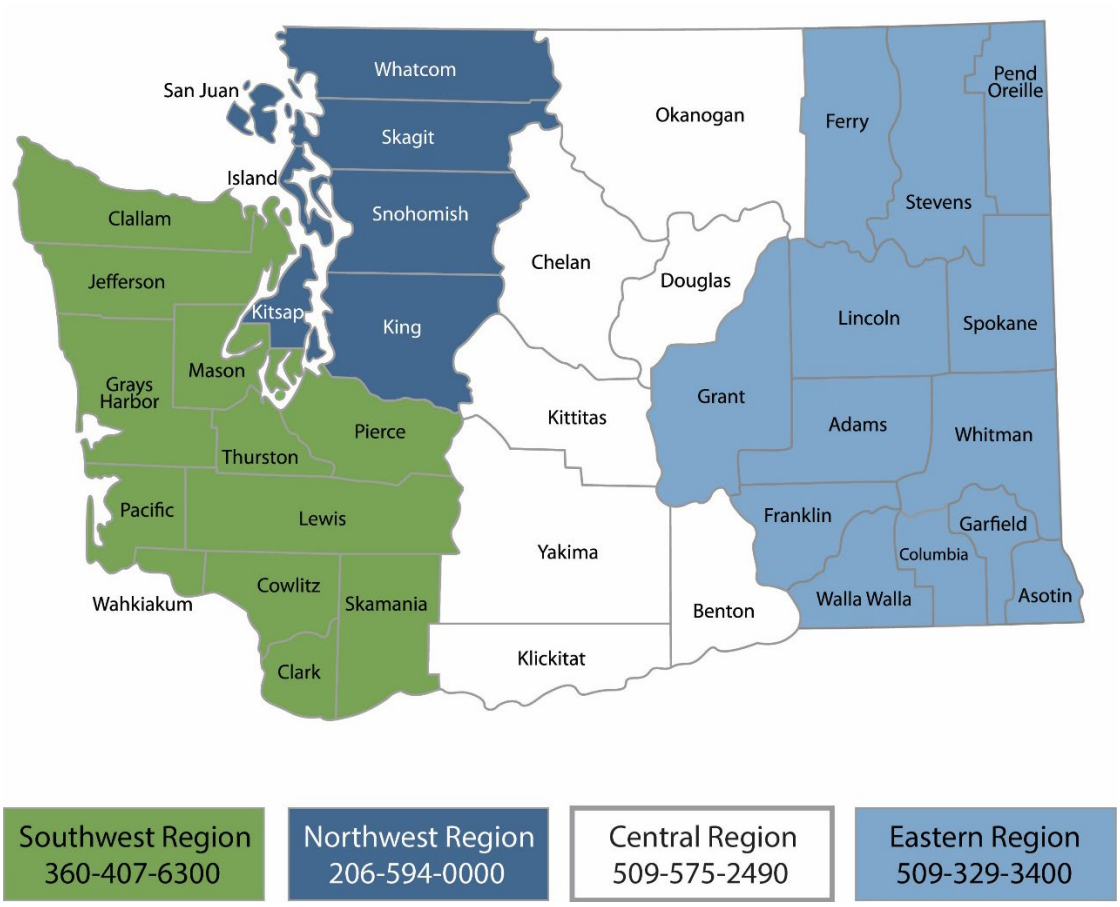
Department of Ecology's Regional Offices

Map of Counties Served



Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

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DEPARTMENT OF
ECOLOGY
State of Washington

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Abbreviations

AO	Agreed Order
AOP	Air Operating Permit
ATG	Attorney General Office
AQ	air quality
BART	Best Available Retrofit Technology
CAA	Federal Clean Air Act
CFR	Code of Federal Regulations
DV	design value
Ecology	Washington State Department of Ecology
EI	emissions inventory
EPA	U.S. Environmental Protection Agency
g/s	grams per second
IPP	inventory preparation plan
lbs/hr	pounds per hour
m	meters
MOVES	Motor Vehicle Emission Simulator
NAA	nonattainment area
NAAQS	National Ambient Air Quality Standards
NEC	not elsewhere classified
NEI	National Emissions Inventory
NOC	Notice of Construction
NOMAD	EPA Nonpoint Methods Advisory Committee
NOV	Notice of Violation
NSR	New Source Review
NWCAA	Northwest Clean Air Agency
NESHAP	National Emission Standards for Hazardous Air Pollutants
PQAO	Primary Quality Assurance Organization
ppb	parts per billion
PTE	potential to emit
QA	quality assurance

QC	quality control
RACM	reasonably available control measures
RACT	reasonably available control technology
RCW	Revised Code of Washington
RFP	reasonable further progress
SCC	source classification code
SEPA	State Environmental Policy Act
SIP	State Implementation Plan
SO_2	sulfur dioxide
TF	total fluorides
tpy	tons per year
UTM	Universal Transverse Mercator
WAC	Washington Administrative Code

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Executive Summary

Effective April 30, 2021, the U.S. Environmental Protection Agency (EPA) designated a small area in the northwest corner of Washington State as a nonattainment area for the 2010 sulfur dioxide (SO_2) national ambient air quality standard (NAAQS). "Nonattainment" means not meeting or complying with the standard. The designated area is a 4.5-square-mile portion of an industrial area – Cherry Point – in Whatcom County. The area encompasses the site of an aluminum smelter, Intalco Aluminum LLC (Intalco), and adjacent areas. In response to the designation, Washington State must submit to EPA a revision to the overarching Washington State Implementation Plan (SIP). The SIP is a federal clean air requirement that allows EPA and the public to oversee and enforce certain state and local air quality rules and plans.

The Washington State Department of Ecology (Ecology) and the Northwest Clean Air Agency (NWCAA) are responsible for regulating the industrial sources of emissions and air quality in the area. Ecology is the permitting agency for the smelter. EPA concurred with Ecology and NWCAA's earlier assessment that the cause for the violation of the SO_2 NAAQS were the SO_2 emissions from the smelter's processes prior to curtailment of the facility. Other industrial sources located in Cherry Point did not cause or contribute to the violation of the standard.

Ecology, in consultation with NWCAA, developed this attainment plan (Plan, or SIP revision) to permanently reduce and control the amount of SO_2 in the nonattainment area. In support of the Plan, Ecology proposed Agreed Order # 21310. The Agreed Order outlines enforceable regulatory mechanisms to limit and monitor the facility's SO_2 emissions and emission rates. The Plan and Agreed Order require the facility to limit facility-wide emissions immediately and install structural modifications and a new wet SO_2 scrubber, after the required engineering, permitting, and environmental review, by April 30, 2025. If the facility continues to be curtailed past April 2025, then the installation of the structural and emission controls must be completed before the planned restart of the facility.

In developing the attainment strategy, Ecology and NWCAA reviewed and verified air quality modeling studies conducted by the facility. The Agreed Order and modeling demonstration are the key components of the Plan. In addition, the Plan addresses miscellaneous federal requirements: ongoing ambient air monitoring, base-year and projected emission inventories, reasonable further progress, reasonably available control measures and reasonably available control technology, and contingency measures.

We used EPA's Environmental Justice screening process and environmental health disparities data from the Washington State Department of Health and determined that there are no communities of color, low-income populations, and other overburdened populations within the nonattainment area.

Ecology solicited public review and comments from September 7 through October 15 and held a hearing online on October 11, 2022. We responded to comment letters from four individuals, the Lummi Nation, and the Intalco facility. Ecology did not make substantive changes as the result of the comments and determined that the Plan and Agreed Order provide for attainment of the SO_2 NAAQS by April 30, 2026, as required by the federal Clean Air Act.

Introduction

Sulfur dioxide air quality area designation

2010 SO_2 National Ambient Air Quality Standard

The Clean Air Act (CAA), last amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered ubiquitous and at certain concentrations harmful to public health and the environment. EPA has set NAAQS for the following pollutants: sulfur dioxide (SO_2), ozone, carbon monoxide, lead, particulate matter, and nitrogen dioxide. All NAAQS are codified in the Code of Federal Regulations (CFR) at 40 CFR Part 50.

The CAA identifies two types of NAAQS:

- Primary standards, which provide public health protection, including the health of sensitive populations such as persons with asthma, children, and the elderly.
- Secondary standards, which provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

In 2008, EPA concluded a multi-year scientific process to review the available health, toxicological, and epidemiologic data to with regard to the SO_2 impacts on human health. EPA summarized their findings in the Integrated Science Assessment for Oxides of Sulfur-Health Criteria (ISA) and the Sulfur Dioxide Health Assessment Plan: Scope and Methods for Exposure and Risk Assessment. EPA found the most significant causal connection between short-term (5 minutes to 24 hours) exposure to levels of SO_2 as low as 200-300 parts per billion (ppb) and appearance of adverse respiratory effects like bronchoconstriction, especially in vulnerable populations. For example, 5-10 minute controlled human SO_2 exposure studies demonstrated decrements in lung function and/or respiratory symptoms in exercising asthmatics.[3]

EPA identified the following populations being at particular risk for experiencing adverse reactions to the short-term spikes in the SO_2 air concentrations:

- persons with pre-existing respiratory disease
- children and older adults
- persons who spend increased time outdoors or at elevated ventilation rates
- persons with lower socioeconomic status (SES)
- persons with certain genetic factors

Based on the ISA's findings and public review, effective on August 23, 2010, EPA revised the primary NAAQS for oxides of sulfur, as measured by SO_2 and notified the public via Federal Register (FR) at 75 FR 35520.[4] The new 1-hour standard of 75 ppb ensures protection of public health with an adequate margin of safety from the effects of short-term exposures to

[3] Integrated Science Assessment, section 5.2
[4] https://www.epa.gov/so2-pollution/primary-national-ambient-air-quality-standard-naaqs-sulfur-dioxide

concentrations above 75 ppb. When a monitoring site records one one-hour concentration above 75 ppb – it is called an exceedance. An exceedance is not an automatic violation of the standard. In order to establish if the area is attaining the standard, EPA requires three years of monitoring data.

The area is in violation of the standard when a 3-year average of the annual 99th percentile (usually the fourth highest) of daily maximum 1-hour concentrations recorded at a monitoring site exceeds 75 ppb. This calculated number is called the Design Value (DV). If the DV is equal to or less than 75 ppb, then the monitoring site is in attainment of the 2010 SO_2 NAAQS.

Since 2010, EPA conducted another review of the newly available scientific evidence and exposure and risk information for SO_2. On February 25, 2019, EPA issued a decision to retain the 2010 SO_2 NAAQS without change.

Area designation process overview

When EPA establishes a new NAAQS, or revises an existing NAAQS, it triggers a comprehensive evaluation that air quality throughout the country meets those standards. Section 107(d)(1) of the CAA requires that EPA designates areas as ‘‘nonattainment,’’ “attainment,” or ‘‘unclassifiable’’ within two years of establishing a new or revising an existing standard. Nonattainment area designation includes both the areas where the SO_2 levels are elevated and the location of sources of SO_2 pollution that contribute to, or cause, these elevated levels.

A state’s governor, or a designee, must submit recommendations for area designations and boundaries to EPA within the one year of the effective date of the standard. In 2011, Washington State, like the majority of other states across the nation, did not have sufficient SO_2 monitoring data and recommended that all areas in the state be designated as unclassifiable. In response to the lacking data, EPA developed the Data Requirements Rule (DRR) that outlined a phased-in approach providing states with time and directions on how and where to place SO_2 monitors or use air quality modeling to evaluate areas for attainment of the NAAQS. Under the DDR, on January 1, 2017, we began monitoring SO_2 near the aluminum smelter Intalco Aluminum LLC (Intalco) in Whatcom County.

Following the DRR, EPA designated certain areas of the U.S. for the revised primary SO_2 standard in a phased approach. There were four rounds: each of them focused on areas for which SO_2 data became available. The areas with the monitoring data collected in 2017-2019, like the one near the Intalco facility in Whatcom County in Washington, were designated in the last, fourth round.

The Round 4 2010 SO_2 NAAQS designations action was signed by EPA Administrator, Andrew Wheeler, on December 21, 2020, as required by the court-ordered deadline of December 31, 2020. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, Acting Administrator Jane Nishida re-signed the same action on March 10, 2021, for publication in the Federal Register. The effective date of the designation is April 30, 2021.

The designation by EPA starts a formal process in which the state must improve air quality in the area within 5 years of the designation date, or face sanctions, which, at their worst, may

result in withdrawal of federal highway funding for the state. The Air Quality Program with Ecology is responsible for representing state and local agencies in this formal process.

Intalco SO_2 nonattainment area

On December 30, 2020, EPA designated a small area – 4.5 square miles – in Whatcom County in the northwest corner of Washington State as a nonattainment area for the 2010 SO_2 NAAQS. **Figure 1** below depicts a map of the boundary of the nonattainment area. A copy of the EPA's designation decision and technical support documents are included in **Appendix A.**

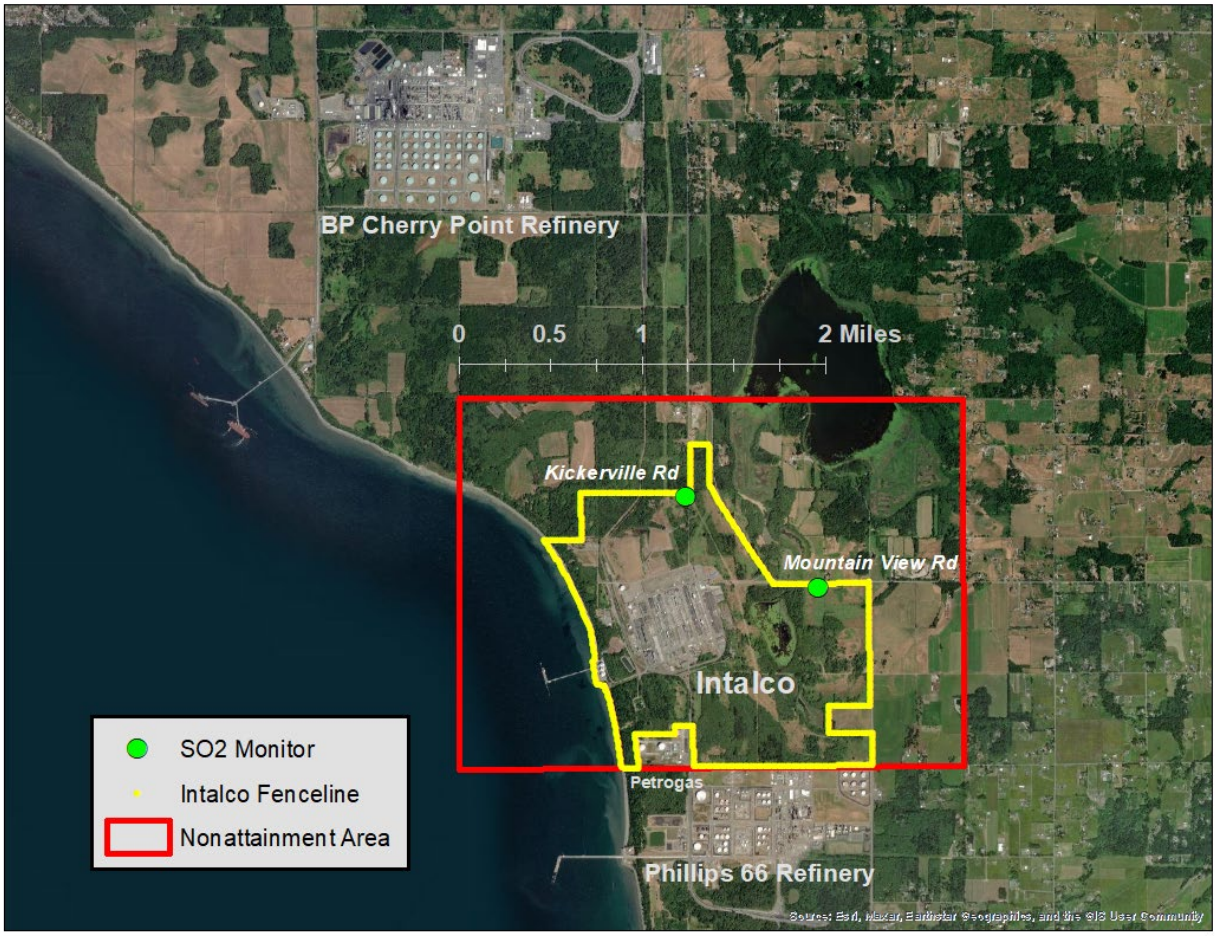

Figure 1. Intalco SO_2 Nonattainment Area boundary, SO_2 monitoring sites, and Intalco fence line.

Lines connecting the following UTM Coordinates (Zone 10) bound the Intalco SO_2 Nonattainment Area:

- Northwest Corner: 519671, 5412272
- Northeast Corner: 524091, 5412261
- Southwest Corner: 519671, 5409010
- Southeast Corner: 524111, 5409044

The designated area is under the jurisdiction of the local clean air authority – the Northwest Clean Air Agency (NWCAA); however, due to a state law, Industrial Section within Ecology regulates air quality emissions from the aluminum smelter. This regulatory structure requires both agencies to cooperate in developing this attainment plan.

Ecology's analysis of the SO_2 monitoring data from 2017-2019 shows the Design Value at one of the monitoring locations near the aluminum smelter reached 106 ppb. In June 2020, Ecology and NWCAA published a detailed technical report[5] on the SO_2 monitoring data, location of the industrial sources, emissions, meteorology, and other relevant factors for this area. In that report, we demonstrated that the aluminum smelter facility was the sole contributor to the violation of the SO_2 NAAQS. EPA reviewed the report as part of their area designation decision.

Ecology determined, and EPA concurred, that the violation of the standard was caused by the SO_2 emissions from the Intalco aluminum smelter. Therefore, the designated area in Washington State encompasses the Intalco aluminum smelter and adjacent areas impacted by elevated SO_2 levels. Other industrial sources of SO_2 located in the area were not found to cause or contribute to the violation of the SO_2 NAAQS, and thus they were not included in the nonattainment areas. Building downwash effects, caused by air emissions releasing at building height, have been identified as the primary cause of the elevated ground-level SO_2 emissions in the nonattainment area.

Washington State Implementation Plan (SIP)

Washington State Implementation Plan (SIP)[6] is a compilation of regulations and programs that a state uses to carry out its responsibilities under the federal Clean Air Act (CAA), including the attainment, maintenance, and enforcement of the National Ambient Air Quality Standard (NAAQS).

Under the CAA, states are directed to develop and submit, for EPA's approval, SIP revisions that provide for the implementation, attainment, maintenance, and enforcement of the NAAQS through control measures directed at sources of criteria pollutant emissions. In particular, any state that has a nonattainment area for the 2010 SO_2 NAAQS is required to develop and submit a nonattainment area SIP:

- meeting the requirements of Title I, Part D, subparts 1 and 5 of the CAA
- providing for attainment of the NAAQS by the applicable statutory attainment date

EPA in April 2014 issued guidance on SIP revisions for the SO_2 nonattainment areas.[7] The guidance explains that all components of the SO_2 nonattainment area SIPs are to be submitted to EPA within 18 months of the effective date of an area's designation as nonattainment. In order for EPA to approve them, the SIPs must provide for future attainment of the NAAQS as

[5] "Analysis of Sulfur Dioxide Monitoring Data in Whatcom County: Air Quality Technical Report" (PDF, 57 pages, 1503KB) available at: https://apps.ecology.wa.gov/publications/SummaryPages/2002015.html
[6] https://ecology.wa.gov/Regulations-Permits/Plans-policies/State-implementation-plans
[7] "Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions," April 2014, available at http://www.epa.gov/airquality/sulfurdioxide/pdfs/20140423guidance.pdf.

expeditiously as practicable, but no later than 5 years from the effective date of designation as nonattainment (see Section 192(a) of the CAA).

For areas designated nonattainment on December 30, 2020, with an effective date of April 30, 2021, attainment SIP revisions are due by October 2022.

Regulatory authority

The federal Clean Air Act requires states to demonstrate their legal authority and means to enforce, implement, attain, and maintain the new or revised NAAQS. We demonstrated our authority and means with regard to the implementation of the 2010 SO_2 NAAQS in our 2019 submittal to EPA, which it approved in 2021. The following documents and web resources outline EPA's approval of specific Washington's authorities to control SO_2 emissions:

- Washington's submittal: Washington State Implementation Plan (SIP) Revision: Infrastructure SIP for 2015 Ozone and 2010 Sulfur Dioxide[8]
- EPA's approval: 86 FR 10022[9]
- EPA's webpage: Washington: 110(a)(2) SO2 (2010) Infrastructure Requirements[10]

The Washington Clean Air Act (WCAA) establishes the authority for Ecology to implement, attain, maintain, and enforce the NAAQS. Washington's legislature enacted the WCAA in 1967, as Title 70.94 of the Revised Code of Washington (RCW). It established a framework for regulation by Ecology, the Energy Facilities Site Evaluation Council (EFSEC), and local air pollution control authorities, and requirements for establishing emission control requirements, among other provisions.

In 2020, the Legislature reorganized[11] about 80 environmental laws, including the WCAA, under a new Title 70A RCW "Environmental Health and Safety." This resulted in recodification of Title 70.94 to Title 70A.15.[12] In RCW 70A.01.020, the law clarifies the connection between the old and the new titles. As it applies to the WCAA, the law says that a reference to Chapter 70.94 RCW in a rule (WAC) remains valid as if it were a reference to Chapter 70A.15 RCW.

The WCAA gives two state agencies and seven local clean air agencies authority to adopt emission standards, limitations, and other measures to comply with NAAQS. The two state agencies are:

- Washington State Department of Ecology (Ecology)
- Energy Facilities Site Evaluation Council (EFSEC)

[8] https://apps.ecology.wa.gov/publications/SummaryPages/1902019.html
[9] https://www.govinfo.gov/content/pkg/FR-2021-02-18/pdf/2021-03034.pdf#page=1
[10] https://www3.epa.gov/airquality/urbanair/sipstatus/reports/wa_infrabypoll.html#x110_a__2__so2__2010_
[11] https://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/Session%20Laws/House/2246-S.SL.pdf?cite=2020%20c%2020%20%C2%A7%20101
[12] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.15

Seven Local Clean Air Agencies (LCAAs) operate in 21 of 39 Washington counties, which covers about 90 percent of the state's population. They are:

- Benton Clean Air Agency (BCAA)
- Northwest Clean Air Agency (NWCAA)
- Olympic Region Clean Air Agency (ORCAA)
- Puget Sound Clean Air Agency (PSCAA)
- Spokane Region Clean Air Agency (SRCAA)
- Southwest Clean Air Agency (SWCAA)
- Yakima Region Clean Air Agency (YRCAA)

The following sections of the WCAA give Ecology, EFSEC and the LCAAs rulemaking authority:

- RCW 70A.15.2040 (formerly 70.94.141), "Air pollution control authority – Powers and duties of activated authority." authorizes the LCAAs, to adopt their own rules and regulations and to issue orders as necessary to implement and enforce Washington's Clean Air Act.
- RCW 70A.15.3000 (formerly 70.94.331), "Powers and duties of department," authorizes Ecology to adopt rules, air quality objectives, and emission standards to meet CAA requirements.
- RCW 70A.15.3080 (formerly 70.94.395), "Air contaminant sources—Regulation by department; authorities may be more stringent—Hearing—Standards," authorizes Ecology to adopt and enforce rules that would apply to a particular type or class of air contaminant source statewide, regardless of the source's location within the state.

When permitting stationary sources of air pollution, the legislative intent reflected in the WCAA is that Ecology, EFSEC and the LCAAs are primarily responsible for implementing programs and rules to control air pollution within their respective jurisdictions. As directed by the WCAA, Ecology established regulations for source categories such as kraft pulp mills, sulfite pulping mills, and primary aluminum plants. These source-category regulations contain requirements specific to these types of facilities.

Ecology adopted regulations specific to primary aluminum plants under Chapter 173-415 WAC[13] (Washington Administrative Code) in 1991. Under WAC 173-415-010(1), the rule provides that it was enacted under the WCAA in order to:

"Assume state jurisdiction over emissions from primary aluminum reduction plants to provide for the systematic control of air pollution in this industry and for the proper development of the state's natural resources."

[13] https://app.leg.wa.gov/WAC/default.aspx?cite=173-415

On March 20, 1980, the Governor delegated responsibility and authority to coordinate and submit all SIP revisions to the Director of Ecology. Ecology submitted the above noted WACs to EPA as part of the SIP revisions.

EPA approved the incorporation of Ch. 173-415 WAC into the Washington SIP in 1993 in 58 FR 4578.[14] Since 1991, many of the cross-references to the general regulations for air pollution sources have changed. As a result, in 2019, Ecology resubmitted the source-category regulations with updated cross references to the general air quality regulations to implement program elements such as new source review permitting. EPA approved a revision to the SIP updating the cross-references and other miscellaneous changes in 85 FR 10984.

A summarized overview of EPA's approval of Ecology's authority to regulate emissions from the aluminum smelters in Washington state is available on EPA's webpage Washington SIP: EPA Approved Regulations (Table 1 - Statewide).[15]

Washington's attainment planning for the Intalco SO_2 nonattainment area

Washington State, represented by Ecology and NWCAA, developed this SIP revision to reduce the amount of SO_2 emitted into the air by the Intalco facility and reduce the ground-level concentration of SO_2 in the nonattainment area. As described in this submission, the majority of the SO_2 emissions contributing to the nonattainment designation were attributable to a single source, the Intalco aluminum smelter facility. Our plan requires the facility to install a new SO_2 wet scrubber, minimize the number of stacks, increase the stack heights, and meet new emission limits. We describe enforceable regulatory mechanisms to limit and monitor the SO_2 emissions and emission rates reduced by the modifications. Using a robust air quality modeling, we evaluate and demonstrate that these actions would:

- Result in permanent and enforceable reductions in SO_2 emissions, and
- Resolve the elevated SO_2 levels in the ambient air near the facility.

Representatives of the State, Intalco, NWCAA, and EPA collaborated on interpretation of the modeling protocol and establishment of enforceable emission limits to ensure attainment of the standard by the attainment date.

Review of the elements of the attainment plan required by CAA

Section 172 of the CAA addresses the general requirements for areas designated as nonattainment for any NAAQS pollutant. Section 172(c) requires any state with a nonattainment area to submit a SIP showing how the affected area will attain the relevant standard as expeditiously as practicable, but no later than the applicable statutory attainment date (in this case, April 30, 2026). Section 172(c) and the 2014 EPA guidance document[7] identifies the following essential elements of a nonattainment area SIP:

[14] https://www.gpo.gov/fdsys/pkg/FR-1993-01-15/pdf/FR-1993-01-15.pdf#page=20
[15] https://www.epa.gov/sips-wa/washington-sip-epa-approved-regulations-table-1-statewide

- **An accurate emissions inventory of current emissions.** Section 172(c)(3) requires a comprehensive, accurate, current inventory of actual emissions for all sources (i.e., point, area, and mobile sources) of SO_2 within the nonattainment area. Per EPA guidance, this baseline emissions inventory should also include emissions from sources outside the nonattainment area that may affect attainment in the area. In addition, EPA guidance calls for submission of a projected emissions inventory for the year in which the area is expected to attain the standard. The emissions inventories provide the foundation for modeling and other analyses to assess impacts to air quality and potential improvements that may result from implementation of pollution control measures.
- **An attainment demonstration using an EPA-approved air quality dispersion model**. EPA guidance interprets section 172(c) as directing any state with a nonattainment area to submit an attainment demonstration as a part of the nonattainment area SIP. An approvable attainment demonstration would include air quality dispersion modeling based on allowable emissions, and supplemental analyses as appropriate, to show that the emission limits in the plan will suffice to provide for attainment of the NAAQS by the applicable attainment date. If the necessary emission limits included in the attainment demonstration have not previously been made as part of the SIP, or have not otherwise become federally enforceable, the plan must include the necessary enforceable limits in adopted form suitable for incorporation into the SIP.
- **A control strategy, including RACM/RACT**. Section 172(c)(1) requires that a nonattainment area plan provide for the implementation of all reasonably available control measures (RACM) as expeditiously as practicable, including emission reductions from existing sources in the area as may be obtained through the adoption of reasonably available control technology (RACT). The state should consider all RACM/RACT that can be implemented in light of the attainment needs for the affected area. Control measures used for attainment of the NAAQS should be permanent and enforceable. EPA has promulgated a number of national and regional control programs that may assist states in planning for attainment of the 2010 SO_2 NAAQS – including the Mercury and Air Toxics Standards (MATS) and the Cross-State Air Pollution Rule (CSAPR). However, state promulgated emission control measures will be of greater importance to achieving the NAAQS in Washington's SO_2 nonattainment area.
- **Provisions for Reasonable Further Progress (RFP).** Section 172(c)(2) of the CAA requires that the nonattainment area plan provide for reasonable further progress. Section 171(1), defines RFP as "such annual incremental reductions in emissions of the relevant air pollutant as are required by [part D] or may reasonably be required by EPA for the purpose of ensuring attainment of the applicable NAAQS by the applicable attainment date." However, EPA guidance states that such incremental reductions are generally of less relevance to pollutants like SO_2 that usually have a limited number of sources affecting areas which are relatively well defined. For the 2010 SO_2 NAAQS, EPA considers "adherence to an ambitious compliance schedule" as ensuring reasonable progress, i.e., affected sources must implement appropriate control measures as

expeditiously as practicable in order to ensure attainment by the specified attainment date.

- **Adequate contingency measures for the affected area.** Section 172(c)(9) of the CAA requires the state to include contingency measures in the SIP that would be implemented automatically in the event that the nonattainment area fails to make reasonable further progress or fails to attain the NAAQS by the applicable attainment date. Because it would be unlikely for an area to implement the necessary emission controls yet fail to attain the NAAQS, EPA guidance explains contingency measures for SO_2 programs. Acceptable state contingency measures include having a comprehensive program to identify sources of any violations of the 2010 SO_2 NAAQS and to undertake aggressive follow-up for compliance and enforcement of the standard. This approach would not prevent a state from requiring additional, enforceable contingency measures that are not included in the control strategy for the nonattainment area SIP.
- **A New Source Review (NSR) permit program.** The nonattainment area SIP must include the nonattainment NSR permitting requirements established in sections 172(c)(5) and 173 of the CAA. States such as Washington with existing nonattainment NSR programs should review their programs to ensure that they meet EPA requirements for the permitting of major stationary sources of SO_2 located in a nonattainment area under the 2010 SO_2 NAAQS.
- **Conformity.** General and transportation conformity is a CAA concept to ensure that federally-funded construction or transportation projects do not:
    - cause new air quality violations in nonattainment or maintenance areas
    - worsen existing violations in nonattainment and maintenance areas
    - delay timely attainment of the relevant NAAQS in nonattainment areas

Intalco Primary Metals Works Aluminum Smelter

The Intalco facility was built in 1965 and began operations as Intalco Aluminum Corporation in 1966, under the ownership of Alumax, Pechiney, and Howmet. In 1988, Alcoa Inc. and Alumax merged, creating Alcoa Intalco Works. By 2006, Alcoa had bought out its remaining partners. Intalco has been the owner and operator for the facility since operations began in 1966. The Intalco smelter is located at 4050 Mountain View Road, Ferndale, WA 98248.

When operating, Intalco turns alumina ore into aluminum metal. At full production, Intalco is capable of making 307,000 tons of aluminum metal each year. A small portion of their overall production comes from scrap aluminum where they remelt purchased scrap aluminum.

This facility curtailed its operations in 2020. Curtailment is a temporary shutdown where the facility ceases production but maintains its permits in order to preserve the ability to restart operations. Intalco continues to monitor pollutants in its treated sanitary and secondary wastewaters and stormwater (sent to the Strait of Georgia), and it continues to operate ambient air quality monitors that measure meteorological data and SO_2, and fluoride levels. Intalco has not informed Ecology of any formal plans for restart at the time of writing this SIP revision and developing attainment strategies. However, Intalco has maintained their permits to allow for restart of operations at any time. Intalco is currently negotiating a possible sale of the facility to a potential buyer.

Figure 2. A bird's eye view of Intalco looking northeast across the facility toward Lake Terrell (source: https://nwcitizen.com/)

In developing this Plan, the Washington Department of Ecology (Ecology) and Intalco Aluminum LLC negotiated an Agreed Order (AO) # 21310 to identify required facility modifications and controls needed for attainment purposes should the facility restart (**Appendix D. Intalco SO2 Agreed Order 21310**). The AO expressly applies to Intalco Aluminum LLC and its successor(s) in interest. Accordingly, the requirements set forth in the AO will continue to apply in the event another company purchases and restarts the facility. Should the facility restart its operations, it will go through all of the required permitting processes, including those necessary to implement the requirements of the AO, regardless of ownership.

Primary aluminum production at Intalco

Feedstock for primary, or molten, aluminum is a sedimentary rock called bauxite. It is mined and processed into aluminum oxide, Al_2O_3, (alumina) near the mining site, typically in Australia, using a caustic process. About four pounds of bauxite result in approximately two pounds of alumina that, in turn, produces roughly one pound of aluminum.

Alumina does not contain sulfur in significant quantities and is not a source of SO_2. However, the process of reducing alumina to aluminum is very energy intensive and requires the use of electrical anodes. Intalco makes their own carbon anodes onsite using calcined petroleum coke and coal tar pitch. The calcined petroleum coke is limited to 3% sulfur by weight, which oxidizes to form the primary source of SO_2 emissions from the facility.

Sulfur dioxide emissions are directly proportional to sulfur content in the carbon anodes. Since the anodes are consumed in the process at a fixed rate, reducing the concentration of sulfur in the anodes results in less sulfur dioxide being generated onsite. Alternately, emissions control devices, such as wet scrubbers, can reduce emissions after they are generated.

Intalco produces molten aluminum in reduction cells (pots) using the Hall-Heroult prebake electrolytic process. The pots are made up of steel shells with two linings, an outer insulating or refractory lining, and an inner carbon lining that acts as the cathode of the electrolytic cell. Each cell can hold 18 prebaked anodes. A direct current of 140,000 amperes is fed in series to each pot. The current passes from the anode through the molten cryolite (bath) and alumina mixture to the cathode. The electrolytic process takes place at temperatures of 940 – 980 degrees Celsius (°C) and breaks the bond between the oxygen and aluminum in the alumina. The oxygen reacts with the anode to form carbon dioxide, carbon monoxide, and sulfur dioxide. The alumina is reduced to molten aluminum at the cathode where it accumulates because it is heavier than the molten bath. The anodes are used up by the electrolytic process. About 0.6 inches of anode is consumed per day (approximately 0.4 lbs carbon/lb Al). The used anodes (called spent anodes) are removed and replaced with a new anode approximately every 25-28 days. The molten aluminum is tapped from the pots every 34 hours and transferred to the casthouse where it is cast into sows, tees, slabs, and billets.

Intalco has 720 electrolytic pots in which the molten aluminum is produced. The pots are arranged in three lines called potlines. The potlines are designated as A, B, and C. Each potline has two buildings (A-1 and A-2, B-1 and B-2, and C-1 and C-2) with 120 pots per building and

240 pots per potline. The operating pots run continuously (24 hours a day, 365 days per year). The average pot is operated for 6 years. After a pot is shut down, a new pot is rebuilt in its place. Production at Intalco is limited by actual production capacity and permit limit to 307,000 tons of aluminum per year.

Figure 3. Aerial views of Intalco facility.

Intalco operations are divided into five main process areas:

- Green Carbon (also called the Green Mill and Paste Plant): Crushed spent anodes, calcined petroleum coke, and coal tar pitch are mixed into anode paste and formed into green anodes.
- Baked Carbon (Bake Ovens): The green anodes are baked in one of two natural gas-fired anode bake furnaces. Anodes exiting the bake furnaces are referred to as baked anodes.
- Anode Rodding (Rod Shop): Molten steel is poured into the baked anodes to form pins and rods that serve as the connection point for the electrical current in the reduction pots.
- Potlines: Molten aluminum is produced in the reduction pots using the Hall-Heroult prebake electrolytic process.
- Metal Products (Casthouse): Molten aluminum is transferred to holding furnaces where it is alloyed and cast into billets, ingots, and tees.

Existing emissions controls

Most of the air emissions at Intalco are generated by the anode manufacturing processes in the paste plant, the anode baking process in the anode bake ovens, and the aluminum smelting process in the potlines. Intalco's Air Operating Permit (AOP) contains emission limits, monitoring, recordkeeping, and reporting requirements for the air pollutants emitted by these processes. Intalco is also required to comply with updated federal requirements called "Maximum Achievable Control Technology" (MACT) standards.

Green Carbon (Green Mill or Paste Plant): The processes in Intalco's paste plant primarily generate particulate matter (PM) and polycyclic organic matter (POM). PM emissions are generated by the crushing and sizing of the materials used to make the green (unbaked) anodes. These PM emissions are controlled by four baghouses. POM and PM emissions generated during the mixing of coal tar pitch (the binding agent used to help form the anodes) with the crushed/sized spent anode components are controlled by the Pitch Fume Treatment System (PFTS). The PFTS consists of a dry scrubber system followed by a baghouse. The dry scrubbing medium is calcined petroleum coke. The calcined petroleum coke reacts with the POM in the exhaust. PM and the reacted calcined petroleum coke is captured in the baghouse. Intalco reuses the captured calcined petroleum coke in the paste plant.

Baked Carbon (Bake Ovens): The green anodes are baked in the bake ovens. PM, total fluorides (TF), nitrogen oxides (NO_x), POM, and SO_2 are generated during the anode baking process. SO_2 is released from the anode bake furnace because of the coal tar pitch oxidizing during the baking process. These emissions are controlled by a dry alumina scrubber and fabric filters called the bake oven baghouse. The emissions generated during the anode baking process are drawn through ducting where the dry scrubber medium (alumina) is injected. The alumina reacts chemically with PM, TF, NO_x, and POM to remove them from the exhaust stream. The reacted alumina flows to the baghouse where it is filtered to remove the particulate and the treated gas is emitted. The captured particulate, including the reacted alumina, is transported to the potlines for use in the pots.

Potlines: Baked anodes are used in the smelting process in the potlines. PM, TF, POM, SO_2, carbonyl sulfide (COS), NO_x, and carbon monoxide (CO) are generated during the smelting process. Sulfur in the anodes is oxidized, releasing SO_2, as the anodes are consumed. These emissions are captured and controlled by two control systems – primary and secondary emission controls.

Primary Emission Control System: Each potline has two primary emission control systems: a dry alumina injection system called a dry scrubber and fabric filters called baghouses. The primary control system captures the gases generated inside the pots (called primary emissions). Every pot is enclosed by hoods that are designed to keep the gases inside the pot so they can be ducted into the dry scrubbers for treatment. Approximately 90% of gases generated in the pots during the smelting process are drawn through these primary dry scrubbing units. In the dry scrubber, the gases are mixed with a combination of fresh and reacted alumina. The alumina reacts chemically with hydrogen fluoride and removes it from the air stream with very

high efficiency. The alumina/gas mixture then flows to a baghouse where it is filtered to remove the particulate, and the treated gas is emitted. The captured particulate containing the fluoride and reacted alumina is transferred back to the potlines as feed material. The primary control system has an approximate control efficiency of 98%.

Secondary Emission Control System: Each potline has a secondary emission control system. Secondary emissions are emissions that escape from the primary emission control system through open hoods during the potroom operations (anode changes, tapping molten aluminum, line breaks, and feeding alumina) and through damaged hoods. The gases that escape/leak from the pots are drawn into the overhead Spray Tower Scrubbers (wet scrubbers) on the roofs of the potline building. Approximately 10% of the potline emissions are captured by the wet scrubbers.

There are a total of 159 wet scrubbers spaced evenly over the three potlines. Each wet scrubber collects emissions from an average of 4.6 pots. The wet scrubbers are organized into six secondary control groups per potline (located in the north, center, and south sections of Buildings 1 and 2 in each of the three potlines). Each wet scrubber sprays a fine mist of alkaline water in a countercurrent direction to the drafted potroom air. This action removes both hydrogen fluoride, PM, and SO_2 from the air stream. Chevron Blade Demisters are used in the top of the wet scrubbers to reduce the quantity of droplets emitted from the scrubbers. The water containing the captured fluoride and PM is routed to the primary wastewater treatment facility. The treated water is recirculated to the wet scrubbers.

Existing emission limits

In addition to the existing emissions control devices, Intalco has numerous existing limits that either directly or indirectly limit SO_2 emissions from the facility. Direct limits for SO_2 at the facility include a facility-wide SO_2 limit and three different SO_2 limits specifically for the potline operations. Limits that indirectly limit SO_2 emissions include sulfur content limits for calcined petroleum coke and coal tar pitch and operational limits for production, number of pots that can be operated, and the amount of carbon consumed (i.e., baked anodes) per pound of aluminum produced. Intalco must continue to comply with these existing limits.

Best Available Retrofit Technology (BART)

The Clean Air Act (CAA) contains requirements that were added in 1977 for the protection of visibility in 156 scenic areas across the United States. States are required to protect and improve visibility in Class I Areas. There are 156 Class I areas, including 47 national parks (under the jurisdiction of the Department of Interior - National Park Service), 108 wilderness areas (under the jurisdiction of the Department of the Interior - Fish and Wildlife Service or the Department of Agriculture - U.S. Forest Service), and one International Park (under the jurisdiction of the Roosevelt Campobello International Park Commission).

The Federal Land Managers have regulatory authority over these areas. PM pollution in the air is the major cause of reduced visibility in parts of the United States, including many of our

national parks. Visibility is impaired when sunlight encounters tiny pollution particles in the air. Some light is absorbed by particles and other light is scattered away before it reaches an observer. More pollutants mean more absorption and scattering of light, which reduces the clarity and color of what we see. High concentrations of sulfur dioxide (SO_2) emissions in the air can cause formation of other sulfur oxides (SO_x). SO_x can react with other compounds in the atmosphere to form fine particles. These fine particles scatter more light than other types of particles in the air.

The CAA established a national goal of eliminating man-made visibility impairment from all Class I areas. As part of the plan for achieving this goal, the visibility protection provisions in the CAA mandate that U.S. Environmental Protection Agency (EPA) issue regulations that require states to adopt measures in their State Implementation Plans (SIPs), including long-term strategies, to provide for reasonable progress toward this national goal. The CAA also requires states to coordinate with the Federal Land Managers as they develop their strategies for addressing visibility. States must require certain existing stationary sources to install best available retrofit technology (BART).

The BART provision applies to "major stationary sources" from 26 identified source categories which have the potential to emit 250 tons per year or more of any air pollutant. The BART provision applies to sources that existed on the date the 1977 CAA amendments became effective (August 7, 1977) but had not been in operation as of August 7, 1962. The CAA required a BART review when any source meeting the criteria above "emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility" in any Class I Area. The BART control determination was to consider the costs of compliance, the energy and non-air quality environmental impacts of compliance, any existing pollution control technology in use at the source, the remaining useful life of the source, and the degree of visibility improvement which may reasonably be anticipated from the use of BART. EPA addressed the visibility in two phases. In 1980, they published regulations (40 CFR 51.300 through 51.307) addressing "reasonably attributable" visibility impairment - the result of emissions from one or few sources that are generally located in close proximity to a specific Class I Area. On July 1, 1999, EPA amended those regulations to address the second, more common type of visibility impairment known as "regional haze" – the result of the collective contribution of many sources over a broad region. The regional haze rule slightly modified 40 CFR 51.300 through 51.307, including the addition of a few definitions in § 51.301, and added new sections (51.308 and 51.309). EPA amended the BART requirements (40 CFR 51.308(e)) in 2005. Definitions of terms used in 40 CFR 51.308(e)(1) are found in 40 CFR 51.301.

The regional haze rule codifies and clarifies the BART provisions in the CAA. The rule requires that states identify and list "BART-eligible sources" and determine if those "BART-eligible sources" may "emit any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility." "BART eligible sources" are:

- sources that fall within the 26 source categories,
- began operations during the period from 1962 to 1977, and

- have potential emissions greater than 250 tons per year, Under the rule, a source which fits that description is “subject to BART.”

States were then required to identify the level of control representing BART for each source subject to BART (40 CFR 51.308(e)(1)(ii)(A)) after considering the best system of continuous emission control technology for each source taking into account:

- the technology available,
- the costs of compliance,
- the energy and non-air quality environmental impacts of compliance,
- any pollution control equipment in use at the source,
- the remaining useful life of the source, and
- the degree of visibility improvement that may be expected from available control technology.

Intalco, as a Primary Aluminum Ore Reduction facility, falls within one of the 26 source categories subject to BART. A baseline Class I Area visibility impact analysis was performed on 100 BART-eligible emission units at Intalco using the CALPUFF model as recommended by the modeling protocol. These sources included Intalco’s three potlines, anode bake furnace, 12 aluminum holding furnaces, various material handling and transfer operations, natural gas, diesel, propane combustion sources, and other small miscellaneous sources.

Ecology completed the BART Determination of the Intalco facility in November 2007. The determination found that Intalco’s emission units, except for the remelt furnace, were subject to BART because they were built between August 7, 1962, and August 7, 1977. Also, Intalco has the potential to emit greater than 250 tons/year of SO_2, NO_x, and PM that could contribute to visibility impairment in a Class I Area. The BART Determination found that visibility impacts for the entire facility exceeded the 0.5 deciview (dv) contribution threshold in the following five Class I Areas:

- Alpine Lakes Wilderness Area
- Glacier Peak Wilderness Area
- Mount Rainier National Park
- North Cascades National Park
- Olympic National Park (ONP)

The highest modeled facility-wide impact was 1.527 dv in the ONP.

The modeled visibility impacts were primarily from the potlines, with a small amount from the anode bake furnace. Other sources contributed negligible amounts. The visibility impact of the potlines was approximately 1.44 dv in the ONP. The projected impacts in the other, more distant Class I Areas were lower. More than 98% of the projected impact from the potlines was attributed to emissions from the potroom primary control devices, with the remainder from the existing potroom wet scrubbers (secondary control device). More than 96% of the potroom primary control device impact is from emissions of SO_2. Sulfur (from calcined petroleum coke in

the baked anodes) is oxidized, releasing SO_2, as the baked anodes are consumed during the smelting process.

The guidelines for BART determinations under the Regional Haze Rule recommend consideration of pollution prevention options in addition to add-on controls. The primary opportunity for pollution prevention in the smelting process to minimize SO_2 emissions is through limitations on the sulfur content in the incoming calcined petroleum coke. Calcined petroleum coke is a major raw material used in the manufacture of green anodes. Green anodes are subsequently baked in a furnace prior to their use in the smelting process.

After a thorough analysis of add on controls and pollution prevention options, Ecology determined that BART for SO_2 was a limit of 3% sulfur in the calcined petroleum coke used to make the anodes. During the BART process, Intalco evaluated the current levels of sulfur in calcined petroleum coke used by other aluminum smelters to determine whether a pollution prevention option using lower sulfur content coke would be a feasible BART option. This analysis indicated that certain smelters were using calcined petroleum coke with sulfur contents as low as 2%. Given that sulfur contents lower than the current Intalco specification are utilized, Intalco undertook a low sulfur coke availability analysis to determine whether calcined petroleum coke at levels below 3% would be available beyond 2013 when BART controls requirements were anticipated.

Based on the market and availability analysis of the future calcined petroleum coke supply, Intalco determined that it was infeasible to consider calcined petroleum coke at sulfur contents below 3% as a BART pollution prevention option because a supply of calcined petroleum coke with sulfur contents below 3% could not be ensured beyond 2013 when BART control requirements were anticipated. These same market pressures were expected to force facilities currently using calcined petroleum coke with sulfur contents below 3% to begin using higher sulfur content coke in the future. Although calcined petroleum coke at sulfur contents below 3% was considered infeasible due to availability concerns, a pollution prevention option that maintains Intalco's current sulfur in coke limit of 3% is considered technically viable or feasible, assuming that sufficient imported lower sulfur coke remains available to allow blending to 3% sulfur content beyond 2013.

Ecology also took some limits in Intalco's AOP into account. Intalco had a number of operational limits that capped allowable emissions of SO_2 from the facility, including:

- a net potline aluminum production limit of 307,000 tons per year
- a daily potline SO_2 limit of 37,780 pounds per day (lb/day)
- limits on sulfur in calcined petroleum coke and coal tar pitch at 3.0% and 0.6%, respectively
- a carbon consumption limit of 0.425 pounds of carbon per pound of aluminum produced

The visibility impact from the anode bake furnaces was 40% (0.02 dv) from SO_2 and 55% (0.03 dv) from NO_x.

BART for NO_x and PM was the existing emission controls. The highest visibility impact from the potlines was 0.053 dv in ONP, with lower projected impacts in other Class I Areas.

Additional BART-eligible emission units at the Intalco facility included aluminum holding furnaces, various material handling and transfer operations, natural gas, diesel, and propane combustion, and other small miscellaneous sources that support the primary aluminum ore reduction process.

The combined projected impacts from all remaining BART-eligible emission units (sources other than the potlines and anode bake furnace) are less than 0.05 dv in ONP, with lower projected impacts in other Class I Areas. Considering the minimal contribution to visibility impairment (less than 0.05 dv) and the existing level of emissions control, these emission sources were excluded from further engineering analysis. BART was determined to be the current controls on those sources. Ecology determined that:

- BART for SO_2 emissions in the potlines and the anode bake furnaces was the current level of control – a pollution prevention limit of 3% sulfur in the calcined petroleum coke used to manufacture anodes. Use of wet scrubbing technology to reduce potline SO_2 emissions was rejected as BART due to excessive costs: total cost effectiveness of $7,500 per ton of SO_2 removed, and capital and total annualized costs of $234.5 million and $46.8 million per year, respectively. A potline wet scrubber would also have substantial secondary impacts, including increased energy usage of 64,824,000 kWh of electricity per year, added water consumption of 183 million gallons per year, and solid waste generation of 27,000 tons per year.
- BART for PM emissions in the potlines and the anode bake furnaces was the current level of control - use of baghouses to control PM emissions from the alumina dry scrubbers and wet roof scrubbers to control secondary PM emissions from the potroom roofs.
- BART for NO_x emissions from the potlines and the anode bake furnaces - there were no feasible technologies for control of NO_x from the potlines or the anode bake furnaces.

EPA developed a federal implementation plan (FIP) in 2014 which identified a Better Than BART Alternative for SO_2 emissions at Intalco (40 CFR 52.2500). The Better Than BART Alternative includes an annual SO_2 emission limit of 5,240 tons of SO_2 per calendar year from the potlines.

2016 curtailment announcement

In November 2015, Alcoa announced that a full curtailment of the Intalco facility's potlines would begin in February 2016 with only the facility's casthouse continuing to operate. Intalco was scheduled to lay off 465 workers because of the planned curtailment. The curtailment was subsequently postponed until June 2016. On May 2, 2016, Alcoa and the Bonneville Power Administration announced a final power agreement that would allow Intalco to continue to operate through February 2018. The scheduled curtailment was cancelled on June 19, 2016. However, Intalco had already offered severance packages to their employees when the curtailment was cancelled, which resulted in a significant loss of trained personnel. Intalco

began hiring and training replacement hourly and salary staff when the cancelation of the 2016 curtailment was announced. Because of the complexity of Intalco's operations, there is a steep learning curve and Intalco experienced high staff turnover. The new staff were not proficient in performing the potline operations, which affects pot operation and maintenance, and potentially contributes to increases in some emissions. This resulted in a number of permit violations.

2019 Agreed Order and 2020 curtailment

In 2018, Ecology began working with Intalco's management to develop options for preventing nonattainment, or, if not feasible, to allow for timely attainment. In 2019, Ecology's Industrial Section reached an agreement with Intalco and issued an Agreed Order (No. 16449) documenting Intalco's readiness to install one scrubber to reduce SO2 emissions should the area be designated as nonattainment by EPA.

On April 22, 2020, Alcoa announced that it would curtail the Intalco facility's operations and stop aluminum production by July 2020. Curtailment is different from the facility permanently shutting down. A curtailed facility often maintains its permits to allow for restart of its operations. In order to preserve this ability to restart, the active permits must comply with the NAAQS and meet other applicable state and federal requirements. Intalco has maintained their permits related to air emissions and water discharges to allow for restart of operations. Intalco has continued to comply with all applicable requirements in their AOP.

On April 23, 2020, Ecology received a 30-day written "null and void" notice from the facility about the Agreed Order No. 16449, in accordance with Action 4 of the Order. The Order was an enforceable agreement to address elevated SO_2 levels recorded near the smelter in recent years. Under the agreement, if EPA designated the area as nonattainment, Intalco would be required to install a piece of equipment called a wet scrubber in 2022. The wet scrubber would capture and remove SO_2 before it is released into the air.

The 30-day notice that Ecology received in April 2020 explained that the Intalco facility would not be proceeding with the plan to install new air pollution control equipment in 2022 to reduce SO_2 emissions due to the curtailment. The notice cited the following language in Action 4 of the Order, Changed Business Conditions: "Notwithstanding anything else in this Order, in the event that lntalco announces the closure or curtailment of one of its three potlines (A, B, or C line, or any combination or equivalent measure thereof), then upon thirty days' prior written notice to Ecology, this Order and lntalco's obligations hereunder will become null and void." The "null and void" notice is included in Appendix D of Agreed Order No. 16449.[16]

Non-SO_2 regulatory actions

The attainment strategy in this Plan addresses SO_2 emissions from the Intalco facility that can lead to elevated levels in the ambient air, outside the facility's boundary. Ecology does not

[16] https://apps.ecology.wa.gov/publications/parts/2002015part3.pdf

anticipate that SO_2 controls required by this attainment plan will negatively affect compliance with other requirements or compliance actions. Additionally, before the facility proceeds with the raising and merging of stacks and the installation of the new wet scrubber, it must complete a State Environmental Policy Act (SEPA) checklist to check for any potential impacts associated with the facility modifications or the installation and operation of the control equipment.

This plan does not address or quantify the extent to which it will generate co-benefits and make progress in bringing the facility into compliance with other regulatory requirements, such as the anticipated effects of the required SO_2 emission reductions on regional haze and visibility. It also does not respond to violations or enforcement actions related to other pollutants. Those requirements will be addressed in separate actions and documents and have a separate public comment and review processes. For context, below we list some of the non-SO_2 air quality regulatory requirements that currently apply at the facility in addition to its active permits.

Regional Haze Agreed Order

Ecology issued Agreed Order No. 18216[17] in January 2021. It outlines the following actions that need to be taken for the Intalco facility to comply with regional haze requirements:

- Prepare and submit an analysis of potential equipment upgrades (a "four-factor analysis") for Ecology's review and approval before restarting any potline operations.
- Install and operate any reasonable air pollution reduction measures identified in the analysis within 3 years of approval by Ecology.

Ecology's Enforcement Actions

During the most recent years when the Intalco facility was operating, the company struggled with controlling emissions due to a variety of staff and equipment issues. Ecology closely monitored emissions and operations at Intalco during this period and issued a series of penalties totaling $60,000 and two enforcement orders requiring Intalco to make operational changes, facility upgrades, and equipment repairs in order to correct these issues. These enforcement actions were related primarily to emissions of PM, TF, POM, and CO. None of the enforcement actions were specifically related to SO_2 emissions. Beyond the penalty amounts, the enforcement orders required Intalco to perform facility upgrades requiring substantial investment. Details of each of the penalties and enforcement orders are provided below:

- Ecology issued Notice of Penalty (NOP) No. 14151 for $5,000 on August 2, 2017. NOP No. 14151 was issued for violations at the bake oven scrubber occurring in October through December 2016. The violations included opacity exceedances and PM emission limit exceedances.
- Ecology issued NOP No. 14152 for $27,500 on August 3, 2017. NOP No. 14152 was issued for violations at the potlines occurring between September through December 2016. The violations included CO, TF, and PM emission limit exceedances.

[17] Alcoa Intalco Agreed Order 18216 is available at: https://fortress.wa.gov/ecy/ezshare/swm/industrial/intalcoAgreedOrder18216.pdf

- Ecology issued NOP No. 16109 for $27,500 on January 30, 2019. NOP No. 16109 was issued for violations at the potlines occurring between January 2017 through April 2018. The violations included TF and PM emission limit exceedances.
- Ecology issued Compliance Order No. 16922 on November 26, 2019, following the issuance of two Notices of Violations (NOVs) issued on April 9, 2019, and October 24, 2019 (NOV Nos. 16581 and 16868). The two NOVs were issued for violations of the PM and TF emission limits at the potlines. Compliance Order No. 16922 required Intalco to complete its planned facility upgrade of converting 100 pots to point-feed technology on an enforceable schedule. Intalco appealed Compliance Order No. 16922 on December 24, 2019. Settlement discussions were ongoing when Alcoa announced the facility curtailment in April 2020. At that time, Intalco had completed the conversion of 38 pots. Ecology and Intalco entered into a settlement agreement resolving the appeal in November 2020 and Ecology issued a revised Compliance Order, Number 19515, as part of the settlement agreement. Revised Compliance Order No. 19515 requires Intalco to convert the remaining 62 pots from side-worked pre-bake pots to point-feed pots within 12 months of restarting potline operations, with at least 31 converted within the first six months.
- Ecology issued Compliance Order No. 16935 on December 16, 2019, in response to violations observed during a joint Ecology-EPA inspection in November 2019. Compliance Order No. 16935 required Intalco to conduct a baseline inventory of the facility's equipment and complete all necessary repairs on an enforceable schedule. Intalco appealed Compliance Order No. 16935 on January 15, 2020. Settlement discussions were ongoing when Alcoa announced the facility curtailment in April 2020. Ecology and Intalco entered into a settlement agreement resolving the appeal in November 2020 and Ecology issued a revised Compliance Order, Number 19514, as part of the settlement agreement. Revised Compliance Order No. 19514 requires Intalco to complete all necessary repairs to damaged pot hoods, subject to Ecology inspection, prior to restart of any potline operations.

EPA Notices of Violations

Since Alcoa announced the facility curtailment in April 2020, EPA has issued three separate NOVs to Intalco for CAA violations that occurred prior to their curtailment. None of these three NOVs are specifically related to SO_2 emissions at the facility.

On September 22, 2020, EPA Region 10 issued the first NOV to Intalco. EPA's second NOV was issued on May 10, 2021, and the third NOV was issued on May 9, 2022. The three NOVs arose from violations of the CAA discovered during a joint EPA-Ecology inspection in November 2019 and through EPA's subsequent information requests. EPA has alleged the facility violated multiple sections of the federal Clean Air Act as well as requirements of Washington's federally approved State Implementation Plan and the facility's Title V Air Operating Permit issued by the Washington Department of Ecology. EPA has referred the violations cited in the three NOVs to the U.S. Department of Justice (DOJ).

Ambient Air Quality Monitoring

In 2010, when EPA revised the health-based NAAQS for SO_2 to a 1-hour standard of 75 parts per billion (ppb), it also revised the form of the standard to a three-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations.

Along with the new standard, EPA revised the data reporting requirements to include 1-hour average SO_2 concentrations and the maximum five-minute block average SO_2 concentration of each hour. EPA also issued new requirements for placement of monitors. These new monitoring requirements resulted in changes to the Washington SO_2 network, including adding two new monitors at the Intalco Aluminum smelter to characterize SO_2 levels in the area. We will continue to rely on the two monitoring sites to characterize SO_2 levels to ensure the area maintains the 1-hour SO_2 NAAQS.

Washington SO_2 air quality monitoring network overview

Ecology's Air Quality Program partners with local clean air agencies, Tribes, and federal agencies to operate monitoring sites and collect air quality information across the state through the Washington Ambient Air Monitoring Network (Washington Network). As the Primary Quality Assurance Organization (PQAO) and designated monitoring agency for the state of Washington, Ecology is responsible for ensuring that the monitoring requirements described in 40 C.F.R. Part 58 are met. Ecology and its partners collect monitoring data to support the three monitoring objectives defined in 40 C.F.R. Part 58 Appendix D:

1. Provide air pollution data to the public in a timely manner.
2. Support compliance with NAAQS and development of pollution control strategies.
3. Support air pollution research studies.

In order to meet these objectives, Ecology and its partners operate several different types of sites at different representative spatial scales, which vary according to the pollutant. SO_2 monitors are sited to:

- Determine representative pollutant concentrations in areas of high population density,
- Assess general background pollutant concentrations, and
- Identify the impact of significant sources or source categories on pollutant concentrations in the ambient air.

Intalco SO_2 air quality monitoring

Ecology and its partners operate six SO_2 monitoring sites in the Washington Network as shown in Figure 4. Three are source-oriented monitoring sites designed to capture the impacts of specific facilities (gray dots), and the remaining three are used to capture regional background concentrations and meet EPA's requirement for monitoring by the Population Weighted Emissions Index.

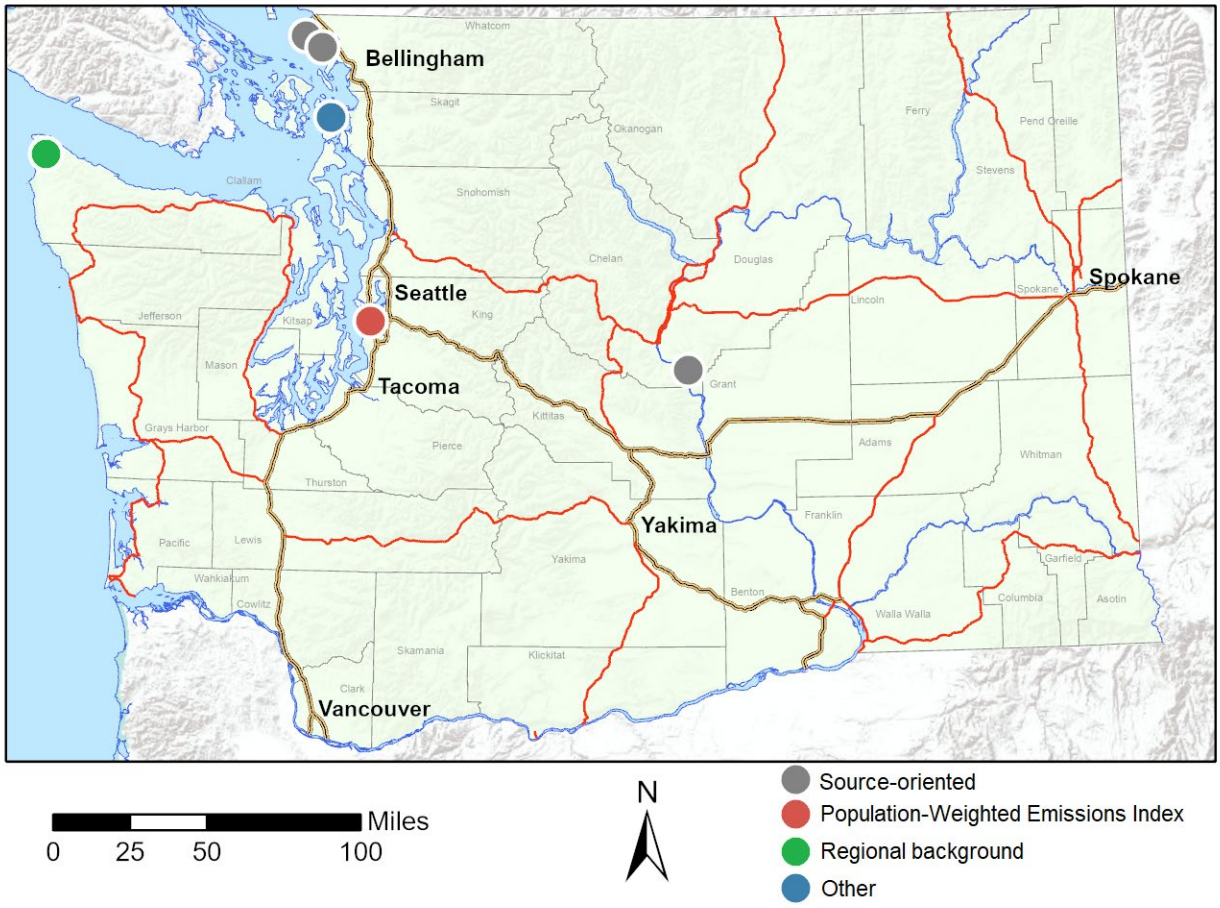

Figure 4. Map of Washington Network SO_2 monitoring sites.

Ecology proposed adding two new SO_2 sites near Intalco to the Washington Network in the 2016 Ambient Air Monitoring Network Plan.[18] Following EPA's concurrence, Intalco installed, and has been operating, two SO_2 monitoring sites near the facility as part of the Washington Network and Ecology's PQAO since January 1, 2017. The map in **Figure 5** shows the locations of the monitoring sites, and **Table 1** summarizes their metadata.

Table 1. Summary of Ferndale monitoring site metadata.

Site Name	AQS ID	Latitude	Longitude	Parameters Measured
Ferndale-Kickerville Road	53-073-0013	48.855274	-122.704700	SO_2
Ferndale-Mountain View Road	53-073-0017	48.848065	-122.688888	SO_2, Wind Speed, Wind Direction, Ambient Temperature

[18] https://www.epa.gov/amtic/washington-2016-annual-network-plan

Figure 5. Map of the two SO_2 monitoring sites near Intalco Aluminum LLC.

Both sites are located on Intalco property near the property line and in publicly accessible areas that meet EPA criteria for ambient air as defined in 40 C.F.R. Part 50.1(e). These monitoring sites are referred to as the Ferndale-Kickerville Road and Ferndale-Mountain View Road sites. Both monitors are sited and operated in accordance with the ambient monitoring network requirements described in 40 C.F.R. Part 58, including the Quality Assurance Requirements for Monitors used in Evaluations of National Ambient Air Quality Standards (Appendix A) and the Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring (Appendix E).

Since meteorological measurements made at the Ferndale-Mountain View Road site are used in dispersion modeling for Prevention of Significant Deterioration (PSD) permitting, the site is operated according to EPA's monitoring guidelines for PSD to ensure it is meeting the data quality objectives of the PSD program.

The Ferndale-Kickerville Road site is located north of the Intalco facility, and the Ferndale-Mountain View Road site is located east of the Intalco facility, near the public Mountain View Road. Ecology identified appropriate locations for the two Ferndale monitors in 2015 by running the AERMOD dispersion model using SO_2 actual emissions from BP, Intalco, and Phillips 66. Ferndale-Kickerville was identified as a suitable site due to the historical data record from an industry-monitoring site operated by the Intalco facility as recently as 2014. In addition to the historical record, the Ferndale-Kickerville site is also located downwind of the Intalco facility when winds are blowing from the dominant wind direction. The Ferndale-Mountain View site was added as a new site in the area of highest expected SO_2 concentrations based on the AERMOD results.

Figure 6. Ferndale-Mountain View Road monitoring site and the road heading into the main Intalco facility (looking west).

Monitoring data quality assurance and completeness

As part of Ecology's PQAO, the Ferndale-Mountain View and Ferndale-Kickerville monitors are subject to EPA's Quality Assurance Requirements for Monitors used in Evaluations of NAQQS (40 C.F.R. Part 58 Appendix A). Monitoring site operators are required to follow Ecology's Quality Assurance Plan and Standard Operating Procedures. Ecology routinely performs in-person performance evaluations of the monitors twice per year and additionally as needed. Performance evaluations involve challenging monitors with independent SO_2 standards of known concentrations. Monitoring data and results of quality control checks are routinely evaluated for validity by Ecology's trained quality assurance staff to ensure that the data meet EPA's measurement quality objectives.

The Ferndale-Mountain View and Ferndale Kickerville monitors routinely exceed EPA's requirement to achieve greater than 75% data completeness per calendar quarter. Over the 2017-2021 period, daily data completeness (measured as the number of days with a valid maximum 1-hour SO_2 concentration divided by the number of possible days) was 99% at Ferndale-Mountain View and 95% at Ferndale-Kickerville.

SO_2 monitoring data summary for nonattainment area and Whatcom County

During active Intalco operations from 2017-2020, both the Ferndale-Mountain View and Ferndale-Kickerville monitors recorded exceedances of the 1-hour SO_2 NAAQS of 75 ppb. Only the Ferndale-Mountain View monitor has recorded a design value above 75 ppb. **Table 2** and **Table 3** summarize the annual 99th percentiles of 1-hour daily maximum concentrations and the 3-year design values at Ferndale-Mountain View and Ferndale-Kickerville, respectively.

Table 2. Summary of Ferndale-Mountain View annual 99th percentiles and design values (in parts per billion of SO_2).

Year	99th percentile	3-year design value
2017	113.6	--
2018	101.3	--
2019	104.5	106
2020	62.0	89
2021	2.6	56

Table 3. Summary of Ferndale-Kickerville annual 99th percentiles and design values (in parts per billion of SO_2).

Year	99th percentile	3-year design value
2017	70.0	--
2018	73.7	--
2019	69.9	71
2020	59.2	68
2021	2.4	44

We show the annual 99th percentiles in comparison with the 1-hour SO_2 NAAQS in the graph in **Figure 7**.

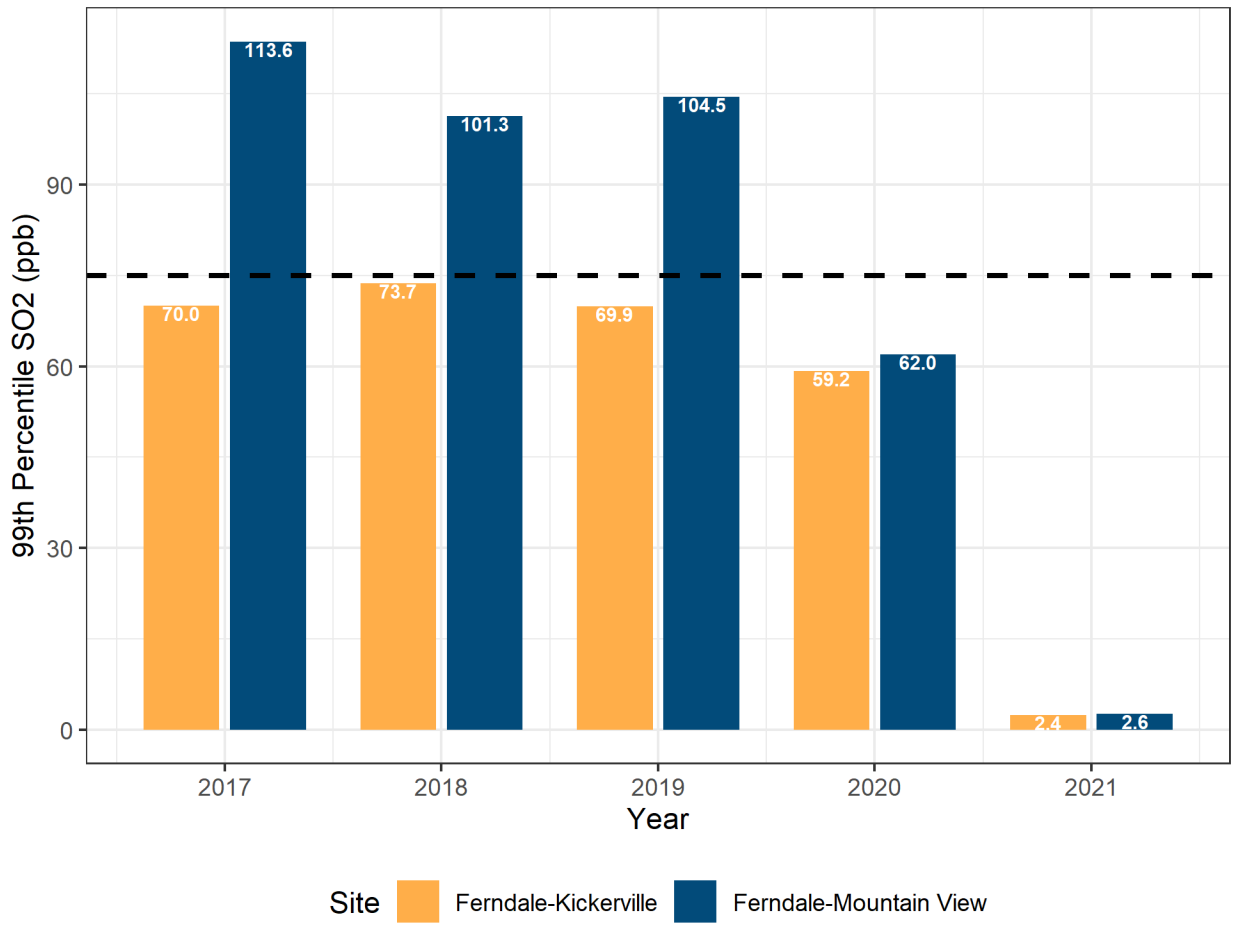

Figure 7. Annual 99th percentile daily maximum 1-hour concentrations.

In April 2020, Alcoa announced its intent to curtail operations at the Intalco facility. Intalco fully curtailed operations on August 26, 2020. As soon as operations were curtailed, SO_2 concentrations at both Ferndale monitoring sites dropped to single digits (ppb). During the 16 months between the curtailment and the end of 2021, the maximum 1-hour concentration recorded at Ferndale-Kickerville was 5.4 ppb and at Ferndale-Mountain View was 5.9 ppb. A time-series graph of the daily maximum 1-hour SO_2 concentrations at both sites from 2020-2021 is shown in **Figure 8**, with the date of the curtailment marked with a dashed line.

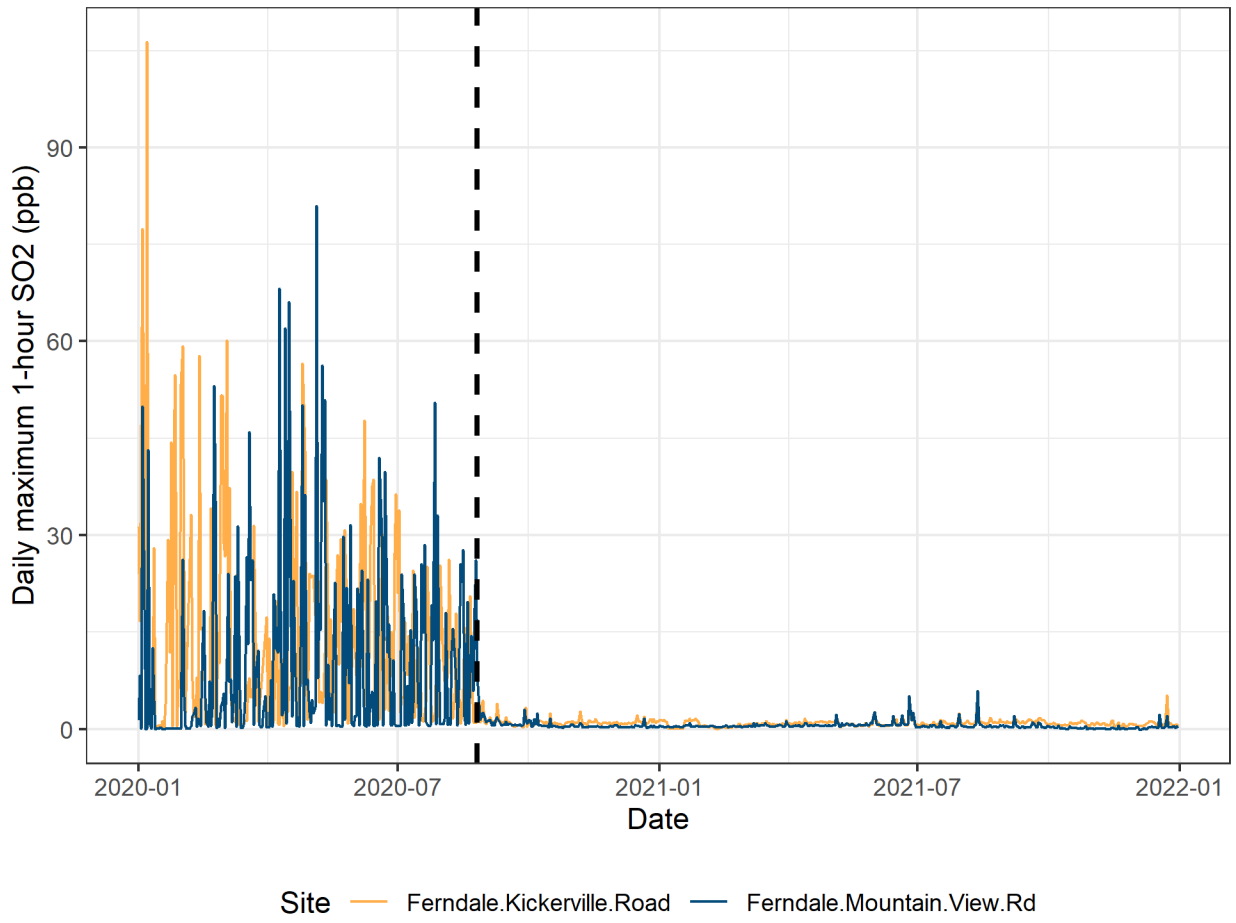

Figure 8. Time-series graph of daily maximum 1-hour SO_2 concentrations at Ferndale monitoring sites, January 2020 through December 2021.

Emissions Inventory

Inventory Preparation Plan

Ecology submitted an Inventory Preparation and Quality Assurance Plan (IPP) to EPA in March 2022. The plan was utilized during preparation and finalization of the inventories. A complete list of source categories required for a SO_2 inventory used in the IPP is included in **Appendix B. SO_2 Source Categories for the Emissions Inventory**. Many sources on the list either did not exist in the nonattainment area or were only present at very insignificant levels. These sources were not included in the inventory.

Inventory types and years

Two annual emissions inventories (EIs) for Whatcom County and the NAA were developed:

1. Base year inventory (2017): The base year is the most recent year of the National Emissions Inventory (NEI) and is an inventory of actual emissions.
2. Attainment projected inventory (2025): The attainment projected inventory is an annual inventory that includes all the sources inventoried for the base year. The projections were based on recent activity levels and effects of current and future controls.

The annual base year and attainment projected inventories were converted to hourly emission rates for both Whatcom County and the NAA.

Responsibility

The inventory process was a cooperative effort between Washington State Department of Ecology (Ecology) Air Quality Program (AQP), Ecology's Industrial Section, and the Northwest Clean Air Agency (NWCAA).

- **Ecology's AQP** inventoried all sources in the NAA and Whatcom County except point sources. Ecology wrote the inventory preparation and quality assurance plan, carried out the tasks in the quality assurance plan, and wrote the final inventory documentation.
- **Ecology's Industrial Section** has regulatory jurisdiction for Intalco and provided the emission estimates for hourly and attainment projected inventories. Ecology's Industrial Section also reviewed the IPP and final EI.
- **NWCAA** provided emissions estimates and locations for all other SO_2 point sources in Whatcom County. NWCAA will assist Ecology with estimating nonpoint emissions sources in Whatcom County. NWCAA will review the IPP and final EI.

Geographic area

The NAA is a rectangular-shaped area of approximately 5.5 square miles within Whatcom County. The NAA area is bounded by lines connecting the following UTM Coordinates (zone 10): Northwest Corner: 519671 5412272; Northeast Corner: 524091 5412261; Southwest Corner: 519671 5409010; Southeast Corner: 524111 5409044. The geographic coordinates of the NAA

corners are approximately: 48.8631 N, 122.7318 W (corner of Henry Rd and Gulf Rd); 48.8628 N, 122.6715 W (corner of Thornton Rd and N. Star Rd); 48.8338 N, 122.7320 W (off coast); 48.8339 N, 122.6715 W (at Unick Rd).

The NAA is to the west of Ferndale, WA, and includes the Intalco aluminum smelter and a small part of the coast along the Puget Sound where ships dock. The only other facility within the NAA besides Intalco is the Petrogas Ferndale Terminal, which receives and ships propane and butane via truck, train, pipeline, and ship. The Petrogas Ferndale Terminal is a very minor source of SO2. There are oil refineries and several smaller commercial/industrial SO_2 sources outside the NAA. There are public roads, a rail line, and marine traffic within the NAA. Population of Ferndale was estimated at 14,043 for 2019, but less than 20 households are within the NAA.

Season determination

Seasonality was analyzed to help select and screen the sources to include in the emissions inventory. Some emission sources could occur seasonally, and meteorology does shift in the winter, but Ecology used a conservative approach that assumes an exceedance could occur during any season. The maximum hourly emissions rate from all sources within the NAA were considered, and no seasons were excluded.

The hourly SO_2 concentrations measured during 2017 – 2021 at the Mountain View Rd monitor show exceedances of the NAAQS from March through September. No exceedances (> 75 ppb) were measured at the monitor from October through February. However, significant SO_2 concentrations were monitored during all months. Seasonal shifts in the dominant meteorology, as well as monitor/facility locations are also factors to consider when determining seasonality. The Analysis of Sulfur Dioxide Monitoring Data in Whatcom County: Air Quality Technical Report (June 2020) contains more specific information about monitoring and NAA boundary determination.[19]

Monthly maximum and average hourly concentrations during 2017 – 2021 are shown in **Table 4**. One-hour average concentrations over 40 ppb were observed during all months. One-hour average concentrations over 75 ppb only occurred during March – September. The number of exceedances per year are shown in **Table 5**. The Intalco facility started reducing operations on May 27, 2020, with full curtailment of smelting operations on August 26, 2020, which effectively reduced their SO_2 emissions to zero. There have been no exceedances of 75 ppb since May 5, 2020. **Table 6** shows the 40 largest concentrations measured from 2017 – 2021.

Table 4. Ferndale-Mountain View Monthly 1-hour Maximum and Average SO_2 Concentrations in ppb: 2017 – 2021.

Month	Maximum	Average
January	50.0	0.4

[19] https://apps.ecology.wa.gov/publications/SummaryPages/2002015.html

Month	Maximum	Average
February	53.1	0.4
March	122.4	1.2
April	115.9	1.4
May	80.9	2.2
June	75.6	1.7
July	104.6	2.2
August	117.4	2.2
September	133.8	1.2
October	60.5	0.8
November	43.3	0.2
December	50.3	0.2

Table 5. Number of Hourly SO_2 Concentrations per year above 75 ppb observed at the Ferndale-Mountain View monitor: 2017 – 2021.

Year	Number of Exceedances
2017	12
2018	13
2019	7
2020	1
2021	0

Table 6. Ferndale-Mountain View largest hourly SO_2 concentrations in ppb: 2017 –2021.

Date and Time (PST)	SO_2 (ppb)
9/11/2017 11:00	133.8
3/18/2019 11:00	122.4
8/10/2017 11:00	117.4
3/20/2019 11:00	116.8
4/16/2017 14:00	115.9
9/28/2017 13:00	113.7
3/19/2019 13:00	108.9
9/2/2017 12:00	108.9
7/25/2019 10:00	104.6
8/10/2017 10:00	104.3
3/11/2018 13:00	103.4
8/15/2018 12:00	103.2
8/21/2018 12:00	101.5
7/23/2018 11:00	101.4
7/29/2018 11:00	98.0
8/21/2018 13:00	92.8
9/11/2017 12:00	91.9
7/21/2019 11:00	90.8
8/21/2018 11:00	89.3
7/29/2018 10:00	86.8

Date and Time (PST)	SO_2 (ppb)
8/6/2017 11:00	83.9
7/24/2018 16:00	82.1
5/5/2020 12:00	80.9
7/16/2018 16:00	80.6
4/4/2019 16:00	80.6
4/26/2018 10:00	80.2
8/3/2017 14:00	77.9
7/30/2018 14:00	77.8
9/2/2019 12:00	77.4
4/21/2017 15:00	76.6
8/3/2017 15:00	76.5
6/30/2017 11:00	75.6
7/29/2018 9:00	75.5
8/7/2018 12:00	75.4
6/18/2018 14:00	75.3
5/26/2017 12:00	74.1
3/11/2018 14:00	73.5
9/2/2017 10:00	73.3
7/23/2018 16:00	72.4
7/25/2019 9:00	72.0

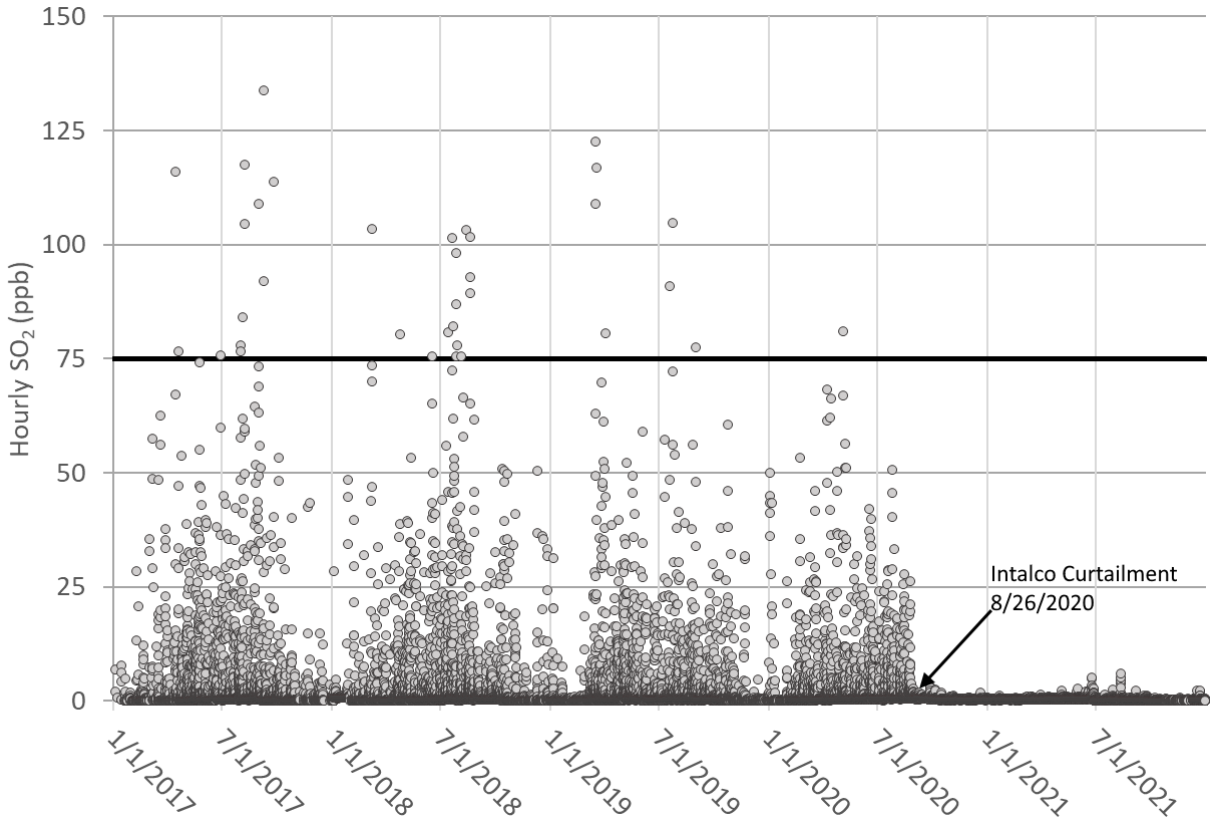

Figure 9. Mountain View hourly SO_2 concentrations in ppb: 2017 – 2021.

Emissions summaries and charts

The emissions summaries and charts shown below represent the annual emissions in the nonattainment area (tons per year) and the seasonal emissions in the county and nonattainment area (pounds per hour). The seasonal emissions (pounds per hour) were calculated such that the highest fractions of monthly, daily, and hourly temporal profiles were used for each non-point, non-road, and on-road category.

Table 7. Base Year 2017 SO_2 Emissions Summary for Whatcom County

Source	Type	Whatcom County SO_2 (tons/yr)	Whatcom County SO_2 (lbs/hr)	Within NAA?
Alcoa Primary Metals Intalco Works (Intalco)	Point ≥ 100 tpy SO_2 PTE	3987.4	983.5	Yes
BP Cherry Point Refinery	Point ≥ 100 tpy SO_2 PTE	828	467.3	No
Phillips 66 Ferndale Refinery	Point ≥ 100 tpy SO_2 PTE	38	23.7	No
PSE Encogen Generating Station	Point < 100 tpy SO_2 PTE	1.6	2.0	No
PSE Ferndale Generating Station	Point < 100 tpy SO_2 PTE	8	3.9	No

Source	Type	Whatcom County SO_2 (tons/yr)	Whatcom County SO_2 (lbs/hr)	Within NAA?
PSE Whitehorn	Point < 100 tpy SO_2 PTE	2	1.5	No
PSE Sumas	Point < 100 tpy SO_2 PTE	1.37	1.4	No
Northwest Pipeline GP Sumas	Point < 100 tpy SO_2 PTE	10.87	2.5	No
Industrial / Commercial / Institutional fuel use	Non-Point	34	37.6	No
Residential non-wood fuel use	Non-Point	2.6	2.1	Yes
Residential wood combustion (home heating)	Non-Point	6.8	5.4	Yes
On-road mobile sources	On-Road	6.6	3.2	Yes
Aircraft: military, commercial, general aviation	Non-Road	8.6	3.1	No
Ships (commercial marine vessels)	Non-Road	27.1	13.1	Yes
Railroad (locomotives)	Non-Road	0.2	0.1	Yes
Non-road mobile equipment and vehicles (NEC)	Non-Road	0.8	0.4	Yes

Table 8. Projection Year 2025 SO_2 Emissions Summary for Whatcom County.

Source	Type	NAA SO_2 (tons/yr)	NAA SO_2 (lbs/hr)	Within NAA?
Alcoa Primary Metals Intalco Works	Point ≥ 100 tpy SO_2 PTE	3425.2	827.0	Yes
BP Cherry Point Refinery	Point ≥ 100 tpy SO_2 PTE	828	467.3	No
Phillips 66 Ferndale Refinery	Point ≥ 100 tpy SO_2 PTE	38	23.7	No
PSE Encogen Generating Station	Point < 100 tpy SO_2 PTE	1.6	2.0	No
PSE Ferndale Generating Station	Point < 100 tpy SO_2 PTE	8	3.9	No
PSE Whitehorn	Point < 100 tpy SO_2 PTE	2	1.5	No
PSE Sumas	Point < 100 tpy SO_2 PTE	1.4	1.4	No
Northwest Pipeline GP Sumas	Point < 100 tpy SO_2 PTE	10.9	2.5	No
Industrial / Commercial / Institutional fuel use	Non-Point	34.0	37.6	No
Residential non-wood fuel use	Non-Point	2.6	2.1	Yes
Residential wood combustion (home heating)	Non-Point	6.8	5.4	Yes
On-road mobile sources	On-Road	6.0	2.9	Yes
Aircraft: military, commercial, general aviation	Non-Road	5.4	3.1	No

Source	Type	NAA SO_2 (tons/yr)	NAA SO_2 (lbs/hr)	Within NAA?
Ships (commercial marine vessels)	Non-Road	32.8	15.8	Yes
Railroad (locomotives)	Non-Road	0.2	0.1	Yes
Non-road mobile equipment and vehicles (NEC)	Non-Road	0.7	0.3	Yes

Table 9. Base Year 2017 and Projection Year 2025 SO_2 Emissions Summary for the NAA.

Source	Type	2017 (tons/yr)	2025 (tons/yr)	2017 (lbs/hr)	2025 (lbs/hr)
Alcoa Primary Metals Intalco Works (Intalco)	Point ≥ 100 tpy SO_2 PTE	3987.4	3425.2	983.5	827.0
Residential non-wood fuel use	Non-Point	2.6	2.6	0.0041	0.0041
Residential wood combustion (home heating)	Non-Point	6.8	6.8	0.0108	0.0108
On-road mobile sources	On-Road	6.6	6.0	0.0065	0.0059
Ships (commercial marine vessels)	Non-Road	27.1	32.8	0.0364	0.0441
Railroad (locomotives)	Non-Road	0.2	0.2	0.0001	0.0001
Non-road mobile equipment and vehicles (NEC)	Non-Road	0.8	0.7	0.0008	0.0006

Base year 2017 inventory development

The base year inventory is an inventory of actual emissions in 2017. Category selection was based on local knowledge of the NAA and the 2017 EI for Whatcom County.

Major sources ≥ 100 tons per year (tpy) SO_2 potential to emit

The federal Clean Air Act defines major sources as any stationary source having the potential to emit 100 tons per year of SO_2 (≥ 100 tpy PTE). Ecology and NWCAA records show that Intalco, BP Refinery, and Phillips 66 Refinery are the only sources in Whatcom County with a PTE ≥ 100 tpy SO_2. These facilities are federal CAA Title V sources and are required to report their annual emissions every year. The Intalco facility has reported between 3,500 and 5,100 tpy SO_2 for the 2012 to 2019 reporting years. Intalco curtailed operations in 2020 and reported 1,919 tons SO_2 for the year. The BP Refinery has reported between 600 and 1,000 tpy SO_2 every year since 2012. The Phillips 66 Refinery has reported less than 100 tpy SO_2 every year since 2012. The 2017 annual emissions reports were used to develop the base year major point source inventory. The 2017 monthly air report maximums were used to calculate hourly emission rates for the base year seasonal inventory for BP, Phillips 66, and Intalco. The maximum hourly rate for 2017 was included in Tables 7 and 9 as the hourly SO_2 emission rate.

Major sources < 100 tons per year (tpy) SO_2 potential to emit

NWCAA permits other major sources in Whatcom County, with emissions less than 100 tpy SO_2 PTE. All of these other major sources emitting SO_2 combined for a total of 24 tons in 2017.

Nonpoint, onroad, and nonroad sources - general information

Nonpoint emissions of SO_2 are typically from fuel consumption sources: industrial, commercial, institutional, and residential. Fuel use at major sources is excluded from this calculation. Onroad emissions of SO_2 are from fuel consumption of mobile vehicles on roads: trucks, cars, motorcycles, etc. Nonroad emissions of SO_2 are from fuel consumption of mobile sources not on roads: ships, trains, equipment, aircraft, etc. Nonpoint, Onroad, and Nonroad emissions are typically calculated by multiplying estimated fuel use by an emission factor. Onroad and Nonroad emission factors are temporally dynamic, while Nonpoint emission factors are not.

The 2017 Ecology inventory, which was submitted to EPA for inclusion in the 2017 NEI, was used for the base year annual inventory. This required allocating county emissions to the NAA using spatial surrogates (see Section 6). A brief description of the estimation methods and data sources used in the 2017 inventory are provided in category sections below.

Industrial/commercial/institutional fuel use

Emissions from industrial/commercial/institutional combustion of wood, natural gas, and other fuels were taken from the 2017 EPA NEI. Total fuel consumption was estimated from the Energy Information Administration State Energy Data System. Reported major facility fuel use was subtracted to avoid double counting with the Point Source category. State fuel use was allocated to counties using the County Business Patterns database of employment by industry.

Residential non-wood fuel use

Emissions from residential (e.g., heating homes) non-wood fuel use are based on distillate oil, natural gas, and liquefied petroleum usage reports. Each county's fuel use was estimated using the 2017 Energy Information Administration State Energy Data System, the 2017 American Community Survey 5-Year Estimates, and EPA emission factors.

Residential wood combustion (home heating)

Emissions from woodstoves, fireplaces, fireplace inserts, and pellet stoves are included in this source category. The 2017 EPA NEI estimates were used for the base year inventory. EPA used the 2018 Commission on Environmental Cooperation (CEC) nationwide survey, supplemented with information from the 2015 Energy Information Administration (EIA) Residential Energy Consumption Survey (RECS) and the state of Minnesota's 2014/2015 residential wood survey. Ecology replaced some EPA assumptions about appliance fractions and burn rates with data from other surveys conducted by WSU, the National Research Center, and Kittitas County.

Onroad mobile sources

Onroad mobile source emissions are those emitted from exhaust and from brake and tire wear. The 2017 EPA NEI inventory estimates were used for the base year inventory. Emissions were calculated using EPA's MOtor Vehicle Emission Simulator (MOVES) model. The MOVES model may be run in a default mode or may be tailored to individual counties using local input data. Ecology submitted local data to EPA to substitute for many of the defaults. The most important included vehicle miles traveled, vehicle population, and vehicle type and age distribution.

Railroad (locomotives)

Emissions from Burlington Northern Santa Fe Railway, Union Pacific Railroad, and Amtrak are included in this category. Railroads provided 2017 county fuel use for line haul and switch yard locomotives, which was combined with EPA emission factors to calculate total emissions. Class II/III locomotives and additional rail yard emissions were obtained from the 2017 EPA NEI.

Aircraft: military, commercial, general aviation

Emissions from aircraft landing and takeoff cycles are included in this category, but in-flight emissions are not included. Base year emissions were taken from the 2017 EPA NEI. EPA used the Federal Aviation Administration Emissions and Dispersion Modeling System for airports where detailed aircraft-specific activity data were available. Emissions from smaller airports were estimated using aircraft operations data and activity survey responses provided by the Federal Aviation Administration.

Ships (commercial marine vessels)

Emissions from ocean-going vessels and harbor vessels are included in this category. Most vessels in this category are powered by diesel engines that are either fueled with distillate or residual fuel oil blends. Estimates were taken from the 2017 EPA NEI. EPA's commercial marine vessels (CMV) estimates use satellite-based automatic identification system (AIS) activity data from the US Coast Guard.

Non-road mobile equipment and vehicles (NEC)

This category includes emissions from gasoline, diesel, compressed natural gas, and liquefied petroleum gas fueled equipment used in agriculture, lawn and garden, airports, logging, oil fields, construction and mining, recreation, commerce, railroad maintenance, and industry. Emissions for the 2017 base year are from the 2017 NEI, which used EPA's MOVES 2014b model with the NONROAD model embedded.

Spatial allocation methods

By rule, an estimate of all source category emissions within the NAA is needed. The NAA is essentially a boundary around the Intalco facility, with no other major sources of SO_2 within the NAA. The other potential sources of SO_2 within the NAA (nonroad, nonpoint, and onroad) are mostly insignificant and intermittent due to the small size of the NAA. It is difficult to accurately estimate non-facility emissions within such a small area, so a simple approach was used based on the Whatcom County totals. Area-based spatial surrogates were used to approximate the amount of the county emissions of source categories within the NAA. The surrogates were allocated to the NAA using the formula:

$$E_{NAA} = E_{County} * A_{NAA} / A_{County}$$

Where E_{NAA} is the emissions in the NAA, E_{County} is the emissions in the county, A_{NAA} is the area of the NAA, and A_{County} is the area of the county. Land area was used for sources that occur on land while ships used ocean (Puget Sound) area. The NAA is in a rural area, so entire county area (not urban area) was used.

Table 10. Areas of the NAA and Whatcom County.

Location	Source	Area (km^2)
SO_2 NAA, Land	GIS	10.9
SO_2 NAA, Ocean	GIS	2.4
SO_2 NAA, Total	GIS	13.4
Whatcom County, Ocean	2010 Census GIS	880.2
Whatcom County, Land	2010 Census GIS	5456.7
Whatcom County, Total	2010 Census GIS	6484.0

Temporal allocation methods

Emissions were estimated for a maximum hourly rate of all source categories within the NAA. The maximum hourly emissions for Intalco were calculated using the monthly reported emission rates and operating conditions. All other source categories within the NAA were estimated using annual emissions and the maximum month/weekday/hour factors (e.g., peak rush hour for on-road, peak heating time for residential fuel use, etc.) from the appropriate temporal profiles in EPA 2016v2 modeling platform. The temporal profiles are source classification code (SCC) specific, so a different reference SCC was used for each emissions category.

Major source emissions outside the NAA were calculated using actual annual emissions divided by the annual operating hours reported, providing an average hourly rate during operations.

The temporal profiles were applied to the annual emissions using the formula:

$$E_{Hourly}\ (lbs/hour) = E_{Annual}\ (tons/yr) * F_{Monthly} * F_{Daily} * F_{Hourly} * 2000\ lbs/ton$$

Where E_{Hourly} is the hourly emissions rate, E_{Annual} is the annual emissions, $F_{Monthly}$ is the fraction of monthly emissions that occur in a year, F_{Daily} is the fraction of daily emissions that occur in a month, and F_{Hourly} is the fraction of hourly emissions that occur in a day. The maximum factor from the reference SCC profile was used in all calculations.

Table 11. Monthly, daily, and hourly factors used to estimate maximum hourly emissions for non-point, non-road, and on-road categories.

Emissions Category	Type	SCC Reference	Monthly Factor	Daily Factor	Hourly Factor
Residential non-wood fuel use	Non-point	2104008000	19%	3%	6%
Residential wood combustion (home heating)	Non-point	2104008000	19%	3%	6%
On-road mobile sources	On-road	2201000000	8%	4%	8%
Ships (commercial marine vessels)	Non-point	2280003000	14%	3%	5%
Railroad (locomotives)	Non-road	2285002010	8%	3%	6%
Non-road mobile equipment and vehicles (NEC)	Non-road	2270002000	12%	3%	6%

Attainment Projection Year 2025 inventory development

The Attainment Projection Year 2025 emissions were developed using EPA guidance and EPA 2016v2 modeling platform, which has projections for 2023 and 2026. The methods used are described for each source category below.

Point sources

Permit conditions, controls, orders, and recent activity levels were considered in making emissions projections for major sources ≥ 100 tpy SO_2 PTE. Major sources < 100 tpy SO_2 PTE were held constant at 2017 emissions values.

The projected annual emissions from Intalco were calculated using the 2017 emissions, plus reductions due to expected controls. For Potline A Baghouse Center 1, the emissions were reduced by 85% to account for the installation of a wet scrubber system.

The projected hourly emission rates for Intalco were calculated based on the 2017 baseline emissions and accounted for 85% removal of SO_2 from the Potline A Baghouse Center 1. The emissions from the remaining sources remained constant from the 2017 baseline emission rate.

Nonpoint sources

Nonpoint sources of SO_2 are not expected to change significantly in Whatcom County by 2025. Nonpoint source emissions were held constant at 2017 emissions values with no changes for the projection year.

Onroad and nonroad mobile sources

Onroad and nonroad emissions were developed by EPA and run for 2023 and 2026 using the MOVES model as part of the 2016v2 modeling platform development. Ship, rail, and airport emission projections were also included in the modeling platform. Details about the projection methods used by EPA are available in the modeling platform documentation.[20] Projection year 2025 emissions were calculated by linearly interpolating between 2023 and 2026 values.

Quality assurance and quality control

In order to provide data of sufficient quality for attainment planning needs, the inventory process included quality assurance (QA) and quality control (QC) procedures. The data quality objectives were accuracy, completeness, comparability, and representativeness.

Data Quality Objectives

- *Accuracy:* Emissions estimates are made using acceptable methods and are documented.
- *Completeness:* The inventory includes all applicable source categories and contains all the information required to estimate emissions.
- *Comparability:* Base year and projection year estimates are comparable. If estimates are outside of specified ranges, they are explained.
- *Representativeness:* Actual 2017 annual and SO_2 season hourly emissions for the base year inventory are estimated. Inventory calculations use local data wherever possible.

Quality Assurance Procedures

- Reality/peer review checks
- Sample calculations
- Sensitivity analysis (ranking)
- Range checks

The results of the procedures are discussed below.

Quality assurance results

Plan adherence, reality/peer review, sample calculations

[20] https://www.epa.gov/air-emissions-modeling/2016-version-2-technical-support-document

The inventory source category list in the inventory preparation plan was checked against the inventory for inclusion of all appropriate source categories. Information sources and emissions estimation methods specified in the inventory preparation plan were also checked against the inventory. Reality/peer review, and sample calculation checks were performed on the final inventory.

Overall, the IPP was followed. Methods, data, and inventory assumptions were judged reasonable. Sample calculations verified inventory results. The checking procedure brought out areas in the inventory text where additional documentation or clarification was necessary. Follow-up actions were taken to supply the additional information.

Standard range check

The standard range check consisted of two major inventory comparisons. The base year 2017 inventory was compared to the projection year 2025 inventory. No differences greater than 20% involving sources that made up greater than 5% of any of the comparison inventories occurred. The only sources that make up greater than 5% of the base year inventory are point sources with ≥ 100 tpy SO_2 PTE: Alcoa Intalco (80%) and BP Cherry Point (17%). The largest projected reduction is from Intalco (14% reduction).

Emissions estimates are compared between base year and projection year in the tables below.

Intalco: The reduction in the hourly emission rates from 2017 to 2025 is due to the installation of a wet scrubber system on Center 1. The wet scrubber system is expected to have a removal efficiency of more than 85%. For purposes of determining projected actual emissions, a removal efficiency of 85% was assumed. In 2017, the average daily production was 551 tons of aluminum per day with an average of 481 pots operating per day.

BP and Phillips 66: There are no expected changes in BP or Phillips 66 activity for the projection year.

Table 12. Comparison of base bear 2017 and projection year 2025 hourly SO2 emissions rates in Whatcom County.

Source	2017 County Hourly Rate (lbs/hr)	2025 County Hourly Rate (lbs/hr)	Change (%)
Point ≥ 100 tpy SO_2 PTE	1474.5	1318.0	-11%
Point < 100 tpy SO_2 PTE	11.3	11.3	0 %
Industrial/Commercial/Institutional fuel use	37.6	37.6	0 %
Residential non-wood fuel use	2.1	2.1	0 %
Residential wood combustion (home heating)	5.4	5.4	0 %

Source	2017 County Hourly Rate (lbs/hr)	2025 County Hourly Rate (lbs/hr)	Change (%)
On-road mobile sources	3.2	2.9	-9 %
Aircraft: military, commercial, general aviation	3.1	2.0	-37 %
Ships (commercial marine vessels)	13.1	15.8	+21 %
Railroad (locomotives)	0.07	0.06	-13 %
Non-road mobile equipment and vehicles (NEC)	0.38	0.32	-17 %

Table 13. Comparison of Base Year 2017 and Projection Year 2025 hourly SO_2 emissions rates in the NAA.

Source	2017 NAA Hourly Rate (lbs/hr)	2025 NAA Hourly Rate (lbs/hr)	Change (%)
Point ≥ 100 tpy SO_2 PTE	983.5	827.0	-16%
Residential non-wood fuel use	0.0041	0.0041	0%
Residential wood combustion (home heating)	0.0108	0.0108	0%
On-road mobile sources	0.0065	0.0059	+8.9%
Ships (commercial marine vessels)	0.0364	0.0441	+21%
Railroad (locomotives)	0.00014	0.00012	-13%
Non-road mobile equipment and vehicles (NEC)	0.0008	0.0006	-17%

Corrective action

Corrective and follow-up actions identified during the QA checking process were referred to the appropriate staff who supplied additional documentation and clarification in the inventory text.

QA/QC conclusion

The inventory accuracy, completeness, and comparability objectives were met. All estimates were calculated and documented using accepted methods (accuracy). All source categories in

the IPP were addressed in the inventory, and all information required to estimate emissions was present (completeness). Comparisons were made between the base and projection year inventories and differences were explained.

Pollution Controls and SO_2 Attainment Strategy

Smelter areas and processes

Anodes

The process of reducing alumina to aluminum is very energy intensive and requires the use of electrical anodes. Intalco makes their own carbon anodes (also referred to as baked anodes) onsite using calcined petroleum coke and coal tar pitch. The calcined petroleum coke contains up to 3% sulfur by weight, which oxidizes to form the primary source of SO_2 emissions from the facility.

Sulfur dioxide emissions are directly proportional to sulfur content in the carbon anodes. Since the anodes are consumed in the process at a fixed rate, reducing the concentration in the anodes results in less SO_2 being generated onsite. Alternatively, emissions control devices, such as wet scrubbers, can reduce emissions after they are generated.

Operations

Most of the SO_2 emissions generated by Intalco's operations come from the aluminum smelting process in the potlines and the anode baking process in the anode bake ovens. Intalco produces molten aluminum in 720 electrolytic pots. The pots are arranged in three lines called potlines. The potlines are designated as A, B, and C. Each potline has two buildings (A-1 and A-2, B-1 and B-2, and C-1 and C-2), with 120 pots per building and 240 pots per potline. During normal operations, the operating pots run continuously (24 hours per day, 365 days per year). Intalco also operates two anode bake ovens for baking green anodes for use in the pots.

Unbaked anodes, referred to as green anodes, are formed in the paste plant where calcined petroleum coke, coal tar pitch, and crushed spent anodes are mixed together. Intalco bakes the green anodes from the paste plant in the anode bake ovens. After the green anodes are baked, they are referred to as baked anodes. Oxidation during the baking process generates emissions of SO_2 from the coal tar pitch. Calcined petroleum coke used in the anodes and as packing also generates SO_2 emissions at the bake ovens. The paste plant is not a significant source of SO_2 emissions at Intalco.

Intalco produces molten aluminum in reduction cells (pots) using the Hall-Heroult prebake electrolytic process. The pots are made up of steel shells with two linings, an outer insulating or refractory lining and an inner carbon lining that acts as the cathode of the electrolytic cell. Electrical current passes from the anode through the molten cryolite (bath) and alumina mixture to the cathode. The electrolytic process breaks the bond between the oxygen and aluminum in the alumina. The oxygen reacts with the anode to form carbon dioxide, carbon monoxide, and sulfur dioxide. The alumina is reduced to molten aluminum at the cathode where it accumulates because it is heavier than the molten bath.

SO_2 emissions at Intalco

Bake Ovens

Intalco captures the emissions from the bake ovens and provides treatment of some of the pollutants with a dry alumina scrubber and baghouse system. The alumina reacts with some of the pollutants in the bake oven exhaust and the baghouse captures the reacted particulates.

Sulfur in the coal tar pitch and calcined petroleum coke converts to SO_2 during the anode baking process. Sulfur in the natural gas used in the bake ovens is also a source of SO_2 at the bake ovens. The dry scrubber and baghouse do not provide control of SO_2 emissions. The dry scrubber media (alumina) reacts with other compounds, primarily those containing fluoride, present in the exhaust before reacting with SO_2. This is due to the alumina's affinity for fluoride over sulfur. The bake oven emissions represent approximately 10% of the facility-wide SO_2 emissions.

Potlines

The reduction process in the pots consumes the baked anodes created in the bake ovens. The sulfur in the anodes converts to SO_2 during this consumption process. Overall, the potline emissions represent the vast majority of the total facility-wide SO_2 emissions.

Emissions are controlled through either the primary or secondary control system. The design of Intalco's primary emission control system is primarily for fluoride and particulate removal and not for SO_2, emission control. Each potline primary control system consists of a dry alumina injection system called a dry scrubber and fabric filters called baghouses. The primary control system captures the gases generated inside the pots. A hood encloses every pot to keep the gases inside the pot and ducted to the primary control system. Currently, treated emissions from the primary control system exhaust to the atmosphere through six baghouses with multiple associated stacks. The stacks exhaust at the same height as the potline buildings.

The secondary control system treats gases that escape from the primary control system through open hoods during the potroom operations and through damaged hoods. The secondary control system includes spray tower scrubbers (wet roof scrubbers) located on the roofs of the potline buildings. Each wet roof scrubber sprays a fine mist of alkaline water in a countercurrent direction. Chevron blade demisters are used in the top of the wet scrubbers to reduce the number of droplets emitted from the scrubbers. There are a total of 159 wet roof scrubbers spaced evenly over the three potlines. Each wet roof scrubber collects emissions from an average of 4.6 pots. The wet roof scrubbers are organized into six secondary control groups per potline, located in the north, center, and south sections of Buildings 1 and 2 of each potline.

The majority of the total potline emissions are captured in the primary control system (approximately 90%). The primary control system is identical to the bake oven dry scrubber and baghouse system and does not provide control of SO_2 emissions. The remaining 10% of potline emissions are captured in the secondary control system. The secondary control system does provide some control of SO_2 emissions from the wet scrubbing of the exhaust.

Fugitive emissions

There are various sources of fugitive emissions at Intalco. The primary pollutant of concern associated with the fugitive emission sources at Intalco is particulate matter (PM). However, there are minimal sources of fugitive SO_2 emissions at the bake ovens and potlines.

Emissions associated with the bake oven are generally captured for control in the bake oven dry scrubber and baghouse system. The capture efficiency of the ducting for the bake oven dry scrubber and baghouse system is 95%. The remaining 5% of emissions that are not captured in the bake oven dry scrubber and baghouse system escape through the anode bake oven building roof vents. The bake oven accounts for approximately 10% of the facility-wide SO_2 emissions at Intalco. Therefore, fugitive emissions from the bake oven represent 0.5% of the total facility-wide SO_2 emissions. This minor amount of fugitive emissions from the bake oven is not expected to have a measurable impact on the ambient SO_2 concentrations outside of Intalco's fenceline. Additionally, the SO_2 emissions at the bake oven are generally a result of sulfur in the calcined petroleum coke and coal tar pitch. Intalco must continue to comply with the existing sulfur limits for calcined petroleum coke and coal tar pitch, which will continue to limit the SO_2 emissions from the bake oven. These emissions are also accounted for in the facility-wide SO_2 emissions, which will be limited to 5,000 tons per year.

Emissions that escape the pot hoods in the potlines are generally captured in the secondary emissions control system. This is due to the heat from the potlines creating a buoyant effect leading to significant plume rise. This plume rise carries the emissions that escape the pots to the secondary emissions control system. Wind entering and exiting the building could transport emissions that escape the pots outside of the building before capture in the secondary emissions control system; however, the ground-level wind speed required to transport pot emissions outside the potline buildings and away from the secondary emissions control system is significant and is not likely to occur. The same controls for limiting the total amount of SO_2 that may be emitted from the bake ovens described above also apply to the potlines.

Natural Gas Combustion

Other sources of SO_2 emissions at the site are from various natural gas combustion sources, including the casthouse and small boilers located throughout the site. The casthouse includes 12 holding furnaces, a remelt furnace, and a homogenization furnace. Each of these furnaces has its own stack. Natural gas-fired boilers are located at the pitch storage tanks, primary water treatment plant, and the paste plant.

Control strategy

Required level of control / RACM

Modeling has shown that building downwash significantly impacts the ground level concentrations of SO_2 around Intalco and is a primary contributor to the nonattainment of the SO_2 NAAQS. Buildings and other structures impact the flow of air, which can interact with exhausted emissions and contribute to higher ground-level pollutant concentrations at or near the facility. As mentioned previously, the potline emissions from the primary control system exhaust at building height from the roof of each potline building and is readily captured in the building downwash. To reduce the impact of building downwash on the exhausted emissions

the stack heights can be raised. Lower ambient concentrations of SO_2 outside Intalco's fenceline will occur with the raised stacks reducing downwash.

Raising the primary emission control system stacks in their current configuration is not feasible. Each primary emission control system (referred to as Centers) consists of multiple small stacks. The specific number of stacks currently exhausting from each Center varies between 6 individual stacks (Centers 1 and 2) up to 26 individual stacks (Centers 3 and 4). Intalco will merge the individual stacks for each center into one new larger and taller stack to achieve the stack height necessary to reduce building downwash effects. This is referred to as "merging and raising." Modeling demonstrates that merging and raising is sufficient to meet the SO_2 NAAQS. Intalco will also raise the bake oven baghouse stack to reduce building downwash effects.

Under both federal and state law, sources cannot use dispersion techniques to demonstrate achievement of ambient air quality standards (Washington Administrative Code (WAC) 173-400-200(2); 40 CFR 51.118(a)). Federal regulations exempt the merging and raising of stacks from the definition of "dispersion technique" if the source emits no more than 5,000 tons per year of SO2 (40 CFR 51.100(hh)(2)(v)). Washington's regulations require the installation of a pollution control device for a project that involves merging existing stacks in order to take credit for stack adjustments in demonstrating achievement of ambient air quality standards. The AO requires Intalco to install and operate a new SO_2 wet scrubber on one potline dry scrubber and baghouse system (referred to as a Center). In accordance with Condition V.1.a. of the AO, Intalco will install and operate the new SO_2 wet scrubber on Center 1, which controls emissions from the north half of Potline A. Condition V.2.e of the AO requires Intalco to notify Ecology prior to any planned curtailment to that entire portion of Potline A. If the pots ducted to Center 1 are curtailed, Ecology will evaluate the circumstances and potential impacts of the curtailment to determine whether enforcement action is needed to ensure compliance with the NAAQS. For example, Ecology may require additional modeling to demonstrate achievement of the NAAQS when the credit for stack adjustments is not included. Ecology will take enforcement, as necessary, if it determines that the curtailment of the portion of Potline A that vents to Center 1 may cause an exceedance of the NAAQS or otherwise violate state or federal law, including the terms of the AO (WAC 173-400-200(2)(b)(ii)(B)).

Based on the above discussion, a facility-wide emission limit of 5,000 tons per year of SO_2, merging and raising of the potline Center stacks, raising of the bake oven baghouse stack, and installation and operation of a new wet scrubber have been identified as reasonably available control measures (RACM).

Significant sources/categories

The primary sources of SO_2 emissions at Intalco are the potlines and the bake ovens. The SO_2 emissions at these sources are a direct result of sulfur in the coal tar pitch and calcined petroleum coke used in the anodes. Intalco currently has monthly average sulfur content limits for both coal tar pitch and calcined petroleum coke. These percent sulfur limits will remain in effect.

A minimal source of SO_2 emissions at Intalco is natural gas combustion. Natural gas combustion occurs at numerous processes at Intalco. The majority of the natural gas combustion at Intalco occurs at the casthouse and bake oven.

Attainment measures

Control measure – Stack Configuration Changes

Intalco will merge the existing stacks at each Center into a single new stack for each Center that is taller than the existing stacks. Modeling has demonstrated that Intalco must construct the new Center stacks with a minimum height of 45 meters (147.6 feet) to mitigate building downwash effects.

Intalco will also raise the bake oven baghouse stack to a minimum height of 45 meters (147.6 feet), which is demonstrated in the modeling as the height necessary to reduce building downwash effects.

Control measure – Facility-wide limit of 5,000 tons of SO_2 a year

Intalco will limit facility-wide emissions of SO_2 to no more than 5,000 tons per calendar year. This limit will go into effect upon the restart of any potline operations at the facility. The AO sets forth a number of options for operational changes that Intalco will implement as necessary to maintain facility-wide SO_2 emissions at or below this limit. The AO also establishes the equations and methods for calculating the facility-wide emissions. Intalco must report facility-wide SO_2 emissions each month in the monthly air report submitted to Ecology.

Control measure – SO_2 Wet Scrubber

Washington's regulations require the installation of a pollution control device for a project that involves merging existing stacks in order to take credit for stack adjustments in demonstrating achievement of ambient air quality standards. The AO requires Intalco to install and operate a new SO_2 wet scrubber on one potline dry scrubber and baghouse system (referred to as a Center). In accordance with Condition V.1.a of the AO, Intalco will install and operate the new SO_2 wet scrubber on Center 1, which controls emissions from the north half of Potline A. Condition V.2.e. of the AO requires Intalco to notify Ecology prior to any planned curtailment to that entire portion of Potline A. If the pots ducted to Center 1 are curtailed, Ecology will evaluate the circumstances and potential impacts of the curtailment. Ecology will take enforcement, as necessary, in response to the notification if it determines that the curtailment of the portion of Potline A that vents to Center 1 may cause an exceedance of the NAAQS or otherwise violate state or federal law, including the terms of the AO.

Control measure – New unit-specific emission limits

Intalco must limit hourly emissions of SO_2 from the bake oven baghouse and the potline Centers in accordance with the following tables. Two sets of emission limits have been established to account for different scenarios based on the operational status of the new SO_2 wet scrubber. **Table 14** includes the emission limits that apply when the SO_2 wet scrubber is operational.

Table 14. Hourly Emission Limits during SO_2 Wet Scrubber Operating Periods.

Emission Unit	SO_2 Emission Limit
Bake Oven Baghouse (Emission Unit 187)	117.5 pounds per hour (lb/hour)
Center 1 (Emission Unit 181)	70 lb/hour
Center 2 (Emission Unit 182)	320 lb/hour [21]
Center 3 (Emission Unit 183)	320 lb/hour [21]
Center 4 (Emission Unit 184)	320 lb/hour [21]
Center 5 (Emission Unit 185)	320 lb/hour [21]
Center 6 (Emission Unit 186)	320 lb/hour [21]
Casthouse Units (Emission Units 4, 5, 7, 8, 10, 11, 13, 14, 16-19, 217, & 314)	0.7 lb/hour [22]

It is expected that the new SO_2 wet scrubber will not be operational occasionally due to maintenance, repair, or malfunction of the scrubber. Shut down of the pots exhausting to Center 1 may not be feasible for each period that the SO_2 wet scrubber is not operational due to maintenance, repair, or malfunction. Therefore, Intalco modeled scenarios where the SO_2 wet scrubber is not operational. During these periods, the emission limits in **Table 15** will apply.

Table 15. Hourly Emission Limits during SO_2 Wet Scrubber Non-operational Periods.

Emission Unit	SO_2 Emission Limit
Bake Oven Baghouse (Emission Unit 187)	117.5 pounds per hour (lb/hour)
Center 1 (Emission Unit 181)	280 lb/hour [23]
Center 2 (Emission Unit 182)	280 lb/hour [24]
Center 3 (Emission Unit 183)	280 lb/hour [24]
Center 4 (Emission Unit 184)	280 lb/hour [24]
Center 5 (Emission Unit 185)	280 lb/hour [24]
Center 6 (Emission Unit 186)	280 lb/hour [24]
Casthouse Units (Emission Units 4, 5, 7, 8, 10, 11, 13, 14, 16-19, 217, & 314)	0.7 lb/hour [22]

The hourly emission limits included in **Table 14** and **Table 15** will go into effect on April 30, 2025. If operations remain curtailed on the emission limit effective date, the limits will go into effect upon restart of operations.

[21] A single Center (Centers 2-6) may be greater than the specified emission limit given that the hourly emission rate does not exceed 400 pounds per hour and all other Centers have an hourly emission rate below the specified emission limit.
[22] Casthouse Units includes Holding Furnaces 1-12, the Remelt Furnace, and the Homogenization Furnace. The specified emission limit is the sum of hourly emissions from each of the specified emission units.
[23] Hourly emissions from Center 1 may be greater than the specified emission limit given that the hourly emission rate does not exceed 350 pounds per hour and all other Centers have an hourly emission rate below the specified emission limit.
[24] A single Center (Centers 2-6) may be greater than the specified emission limit given that the hourly emission rate does not exceed 400 pounds per hour and all other Centers have an hourly emission rate below the specified emission limit.

The AO requires hourly emissions from the bake oven baghouse and potline Centers to be measured via quarterly stack testing or a continuous monitoring system (CMS), or a combination thereof. Additional details and requirements for monitoring will be established in the notice of construction (NOC) approval order that will be required for Intalco to proceed with the merging and raising of stacks and the installation and operation of the new wet scrubber.

Intalco must use specified equations to show compliance with the hourly emission limit for the Casthouse Units.

Implementation strategy

The AO specifies controls and emission limits that are legally and practically enforceable. The implementation of all of the control strategies discussed above are required as expeditiously as practicable and have required completion dates based on two restart scenarios: (1) restarting the facility on or before April 30, 2025, and (2) restarting the facility after April 30, 2025. For the scenario of restarting the facility after April 30, 2025, all of the control measures must be installed and operational before Intalco can restart any potline operations.

For the scenario of restarting on or before April 30, 2025, the facility may restart without the controls installed, provided facility-wide SO_2 emissions remain at or below 5,000 tons per year and all other applicable regulatory requirements (including permit conditions) are met. If Intalco restarts before April 30, 2025, without the controls required by the AO, it must either complete installation and operation of these controls by April 30, 2025, or immediately curtail the facility on that date and cease operations until the controls are installed and operational.

Regardless of when the facility restarts, the 5,000 ton per year facility-wide emission limit goes into effect upon restart of any potline operations. The new unit-specific emission limits will go into effect on April 30, 2025.

Based on this, the control measures will be implemented as expeditiously as practicable. Permitting, purchasing, and installation of the SO_2 wet scrubber system and modifications to the Center stacks and bake oven stack generally requires at least two years. Given recent supply chain and shipping delay issues, the earliest expected timeframe for completion of the control measure installations is approximately three years. Implementation of the hourly emission limits will also be completed as expeditiously as practicable. Because there is not a practical or realistic method for determining hourly emission rates from each Center in the current stack configurations, the hourly emission limits will go into effect April 30, 2025, following completion of the stack configurations and installation of the new SO_2 wet scrubber at Center 1.

Implementation of RACM, including RACT

Section 172(c)(1) of the CAA states that a state's nonattainment plan shall "provide for the implementation of all reasonably available control measures [RACM] as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be

obtained through the adoption, at a minimum, of reasonably available control technology [RACT]) and shall provide for attainment of the primary ambient air quality standards."

The Intalco facility is already subject to sulfur and SO_2 limits that represent RACT for SO_2.

In developing this Plan, Intalco and Ecology have implemented RACM as expeditiously as practicable through the new facility-wide and unit-specific SO_2 emission limits, the new wet scrubber, and the facility modifications required by the AO. This includes compliance with federal regulations allowing for the merging and raising of stacks if the source emits no more than 5,000 tons per year of SO_2 (40 CFR 51.100(hh)(2)(v)). This also includes compliance with Washington State regulations that require additional measures of installing a pollution control device and a net reduction of allowable emissions in order to merge stacks (WAC 173-400-200(2)(b)(ii)(B)).

Attainment Demonstration

Introduction to SO_2 dispersion modeling

This chapter describes the air quality dispersion modeling conducted to demonstrate attainment. EPA's Guideline on Air Quality Models, 40 CFR Part 51 Appendix W, provides information on EPA's preferred models, recommended techniques, and guidance to estimate ambient air pollutant concentrations. Air quality dispersion modeling utilizes mathematical formulations to characterize the atmospheric processes that disperse a pollutant emitted by a source. Based on emissions and meteorological inputs, an air quality dispersion model can be used to predict pollutant concentrations at receptor locations. The modeling methodology and data inputs applied in this analysis are consistent with the recommendations provided in the following EPA guidance documents:

- Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, April 23, 2014 http://www.epa.gov/airquality/sulfurdioxide/pdfs/20140423guidance.pdf
- Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard, March 20, 2015 https://www.epa.gov/sites/production/files/2016-04/documents/20150320so2designations.pdf
- Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, March 1, 2011 http://www.epa.gov/ttn/scram/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf, (parts of which are also applicable to the 1-hour SO_2 standard)
- Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality http://www.epa.gov/ttn/scram/guidance/clarification/ClarificationMemo_AppendixW_Hourly-SO2-NAAQS_FINAL_08-23-2010.pdf

Ecology conducted a preliminary modeling evaluation during the area designation phase to demonstrate the extent of the SO_2 violations.[25] EPA evaluated Ecology's air dispersion modeling analysis and determined the resulting NAA boundary shown in **Figure 1**.[26]

The Intalco facility contracted consulting firm AECOM to assess the facility's future attainment with the 1-hour SO_2 NAAQS. In the following sections we present a technical analysis of the AECOM modeling report to demonstrate that SO_2 concentrations in the NAA will attain the NAAQS no later than five years from the effective date of the designation (i.e., April 30, 2026).

Modeling protocol

[25] https://apps.ecology.wa.gov/publications/documents/2002015.pdf
[26] https://www.epa.gov/sites/default/files/2020-08/documents/10-wa-rd4_intended_so2_designations_tsd.pdf

In close coordination with Ecology and EPA Region 10, AECOM prepared a modeling protocol using the EPA-approved AERMOD air dispersion model. AECOM submitted an initial modeling report on November 30, 2021. In response to feedback from Ecology and EPA Region 10, AECOM resubmitted the modeling report on May 11, 2022. The final modeling report was submitted to Ecology on June 24, 2022. The modeling report and modeling protocol are included in **Appendix C. Intalco SO_2 Attainment Plan Modeling Report by AECOM**.

The resulting modeling generally followed the approved protocol. However, the following additional changes were made during implementation of the protocol:

1) Two different scenarios were modeled: Scenario 1 assumed typical operations, and Scenario 2 assumed a non-operational SO_2 emission control device. Both scenarios also consisted of multiple modeling cases with variable hourly emission rates for each Center.
2) Specifying hourly emission rates for the modeled SO_2 emission sources at the Intalco facility. The approved protocol specified that hourly emission rates should be calculated based on the 5,000 ton per year limit included in the Agreed Order (AO). Instead of using the annual limit to calculate hourly emission rates, Intalco determined hourly emission rates for each emission unit by modeling the maximum emission rates possible while still showing compliance with the NAAQS.
3) Substitution of missing upper air meteorological data from the Quillayute Airport with upper air meteorological data from Salem, Oregon.
4) To account for nearby emissions, the modeling protocol included two scenarios: modeling the nearby BP Cherry Point and Phillips 66 contributions explicitly using their maximum monthly emissions as well as using a constant background concentration. The modeling presented herein only includes the scenario that models the nearby refineries' contributions explicitly. This modified modeling approach was based on feedback from EPA Region 10.
5) Each of the six buildings wet scrubber releases were modeled as a single point source per building, rather than adding their emissions to the dry scrubber stacks.

Modeling domain

Following the modeling protocol, the modeling domain covers a 10 km grid extending in each direction from Intalco. The modeling domain includes the nearby BP and Phillips 66 refineries, the Intalco facility, as well as the NAA, as shown in **Figure 10**.

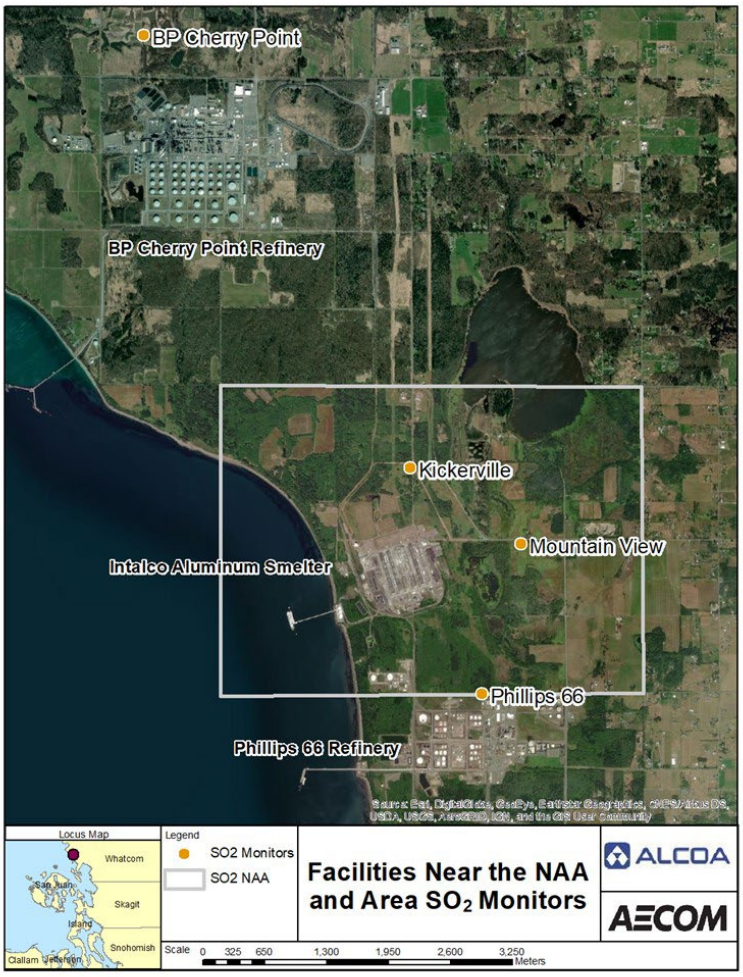

Figure 10. The modeling domain included the BP Cherry Point and Phillips 66 Refineries, Intalco facility, NAA boundary, and SO_2 ambient air monitors.

Emission sources

Intalco

Sources at the Intalco facility that emit SO_2 include three side-worked prebake potlines with primary and secondary emission controls, two anode baking furnaces controlled by a single bake oven dry scrubber and baghouse, and 14 natural gas-fired melting/holding furnace stacks. The majority of the SO_2 emissions come from the potline primary emissions control systems (Centers), of which there are two per potline, or six total Centers. As described in the previous section, the attainment strategy involves merging and raising the potline Centers and Bake Oven Scrubber stacks as well as installing one SO_2 emission control device on Center 1.

The modeling described herein utilizes 1-hour maximum SO_2 emission rates from the facility.

Nearby SO_2 emission sources

As shown in **Figure 10**, the BP Cherry Point and Phillips 66 refineries are located outside the nonattainment area boundary; however, they are included in the modeling domain. Along with

less than 2,000 tpy emission rates in 2017-2019 (745 tpy and 30 tpy for BP Cherry Point and Phillips 66, respectively), SO_2 monitoring near these two facilities during 2017-2019 resulted in design concentrations well below the NAAQS. Further, the area designation modeling[27] demonstrated that SO_2 concentrations were highest near the Intalco facility and dissipated quickly as the plume moved away from the Intalco facility. The area designation modeling indicated that even if all sources besides the Intalco facility ceased to emit SO_2 the Intalco facility would still be in violation of the SO_2 NAAQS. Thus, these two nearby SO_2 emission sources do not significantly contribute to or cause the 1-hour SO_2 NAAQS exceedances in the NAA. EPA's boundary determination document concurred with Ecology's analysis during the area designation phase; the NAA excludes both refineries due to a lack of sufficient contribution to the modeled SO_2 violations and exceedances.

SO_2 emissions from the two facilities were explicitly modeled in the attainment demonstration. Consistent with Table 8-1 of EPA's Guideline on Air Quality Models and the modeling protocol, the constant hourly SO_2 emission rate for each SO_2 release point was determined from the monthly maxima of the 2017-2019 SO_2 emissions.

Regional background of SO_2

As specified in the modeling protocol, a regional background concentration was selected to represent any other SO_2 emission sources. This regional background concentration includes sources that were not directly modeled as well as any naturally occurring SO_2 emissions. The Anacortes SO_2 monitor (AQS ID: 53-057-0011, approximately 37 km south of the Intalco facility) was chosen to represent the regional background of SO_2. Its 2017-2019 design value of 3 ppb was added to the modeled results at each receptor.

Ambient air boundary and receptor grid

The 10 km receptor grid contained 2,940 receptors and followed the modeling protocol as well as Ecology air toxics modeling guidance.[28] A polar grid centered on Intalco was used close to Intalco while outer areas utilized a Cartesian grid. The receptor grid fully encapsulates the NAA, the Intalco facility, and the Phillips 66 and BP Cherry Point refineries. Flagpole heights for all receptors were set to 1.4 m. Receptor spacing is as follows, and a far-field view of the full receptor grid is shown in **Figure 11**:

- 25 meter spacing along the ambient boundary
- 100 meter spacing out to 2,000 meters from the facility
- 300 meter spacing between 2,000 meters and 4,500 meters from the facility
- 600 meter spacing between 4,500 meters from the facility out to 10,000 meters

[27] https://apps.ecology.wa.gov/publications/documents/2002015.pdf
[28] https://apps.ecology.wa.gov/publications/documents/0802025.pdf

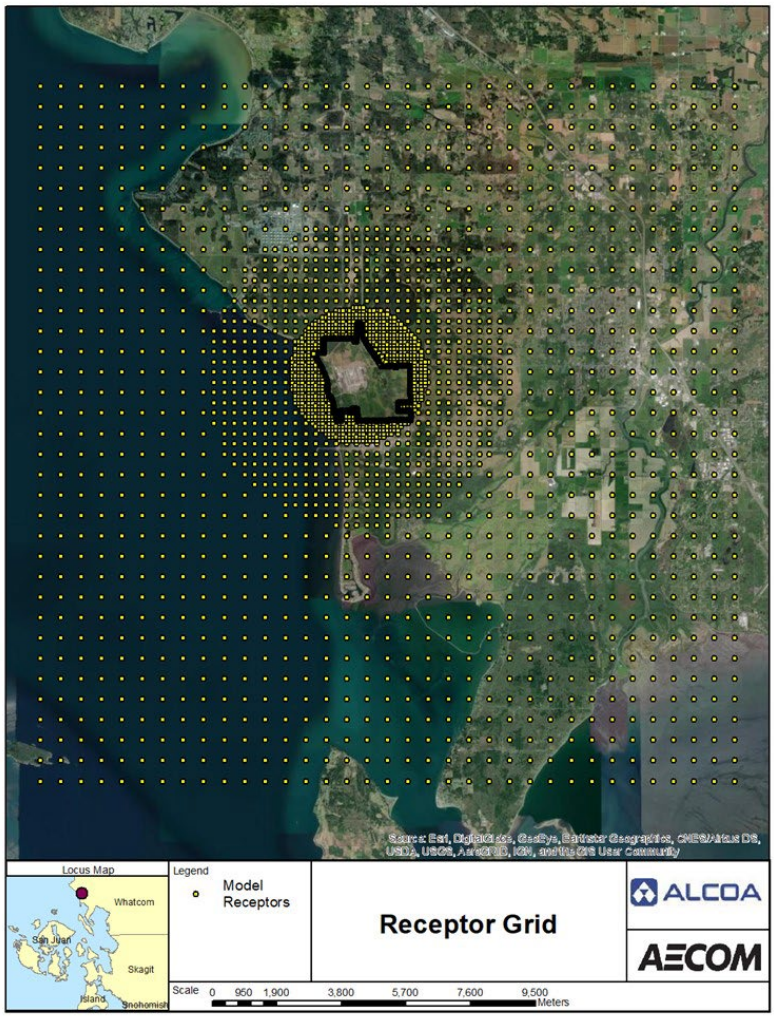

Figure 11. Far-field receptor grid view (figure is reproduced from the modeling report).

Model selection

Following the modeling protocol, the most recent version of AERMOD (version 21112) was used in this modeling demonstration. Terrain processor AERMAP version 18081, surface characteristics processor AERSURFACE version 20060, meteorological data processor AERMET version 21112, and building input processor BPIPPRM version 04274 were also utilized.

A summary of the AERMOD modeling parameters discussed in the following sections is shown in **Table 16**.

Table 16. Summary of modeling parameters

Modeling Parameter	Description
AERMOD version	21112
AERMAP version	18081

Modeling Parameter	Description
AERSURFACE version	20060
AERMET version	21112
BPIPPRM version	04274
Dispersion Characteristics	Urban, with ADJ_U*
Total Receptors	2,940 receptors Flagpole heights set to 1.4 m
Emissions Years	2017-2019
Meteorology Years	2017-2019
Surface Meteorology Site (wind speed, wind direction, ambient temperature)	Ferndale-Mountain View Road monitoring site. Wind speed and wind direction collected at 10m; ambient temperature collected at 2m.
Surface Meteorology Substitution Site	NWS ASOS Bellingham International Airport (KBLI). Data substituted for missing wind speed, wind direction, and ambient temperature. Primary dataset for cloud cover.
Upper Air Meteorology Site	Quillayute, WA (KUIL)
Upper Air Meteorology Substitution Site	Salem, OR (KSLE)

Urban heat island characterization

As of 2017, EPA's Guideline on Air Quality Models allows models to account for the added dispersion from fugitive heat generated by large industrial complexes, even if those large complexes are located in rural areas. Based on this, the Urban Dispersion option in AERMOD was utilized, with an effective population related to the excess heat estimated to be about 2 million. Only the Intalco sources were assigned Urban Source Groups. Although the regulatory default half-life of SO_2 (4 hours) is not appropriate for a rural setting, it was also used to ensure the modeling only used AERMOD v21112 with DFAULT options. As most of the SO_2 impacts are localized near the facility, this option is not expected to under-estimate design values. This characterization followed the modeling protocol.

Meteorological data processing

Surface meteorology was selected from a 2017-2019 Prevention of Significant Deterioration (PSD) quality site-specific dataset collected at the Ferndale-Mountain View Road site and processed with AERMET. The Ferndale-Mountain View Road site measures wind direction and wind speed at 10 meters and ambient temperature at 2 meters. Missing data was substituted (3.8% for wind and 4.1% for air temperature) using data from the Bellingham International

Airport (KBLI) – a nearby National Weather Service (NWS) Automated Surface Observing Station (ASOS). KBLI is located approximately 13 km to the southeast of the Ferndale-Mountain View Road site. Cloud cover data was also selected from the KBLI ASOS site.

Upper air meteorological data was selected from Quillayute Airport (KUIL), the closest NWS station providing upper air data. Substitution of missing data (0.2%) utilized the Salem, Oregon, (KSLE) station after verification that synoptic weather patterns were similar to those at Quillayute Airport.

AERSURFACE version 20060 and the USGS National Land Cover Data 2016 archives were utilized to estimate surface roughness, albedo, and Bowen ratio parameters at both the Ferndale-Mountain View Road site as well as the Bellingham International Airport KBLI site. Estimations of these meteorological site characteristics correctly followed the AERMOD Implementation Guide and the AERSURFACE User's Guide.

PSD quality meteorological performance

Meteorological monitoring sites in the Washington Ambient Air Monitoring Network, including Ferndale-Mountain View Road (AQS: 53-073-0017), follow EPA's monitoring guidelines for PSD.[29] Parameters related to wind speed, wind direction, and ambient temperature measured at the Ferndale-Mountain View Road monitoring site are applicable to this performance summary. Documentation of quality control checks, quality assurance audits, corrective action, data validation, and other files related to the meteorological data at Ferndale-Mountain View Road is available upon request.

As required in Ecology's Meteorological Monitoring Procedure,[30] quality control checks at the Ferndale-Mountain View Road site were conducted every 90 days. Ecology also requires that the ultrasonic anemometer is verified annually via wind tunnel testing by an independent laboratory (at the time Bryza Wind Lab, San Jose, CA). Ecology's Quality Assurance personnel conduct quality assurance audits minimally every 365 days. During 2017-2019, three quality assurance audits were conducted. One audit was completed in each calendar year.

Ecology's Air Monitoring Documentation, Data Review, and Validation Procedure[31] describes documentation of quality control and quality assurance activities, as well as initial data review and final data validation. Ecology Quality Assurance personnel conduct final data validation, which involves reviewing data, quality control checks and quality assurance audits, electronic logbooks, annual anemometer certifications, and any other supplementary information to ensure data collection meets the requirements stated in 40 CFR Part 58 Appendix A and Ecology's Meteorological Monitoring Procedure.

The majority of wind speed, wind direction, and ambient temperature data was valid during 2017-2019; **Figure 12** shows the percentage of data associated with valid and invalid data. Data

[29] https://www.epa.gov/nsr/ambient-monitoring-guidelines-prevention-significant-deterioration
[30] https://apps.ecology.wa.gov/publications/documents/0002003.pdf
[31] https://apps.ecology.wa.gov/publications/documents/1702013.pdf

was valid over 90% of the time during 2017-2019, satisfying the 90% completeness goal for modeling.

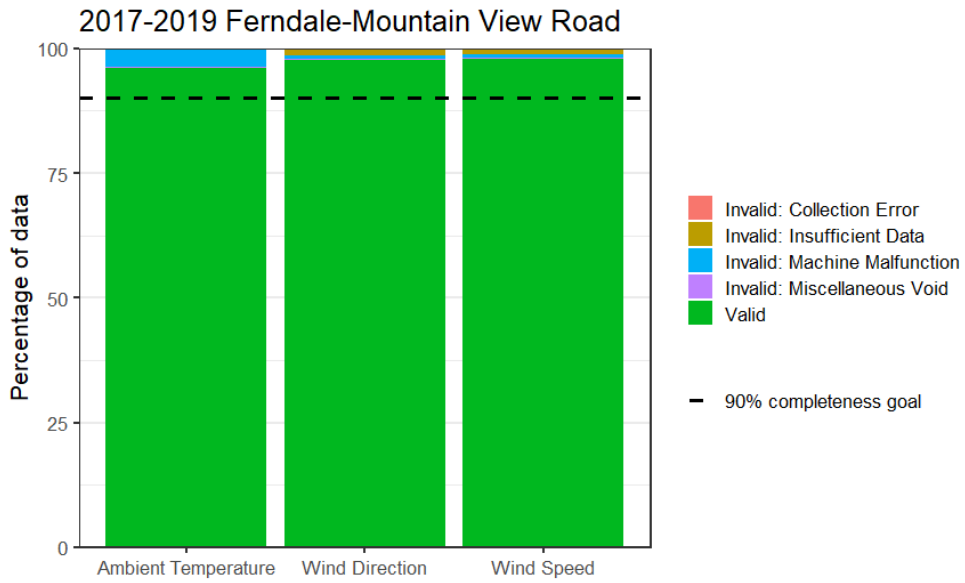

Figure 12. Percentage of data associated with valid and invalid data at the Ferndale-Mountain View Road monitoring site.

Building downwash treatment

Following the modeling protocol, building downwash effects at Intalco, Phillips 66, and BP Cherry Point refineries were accounted for with building input processor BPIPPRM version 04274.

Maximum creditable stack height analysis

Ecology requires an analysis of creditable stack heights to identify the maximum creditable stack heights applicable for reducing building downwash effects for the merged and raised Center stacks. Stacks may be raised to avoid a "significant downwash effect" as defined in WAC 173-400-200(3)(b) by conducting the following analysis:

(i) Determine the receptors with Highest 1st High (H1H) SO_2 concentrations over 75 ppb when all sources and background are considered. Use the existing un-merged individual stack configuration. On-site receptors can be included. EPA guideline model would be used.

(ii) Raise and merge "base case" stack heights in approximately 5m increments and perform two model runs, one with and another without downwash. Each time, determine the downwash effect at the violating receptors identified above. Each baghouse center should be evaluated separately using AERMOD source groups.

$$Downwash\ effect_{\ SRCGRP} = \left[\frac{(H1H\ concentration)_{with\ downwash}}{(H1H\ concentration)_{without\ downwash}}\right]_{SRCGRP}$$

(iii) The maximum creditable stack height for a source group is reached when the downwash effect at all receptors identified in (i) drop below 1.4.

The resulting analysis showed that all merged and raised Center stacks are creditable up to at least 45 m. Stacks higher than 45 m were not tested as Intalco is not planning on raising stacks higher than 45 m. The modeling results presented also use stack heights of 45 m for the six Centers and the Bake Oven Stack. The downwash analysis was conducted in accordance with the modeling protocol.

Source inputs

Intalco operations and source points

Two different attainment scenarios were modeled. Both scenarios included merging and raising of the potline dry scrubber stacks to 45 m, raising the Bake Oven Stack to 45 m, and installing one SO_2 emission control device (wet scrubber) on Center 1. Scenario 1 conservatively assumes the SO_2 emission control device is operating at 80% efficiency, although the control device is designed for at least 90% removal of SO_2. Scenario 2 assumes that the SO_2 emission control device is not operational due to maintenance or malfunction. Both scenarios involve raising stacks to 45 m to reduce building downwash effects. Potline roofline wet scrubber emissions from each building were modeled as single point sources. Source unit parameters reproduced from the modeling report are shown in **Table 17** and **Table 18**.

Emissions from the casthouse SO_2 sources were also modeled. The same emission rates were used for the casthouse emission points for both scenarios. The casthouse emission points include 12 holding furnaces, the remelt furnace, and the homogenization furnace.

Table 17. Source unit parameters utilized in Scenario 1.

Emission Unit(s) (ID)	Number of Stacks	Base Elevation (m)	Release Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)
Center 1 (DSA1)	1	65.4	45.0	3.14	20.33	303.65
Center 2 (DSA2)	1	63.9	45.0	3.11	22.86	355.37
Center 3 (DSB3)	1	62.2	45.0	3.11	22.86	355.37
Center 4 (DSB4)	1	61.4	45.0	3.11	22.86	355.37
Center 5 (DSC5)	1	59.7	45.0	3.11	22.86	355.37
Center 6 (DSC6)	1	59.0	45.0	3.11	22.86	355.37
Roofline Wet Scrubbers on Building A1 (A1_13)	1	65.4	15.2	21.06	4.31	291.76
Roofline Wet Scrubbers on Building A2 (A2_13)	1	64.1	15.2	20.68	4.31	291.76

Emission Unit(s) (ID)	Number of Stacks	Base Elevation (m)	Release Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)
Roofline Wet Scrubbers on Building B1 (B1_13)	1	62.9	15.2	20.29	4.31	291.76
Roofline Wet Scrubbers on Building B2 (B2_13)	1	61.7	15.2	20.29	4.31	291.76
Roofline Wet Scrubbers on Building C1 (C1_13)	1	60.5	15.2	20.29	4.31	291.76
Roofline Wet Scrubbers on Building C2 (C2_13)	1	59.3	15.2	20.29	4.31	291.76
Bake Oven Baghouse (BAKEOVEN)	1	57.5	45.0	2.13	15.64	341.3
Casthouse Holding Furnaces 1-6 (CAST1_6)	6	70.4	26.9	0.79	13.80	532.5
Casthouse Holding Furnaces 7 & 8 (CAST7_8)	2	70.7	23.2	0.79	13.80	532.5
Casthouse Holding Furnaces 9 & 10 (CAST9_10)	2	70.2	18.4	0.79	13.80	532.5
Casthouse Holding Furnaces 11 & 12 (CAST11_12)	2	68.8	23.2	0.79	13.80	532.5
Remelt Furnace (REMELT)	1	67.4	10.8	0.91	6.04	463.69
Homogenization Furnace (HGF)	1	66.4	19.8	0.76	7.33	451.48

Table 18. Source unit parameters utilized in Scenario 2.

Emission Unit(s) (ID)	Number of Stacks	Base Elevation (m)	Release Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)
Center 1 (DSA1)	1	65.4	45.0	3.14	22.42	355.37
Center 2 (DSA2)	1	63.9	45.0	3.11	22.86	355.37

Emission Unit(s) (ID)	Number of Stacks	Base Elevation (m)	Release Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)
Center 3 (DSB3)	1	62.2	45.0	3.11	22.86	355.37
Center 4 (DSB4)	1	61.4	45.0	3.11	22.86	355.37
Center 5 (DSC5)	1	59.7	45.0	3.11	22.86	355.37
Center 6 (DSC6)	1	59.0	45.0	3.11	22.86	355.37
Roofline Wet Scrubbers on Building A1 (A1_13)	1	65.4	15.2	21.06	4.31	291.76
Roofline Wet Scrubbers on Building A2 (A2_13)	1	64.1	15.2	20.68	4.31	291.76
Roofline Wet Scrubber B1 (B1_13)	1	62.9	15.2	20.29	4.31	291.76
Roofline Wet Scrubbers on Building B2 (B2_13)	1	61.7	15.2	20.29	4.31	291.76
Roofline Wet Scrubbers on Building C1 (C1_13)	1	60.5	15.2	20.29	4.31	291.76
Roofline Wet Scrubbers on Building C2 (C2_13)	1	59.3	15.2	20.29	4.31	291.76
Bake Oven Baghouse (BAKEOVEN)	1	57.5	45.0	2.13	15.64	341.3
Casthouse Holding Furnaces 1-6 (CAST1_6)	6	70.4	26.9	0.79	13.80	532.5
Casthouse Holding Furnaces 7 & 8 (CAST7_8)	2	70.7	23.2	0.79	13.80	532.5
Casthouse Holding Furnace 9 & 10 (CAST9_10)	2	70.2	18.4	0.79	13.80	532.5
Casthouse Holding Furnaces 11 & 12 (CAST11_12)	2	68.8	23.2	0.79	13.80	532.5
Remelt Furnace (REMELT)	1	67.4	10.8	0.91	6.04	463.69

Emission Unit(s) (ID)	Number of Stacks	Base Elevation (m)	Release Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)
Homogenization Furnace (HGF)	1	66.4	19.8	0.76	7.33	451.48

Scenario 1 modeling included five separate modeling exercises in which the SO_2 emission control device on Center 1 was assumed to be operational at 80% control. The remaining five Center stacks have hourly emission rates that allow any one of the remaining Centers 2-6 to emit as high as 400 lb/hr as long as none of the other Centers exceed an emission rate of 320 lb/hour.

Modeling of Scenario 2 included six separate modeling exercises in which the SO_2 emission control device was assumed to be non-operational with an hourly SO_2 emission rate of either 280 or 350 lb/hr. Any one of the remaining Centers 2-6 can emit as high as 400 lb/hr if all of the other Centers 1-6 do not exceed an emission rate of 280 lb/hr. If Center 1 is emitting up to 350 lb/hr, Centers 2-6 must have an emission rate less than 280 lb/hr.

The modeled hourly emission rates in Scenarios 1 and 2 account for variability in the dry alumina scrubbing of the Centers and are expected to be significantly higher than the actual emission rates from the Centers. The hourly emission rates for the bake oven scrubber and casthouse sources remained constant in each modeling exercise and both scenarios. These emission rates are also significantly higher than the expected actual emission rates. Emission rates for all SO_2 sources for both scenarios are shown in **Table 19**.

Table 19. SO_2 Emission rates for each modeling scenario.

Emission Unit ID	Scenario 1, lb/hr	Scenario 1, g/s	Scenario 2, lb/hr	Scenario 2, g/s
DSA1 (Center 1)	70	8.82	350 / 280	44.10 / 35.28
DSA2 (Center 2)	400 / 320	50.40 / 40.32	400 / 280	50.40 / 35.28
DSB3 (Center 3)	400 / 320	50.40 / 40.32	400 / 280	50.40 / 35.28
DSB4 (Center 4)	400 / 320	50.40 / 40.32	400 / 280	50.40 / 35.28
DSC5 (Center 5)	400 / 320	50.40 / 40.32	400 / 280	50.40 / 35.28
DSC6 (Center 6)	400 / 320	50.40 / 40.32	400 / 280	50.40 / 35.28
Roofline Wet Scrubbers – Per Building (each)	8.75	1.10	8.75	1.10
BAKEOVEN (Bake Oven Baghouse)	117.5	14.80	117.5	14.80
CAST1_6 (Casthouse Holding Furnaces 1-6)	0.273	0.0344	0.273	0.0344

Emission Unit ID	Scenario 1, lb/hr	Scenario 1, g/s	Scenario 2, lb/hr	Scenario 2, g/s
CAST7_8 (Casthouse Holding Furnaces 7 & 8)	0.091	0.0115	0.091	0.0115
CAST9_10 (Casthouse Holding Furnaces 9 & 10)	0.091	0.0115	0.091	0.0115
CAST11_12 (Casthouse Holding Furnaces 11 & 12)	0.091	0.0115	0.091	0.0115
REMELT (Remelt Furnace)	0.056	0.0071	0.056	0.0071
HGF (Homogenization Furnace)	0.105	0.0132	0.105	0.0132

Modeling results

Modeled emissions and results

All modeling results, presented as the 99th percentile daily maximum 1-hour SO_2 concentrations averaged over three years, showed compliance with the NAAQS. Modeling results, adapted from the modeling report, are shown in **Table 20** and **Table 21**. Total maximum design concentrations for each modeling scenario ranged from 93.4 – 99.9% of the NAAQS.

These modeling results demonstrate future compliance with the SO_2 NAAQS. The modeling presented assumes conservatism in the SO_2 emission control device (modeled at 80% efficiency despite being designed for 90% efficiency), explicitly modeling scenarios if the SO_2 emission control device is non-operational and including the maximum monthly average emissions of the nearby modeled refineries to assume that the nearby sources emit constantly at the highest monthly emission rate.

Scenario 1 includes modeling Center 1 with the SO_2 wet scrubber operational. Five separate modeling runs were completed for Scenario 1. The modeling runs are described below, and the results of the model runs are included in **Table 20**.

1. Model Run 1: Center 1 at 70 lb/hr, Center 2 at 400 lb/hr, and all other Centers (3-6) at 320 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.
2. Model Run 2: Center 1 at 70 lb/hr, Center 3 at 400 lb/hr, and all other Centers (2 and 4-6) at 320 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.
3. Model Run 3: Center 1 at 70 lb/hr, Center 4 at 400 lb/hr, and all other Centers (2, 3, 5, & 6) at 320 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.

4. Model Run 4: Center 1 at 70 lb/hr, Center 5 at 400 lb/hr, and all other Centers (2-4 & 6) at 320 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.
5. Model Run 5: Center 1 at 70 lb/hr, Center 6 at 400 lb/hr, and all other Centers (2-5) at 320 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.

Table 20. Scenario 1 modeling results for the 1-hour SO_2 NAAQS.

Modeling Run Number	Maximum Modeled Concentration (µg/m³)	Background Concentration (µg/m³)	Total Maximum Modeled Concentration (µg/m³)	NAAQS (µg/m³)	Percent of NAAQS
1	180.5	7.9	188.4	196.4	95.9%
2	178.6	7.9	186.4	196.4	95.0%
3	183.0	7.9	190.8	196.4	97.2%
4	175.6	7.9	183.5	196.4	93.4%
5	188.4	7.9	196.3	196.4	99.9%

Scenario 2 includes modeling Center 1 with the SO_2 wet scrubber not operational. Six separate modeling runs were completed for Scenario 2. The modeling runs are described below, and the results of the model runs are included in **Table 21**.

1. Model Run 1: Center 1 at 350 lb/hr and all other Centers (2-6) at 280 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.
2. Model Run 2: Center 2 at 400 lb/hr and all other Centers (1 & 3-6) at 280 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.
3. Model Run 3: Center 3 at 400 lb/hr and all other Centers (1, 2, & 4-6) at 280 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.
4. Model Run 4: Center 4 at 400 lb/hr and all other Centers (1-3, 5, & 6) at 280 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.
5. Model Run 5: Center 5 at 400 lb/hr and all other Centers (1-4 & 6) at 280 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.
6. Model Run 6: Center 6 at 400 lb/hr and all other Centers (1-5) at 280 lb/hr. Each roofline wet scrubber point at 8.75 lb/hr and the bake oven at 117.5 lb/hr. Cumulative casthouse emissions at 0.7 lb/hr.

Table 21. Scenario 2 modeling results for the 1-hour SO_2 NAAQS.

Modeling Run Number	Maximum Modeled Concentration (µg/m³)	Background Concentration (µg/m³)	Total Maximum Modeled Concentration (µg/m³)	NAAQS (µg/m³)	Percent of NAAQS
1	184.4	7.9	192.3	196.4	97.9%
2	179.9	7.9	187.8	196.4	95.6%
3	188.1	7.9	196.0	196.4	99.8%
4	182.4	7.9	190.3	196.4	96.9%
5	180.3	7.9	188.2	196.4	95.8%
6	187.1	7.9	195.0	196.4	99.3%

Analysis of maximum modeled impact receptor locations

The receptors impacted by the maximum modeled concentrations in each scenario are generally located near the ambient air boundary (plant fenceline). To demonstrate the maximally impacted receptor locations, modeling case Run 5 from Scenario 1 and modeling case Run 3 from Scenario 2 were selected to show the locations of the top ten impacted receptors in each modeling run. As shown in **Table 20** and **Table 21**, both of these modeling cases have the highest design concentrations of all cases modeled.

Table 22 and **Figure 13** show the maximum modeled concentration receptor locations for Run 5, Scenario 1. This modeling run included the SO_2 wet scrubber on Center 1 and Center 6 at the maximum emission rate of 400 lbs/hr.

Table 22. Locations of the ten highest design concentration receptors for Run 5, Scenario 1.

Modeled Concentration Ranking (Highest to Lowest)	Receptor Location (UTM)	Total Design Concentration (µg/m³)	Receptor Orientation with respect to Facility Fenceline
1	X: 520,945.0 Y: 5,409,750	196.3	Southwest
2	X: 520,923.5 Y: 5,409,752	193.5	Southwest
3	X: 520,952.6 Y: 5,409,730	193.5	Southwest
4	X: 520,960.2 Y: 5,409,710	191.9	Southwest
5	X: 520,901.9 Y: 5,409,710	191.9	Southwest

Modeled Concentration Ranking (Highest to Lowest)	Receptor Location (UTM)	Total Design Concentration ($\mu g/m^3$)	Receptor Orientation with respect to Facility Fenceline
6	X: 520,967.8 Y: 5,409,691	188.9	Southwest
7	X: 520,880.3 Y: 5,409,755	188.4	Southwest
8	X: 520,975.4 Y: 5,409,671	187.2	Southwest
9	X: 520,876.4 Y: 5,409,777	184.7	Southwest
10	X: 521,622.4 Y: 5,411,365	181.8	North

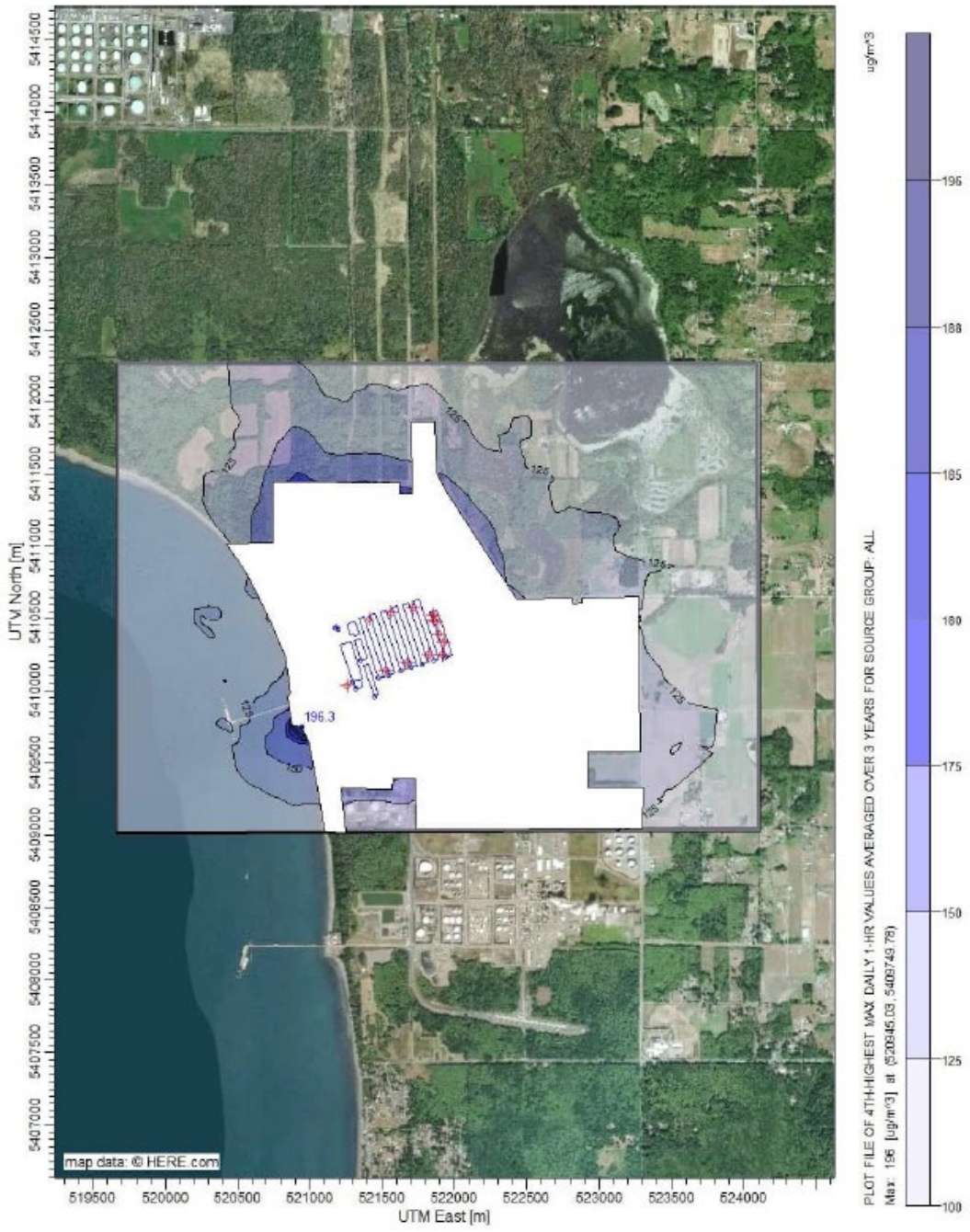

Figure 13. Location of maximum impacted receptor for Run 5, Scenario 1.

Table 23 and **Figure 14** show the maximum modeled concentration receptor locations for Run 3, Scenario 2. For this model run, the SO_2 wet scrubber on Center 1 is not operational and Center 3 is modeled with a maximum emission rate of 400 lbs/hr.

Table 23. Locations of the ten highest design concentration receptors for Run 3, Scenario 2.

Modeled Concentration Ranking (Highest to Lowest)	Receptor Location (UTM)	Total Design Concentration (µg/m³)	Receptor Orientation with respect to Facility Fenceline
1	X: 521,622.4 Y: 5,411,365	196.0	North
2	X: 521,708.2 Y: 5,411,365	195.5	North
3	X: 521,707.0 Y: 5,411,367	195.0	North
4	X: 521,665.3 Y: 5,411,365	195.0	North
5	X: 521,686.8 Y: 5,411,365	194.7	North
6	X: 521,643.9 Y: 5,411,365	194.5	North
7	X: 521,621.6 Y: 5,411,385	192.6	North
8	X: 522,012.3 Y: 5,411,275	192.6	North-Northeast
9	X: 522,025.9 Y: 5,411,254	192.5	North-Northeast
10	X: 522,039.4 Y: 5,411,234	192.3	North-Northeast

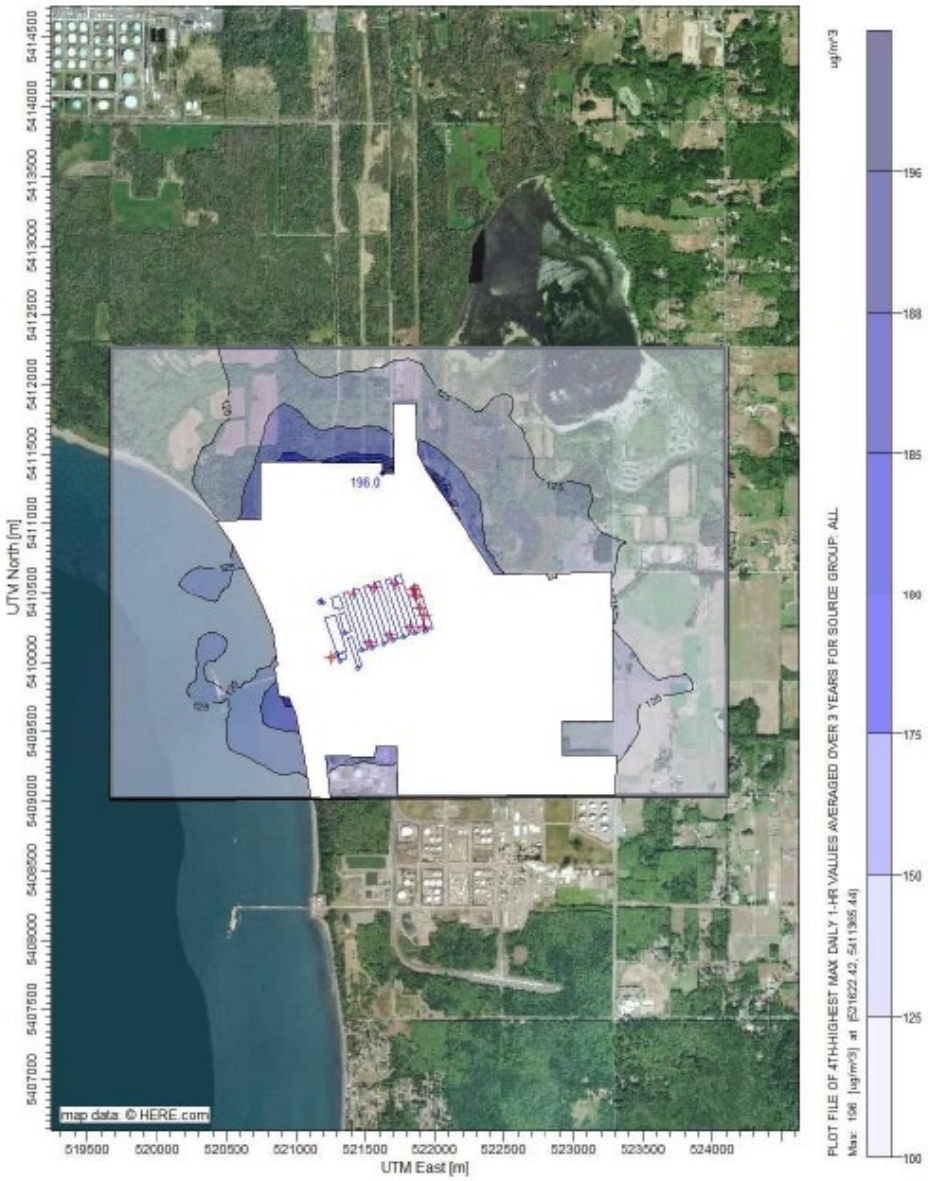

Figure 14. Location of maximum impacted receptor for Run 3, Scenario 2.

Attainment demonstration summary

Consulting firm AECOM, contracted by Intalco, conducted air quality dispersion modeling of the attainment strategy scenarios using an EPA approved air quality dispersion model. Ecology reviewed the modeling and concurred that it demonstrated attainment with the SO_2 NAAQS. Intalco's attainment strategy includes the adoption of a facility-wide SO_2 emission limit of 5,000 tpy, as well as merging and raising all potline dry scrubber stacks and the Bake Oven Stack to 45 m. One SO_2 emission control device, designed to remove 90% of emissions, will also be installed.

The AO contains enforceable limits of the modeled values showing compliance with the SO_2 NAAQS. Compliance with the hourly emission limits will be determined using continuous monitoring systems (CMS) or quarterly stack testing.

Reasonable Further Progress

CAA defines the term "reasonable further progress" (RFP) as such annual incremental reductions in emissions of the relevant air pollutant as are required or may reasonably be required for the purpose of ensuring attainment of the applicable NAAQS by the attainment date. This concept is helpful for nonattainment areas where there are multiple emission sources and where the reductions can only occur in a phased or staggered approach after the initial phase of controls installation.

EPA recognizes that in the case with many SO_2 emission sources and nonattainment areas, RFP "is generally less pertinent to pollutants like SO_2 that usually have a limited number of sources affecting areas of air quality which are relatively well defined, and emissions control measures for such sources result in swift and dramatic improvement in air quality…Therefore, for $S0_2$ … RFP is best construed as adherence to an ambitious compliance schedule."[32]

Intalco SO_2 attainment compliance schedule

As discussed in the "Attainment Strategy" chapter, Ecology is issuing an SO_2 Attainment Agreed Order No. 21310 that includes appropriate compliance schedules. Given the current curtailment at the facility and uncertainty regarding the timing of the restart, there are two possible compliance schedules. The AO:

1) Requires installation of controls by a certain date; and
2) If restart occurs after the date described in number 1 above, the facility can install controls later, but installation must be completed before restarting operations at the facility.

This decision allows for the area to attain the standard by the attainment date and thereafter but takes into account the fact that the facility will need time to make the required changes to the facility. The compliance schedule includes time required for Intalco to obtain the appropriate permits prior to construction, order and receive all of the required construction materials, and perform the construction activities.

The following are specific compliance dates as outlined in the AO:

1) Upon restart of any potline operations, the facility will be subject to the 5,000 tons per year facility-wide SO_2 limit.
2) If the facility restarts operations of its potlines before April 30, 2025, the wet scrubber must be installed and operational, and stacks from the potline baghouse centers must be merged into six individual raised stacks no later than April 30, 2025.

[32] 2014 Guidance at pdf pg. 46

3) If the facility restarts potline operations after April 30, 2025, the wet scrubber must be installed and operational, and stacks from the potline baghouse centers must be merged into six individual raised stacks before the potline operations commence.

4) The hourly emission limits at the potline baghouse centers, bake oven baghouse, and the casthouse will go into effect on April 30, 2025, or upon restart of potline operations if operations are curtailed on this date.

Contingency Measures

Section 172(c)(9) of the CAA requires that the attainment SIP provide for specific contingency measures to be implemented if a nonattainment area fails to:

- Make reasonable further progress, or
- Meet the NAAQS by the applicable attainment date.

The contingency measures must:

- Become effective without further action by the state or EPA, and
- Consist of control measures not already included in the control strategy.

EPA explained their approach to evaluating states' SO_2 SIP contingency measures in several guidance documents. In the "General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990," published on April 16, 1992, at 57 Fed. Reg. 13, 498, EPA stated that in many cases attainment revolves around compliance of a single source, like the case with the Intalco SO_2 nonattainment area, with emission limits shown to provide for attainment. This guidance concludes that in such cases, "EPA interprets 'contingency measures' to mean that the state agency has a comprehensive program to identify sources of violations of the SO_2 NAAQS and to undertake an aggressive follow-up for compliance and enforcement including expedited procedures for establishing enforceable consent agreements pending the adoption of revised SIPs."

EPA's 2014 memo Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions[33] further states: "Since SO_2 control measures are by definition based on what is directly and quantifiably necessary to attain the SO_2 NAAQS, it would be unlikely for an area to implement the necessary emission controls yet fail to attain the NAAQS. Therefore, for SO_2 programs, EPA has explained that "contingency measures" can mean that the air agency has a comprehensive program to identify sources of violations of the SO_2 NAAQS and to undertake an "aggressive" follow-up for compliance and enforcement, including expedited procedures for establishing enforcement consent agreements pending the adoption of the revised SIP."

Separately, the 9th Circuit in Bahr v EPA[34] for an attainment plan addressing $PM_{2.5}$ issues asserted that "under the plain language of § 7502(c)(9) contingency measures are measures that will be taken in the future, not measures that have already been implemented."

Washington's approach to contingency measures described below is intended to comply with the above requirements and follows guidance recommendations. We identified "thresholds" –

[33] Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions. Stephen D. Page Memorandum dated April 23, 2014, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, available at: https://www.epa.gov/so2-pollution/guidance-1-hour-sulfur-dioxide-so2-nonattainment-areastate-implementation-plans-sip (pages 47-48)

[34] https://cdn.ca9.uscourts.gov/datastore/opinions/2016/09/12/14-72327.pdf

levels that would prompt Washington into implementing additional (contingency) measures on the specific timeline not established or required otherwise.

Contingency measure thresholds

Ecology will begin implementing contingency measures, as described further below in the Plan, when monitoring data exceeds any of the following thresholds:

1) No later than March 31, 2026, Ecology will complete its review of the ambient air quality monitoring data collected between May 1, 2025, and December 31, 2025, from the two SO_2 monitoring sites within the nonattainment area. The contingency measures specified below will be implemented if Ecology finds the 99th percentile value[35] of the data collected during that eight-month period exceeds 75 ppb (the SO_2 NAAQS).
2) Starting in 2027, no later than March 31 of each year, Ecology will complete its review of the ambient air quality monitoring data collected for the previous calendar year from the two SO_2 monitoring sites within the nonattainment area. The contingency measures specified below will be implemented if Ecology finds the 99th percentile value[35] of the data collected during the previous calendar year exceeds 75 ppb (the SO_2 NAAQS).
3) Starting in 2028, no later than March 31 of each year, Ecology will complete its review of the ambient air quality monitoring data collected for the previous three calendar years (starting with 2025-2027 period) from the two SO_2 monitoring sites within the nonattainment area to identify if there was a potential violation of the standard. If Ecology finds the Design Value of the data collected during the previous three-year period exceeds 67.5 ppb (90% of the SO_2 NAAQS), Ecology must implement contingency measures below.

These thresholds are based on the existing robust process of air quality monitoring data collection and review. Ecology's Air Quality Monitoring Quality Assurance (QA) staff reviews the monitoring data daily for *potential* exceedances and submits an exceedance notification and confirmation to Ecology, NWCAA, and EPA within three business days following any monitored exceedance.[36] These preliminary notifications of potential exceedances contain a caveat that the data have yet to be reviewed for accuracy and may not represent an actual exceedance of the standard.

The thresholds identified above were established in order to ensure Washington will be able to implement contingency measures before an actual violation of the standard occurs, using monitoring data that is certified. Specifically:

- The first threshold identified above addresses the CAA requirement to make Reasonable Further Progress before the attainment date of April 30, 2026.

[35] Calculated according to 40 CFR 50 Appendix T-5 – Calculation Procedures for the 1-Hour Primary SO_2 NAAQS.
[36] Performance partnership agreement with EPA (condition of EPA's funding of Ecology's qa/qc)

- The second threshold identified above requires Washington to initiate contingency measures if the first full calendar year of monitoring data indicates the 99th percentile value is above 75 ppb.
- The third threshold identified above requires Washington to initiate contingency measures if the first three years of monitoring data indicates the resulting DV exceeds 90% of the NAAQS level of 75 ppb.

The monitoring data that Ecology will use to identify if any of the above thresholds have been exceeded is publicly available.[37] The public and EPA will be able to independently oversee and thus enforce implementation of the contingency measures' thresholds in a timely manner as well.

In addition to the three thresholds identified above, if EPA makes a determination that the area has failed to attain the SO_2 NAAQS by the attainment date under CAA Section 179(c)(1), Ecology will analyze the monitoring data EPA used in their determination. If the data used in EPA's determination is representative of emissions after installation and operation of the control strategy described in the Pollution Controls and SO_2 Attainment Strategy Chapter of this Plan, Ecology will determine what additional controls (if any) may be necessary to bring the area back into attainment.

Contingency measures

Should any of the above threshold exceedances occur, Ecology must first determine which of the following, or a combination thereof, caused the exceedance: (1) Intalco's violation of the AO and/or other applicable requirements such as permit conditions; (2) emissions from another source located within or near the nonattainment area; or (3) an unknown cause. If Ecology determines the exceedance was a result of Intalco's non-compliance with the AO, or other requirements including permit conditions, Ecology will undertake enforcement actions in accordance with current agency policy and guidance related to compliance and enforcement. If Ecology determines that Intalco was in compliance with all applicable requirements, during the time period evaluated, Ecology will coordinate with NWCAA to determine the cause(s) of the exceedance and to impose additional control measures within 18 months, as necessary.

Thus, Ecology would undertake the following actions:

Initial notification, operational audit, and meteorological review

On or before March 31 of each year, following Ecology's review of the monitoring data from the two monitoring stations (Ferndale-Kickerville Road and Ferndale-Mountain View Road monitors), if a threshold exceedance as described previously is discovered, Ecology will notify Intalco of the exceedance and require Intalco to conduct an audit and submit an audit report within 60 days. Upon receipt of the notification, Intalco will be required to:

- Undertake an operational audit of all of the facility's emission units that are subject to control under the AO and NAA plan.

[37] https://www.epa.gov/outdoor-air-quality-data

- Submit a written operational audit report to Ecology within 60 days. The written operational audit report will detail:
    - The operating parameters of all emissions units subject to control under the AO and NAA plan. Intalco must include operating parameters for each operating period for which the Ferndale-Kickerville Road monitor or Ferndale-Mountain View Road monitor register an exceedance of 75 ppb. For purposes of this operational audit, operating period is defined as the date of the exceedance and the 10 calendar days prior to the date of the measured exceedance.
    - If there are practicable methods for further reducing SO_2 emissions from the facility, the audit report must include recommended provisional SO_2 emission control strategies for each affected unit.

Upon receipt of the written operational audit report, Ecology will coordinate with NWCAA to review the cause(s) of the threshold exceedance. Ecology's and NWCAA's reviews will include an evaluation of Intalco's operational audit report, the monitoring data, and meteorological data for each monitored exceedance above the specified threshold value.

Ecology would rely on its authority under Revised Code of Washington (RCW) 70A.15.2040(4), which expressly authorizes Ecology to require the facility to provide information specific to the control or release of air contaminants, including SO_2, into the atmosphere. This request would also effectuate the purpose of the provisions in WAC 173-400-105, which requires the owner or operator of an emissions source to maintain records as necessary to determine if the source is in compliance with applicable emission limitations and control measures.

Enforcement if there is an identified violation of the Agreed Order 21310

Because the SO_2 control measures outlined in the Pollution Controls and SO_2 Attainment Strategy chapter of this Plan are based on what the modeling demonstrates is quantifiably sufficient to attain the SO_2 NAAQS, it would be unlikely for the area to fail to achieve attainment after Intalco implements the required emission controls. Therefore, for control of SO_2 contingency measures, Ecology will continue to operate a comprehensive compliance monitoring program to identify sources of potential violations of the SO_2 NAAQS and will undertake all appropriate compliance and enforcement actions, including expedited procedures for establishing consent agreements pending the adoption of a revised SIP. This is consistent with the approach for the implementation of contingency measures to address the 2010 SO_2 NAAQS as described in EPA guidance.

If a threshold exceedance occurs and Intalco has complied with the Agreed Order

If Ecology determines that Intalco is in compliance with the AO and all other applicable requirements, Ecology and NWCAA will coordinate to determine the cause of the exceedance, propose a revision to the controls identified in the SIP, as necessary, and implement additional controls, as necessary, within 18 months of the determination date of the threshold exceedance.

Threshold exceedance caused by Intalco's operations

If operations at the Intalco facility are determined to be a cause of the threshold exceedance, Ecology will initiate a consultation period with Intalco to develop and evaluate potential operational changes. Upon completion of this consultation period, Ecology will issue a compliance order requiring Intalco to implement one or more operational changes as necessary to reasonably prevent any future monitored violation of the standard. These operational changes could include, but would not be limited to:

- Establishing new operating limits for sulfur content in calcined petroleum coke/pitch/green anodes
- Installing and operating an additional wet scrubber on a center
- Identifying and minimizing any significant sources of fugitive emissions
- Implementing physical or operational reduction of production capacity, as appropriate

Any necessary operational changes would be implemented as soon as practicable, with at least one change implemented within 18 months of the date that a threshold exceedance is identified, in order to bring the area into attainment as expeditiously as possible.

To issue the compliance order requiring implementation of operational controls in response to a threshold exceedance, Ecology would rely on its authority under RCW 70A.15.2040(3), in conjunction with 70A.15.3000(1), to issue orders as necessary to implement the requirements of the Washington CAA and the Federal CAA.

Threshold exceedance not caused by Intalco's operations

If Ecology and NWCAA determine that emissions from the Intalco facility are not the cause of a threshold exceedance, the following specific contingency measures will be implemented:

1) No later than 12 months after the identification of a threshold exceedance, Ecology and NWCAA will submit to EPA a detailed plan of action specifying additional control measures to be implemented.
2) The additional control measures will be implemented no later than 18 months following identification of a threshold exceedance.
3) The additional control measures will be shared with the public for review and comment and submitted to EPA for approval and incorporation into the SIP.

All contingency measures would become applicable immediately upon Ecology's determination of a threshold exceedance, without the need for additional action by EPA or the public.

Nonattainment New Source Review Permit Program

EPA requires that states review their New Source Review (NSR) rules when an area is designated as nonattainment. Nonattainment NSR rules must enable the appropriate permitting of any major stationary source of SO_2 within the nonattainment area. If the existing rules are not sufficient to attain the air quality standard within the nonattainment area, the state must revise their nonattainment NSR programs or develop new ones within 18 months of the designation. Ecology has rules that cover both major new sources/modifications and minor new sources/modifications. Projects may have pollutants with a major increase and other pollutants with a minor increase. In those cases, two construction permits would be required.

Major sources / modifications in nonattainment areas

Currently there is only one major source located within the nonattainment area, Intalco. As discussed above, Intalco is a source that is regulated by Ecology. Therefore, if Intalco requested a major modification to their facility, the project would be subject to new source review permitting through Ecology. For SO_2, the applicable regulations would be WAC 173-400-800 through WAC 173-400-860.

If another major source of SO_2 that is not specifically regulated by Ecology proposed to be located within the nonattainment area, they would be subject to new source review permitting through NWCAA, and possibly Ecology if the source would be a new major source for other criteria pollutants. For SO_2, the applicable regulation is WAC 173-400.

Review of Existing Regulations

Ecology and NWCAA consulted with EPA early on following the designation of the area. We determined that our existing state and local rules were sufficient and did not require a revision. Thus, we did not initiate a rulemaking process. Moreover, both Ecology and NWCAA rules that would support proper permitting within the nonattainment area are a part of the SIP-approved body of regulations and thus federally enforceable. Washington's permitting programs, including nonattainment NSR, are codified in the SIP under 40 CFR part 52, subpart WW.

Washington Clean Air Act

Washington Clean Air Act is codified under Chapter 70A.15 of the RCW. It authorizes Ecology and local clean air agencies to adopt rules and regulations to attain, maintain, enhance, and protect air quality. This includes revisions to SIPs and review of nonattainment NSR permit program.

Ecology rules applicable to nonattainment areas

Ecology statewide and source-specific nonattainment NSR rules that apply to the Intalco SO_2 Nonattainment Area are addressed in Chapter 173-400 WAC. Specific sections of the Chapter that apply to nonattainment are discussed below. Chapter 173-400-112 provides direct rules on requirements for new sources in a nonattainment area. It includes review for compliance with regulations, provides regulations for permitting new or modified sources within a non-

attainment area. It also requires that new or modified SO_2 emissions in the non-attainment area requires the use of the lowest achievable emission rate (LAER) to determine controls and for non-SO_2 emissions, the use of best available control technology (BACT) is required.

Chapter 173-400 WAC "General Air Quality Regulations"

This chapter establishes technically feasible and reasonably attainable standards and to establish rules generally applicable to the control and/or prevention of the emission of air contaminants. The chapter has subparts, described below, with requirements for permitting in nonattainment areas.

Section 173-400-040 WAC "General standards for maximum emissions"

WAC 173-400-040(58) defines a Nonattainment area as "a geographic area designated by EPA at 40 C.F.R. Part 81 as exceeding a National Ambient Air Quality Standard (NAAQS) for a given criteria pollutant. An area is nonattainment only for the pollutants for which the area has been designated nonattainment."

(SIP State Adopted 7/1/2016; EPA effective 10/6/16; 81 FR 69386).

WAC 173-400-036 "Relocation of portable sources"

Portable sources may, without obtaining site-specific or permitting authority-specific order of approval, relocate and operate in any jurisdiction in which the permitting authority has adopted this section by reference. As these sources could affect a nonattainment area, WAC 173-400-036(2) requires that "if a portable source is locating in a nonattainment area and if the source emits the pollutants or pollutant precursors for which the area is classified as nonattainment, then the source must acquire a site-specific order of approval." Site-Specific order of approvals in nonattainment areas are described below.

WAC 173-400-110 "New source review (NSR) for sources and portable sources"

WAC 173-400-110(2) requires that an "applicant must evaluate the proposed project and submit an application addressing all applicable new source review requirements of this chapter." WAC 173-400-110(2)(b) states that "if the proposed project is a new major stationary source or a major modification, located in a designated nonattainment area, and if the project emits the air pollutant or precursors of the air pollutant for which the area is designated nonattainment, and the project meets the applicability criteria in WAC 173-400-820, then the project is subject to the permitting requirements of WAC 173-400-800 through 173-400-860."

WAC 173-400-111 Processing notice of construction applications for sources, stationary sources, and portable sources

WAC 173-400-111(3) requires that an order of approval cannot be issued until specific criteria is met. One of the required criteria, WAC 173-400-111(3)(g) is meeting "the requirements of WAC **173-400-800** through **173-400-860**." The conditions in 800 through 860 are applicable to major stationary sources and major modifications in nonattainment areas and are discussed below.

WAC 173-400-112 "Requirements for new sources in nonattainment areas"

WAC 173-400-112(4) requires that any new or modified source will not cause any ambient air quality standard to be exceeded and will not violate the requirements for reasonable further progress established by the SIP.

Section 173-400-112 WAC "Requirements for New Sources in Nonattainment Areas" (State adopted date 12/29/12; EPA effective date 9/29/2016; 81 FR 66825).

WAC 173-400-113 New sources in attainment or unclassifiable areas—Review for compliance with regulations

WAC 173-400-113 provides threshold values where the allowable emissions from new major stationary sources or the projected impact from the proposed major modification at any location with a nonattainment area, the emissions are considered as not causing or contributing to a violation of an ambient air standard. For SO_2 emissions the threshold value is 1.0 microgram per cubic meter ($\mu g/m^3$) for an annual average, 5 $\mu g/m^3$ for a 24-hour average, 25 $\mu g/m^3$ for a 3-hour average, and 30 $\mu g/m^3$ for a 1-hour average.

WAC 173-400-113(4)(b) provides for when a project does exceed the threshold values above, the owner or operator may use an offsetting emission reduction or other method identified in 40 C.F.R. Part 51 Appendix S, Sections III and IV.A which reduce the projected impact to the threshold values above or less. If the owner or operator of the proposed new major stationary source or major source proposed to be modified is unable to reduce emissions or obtain offsetting emissions reductions adequate to reduce modeled impacts below the threshold values above, then the permitting authority shall deny approval to construct and operate the proposed new major stationary source or major modification.

WAC 173-400-800 to 860

WAC 173-400-800 through 860 apply to major stationary source and major modification in a nonattainment area. They apply site wide except where a permitting authority has a permitting program for major stationary sources in a nonattainment area incorporated in the Washington State implementation plan as replacement for these sections. EPA has already approved these sections in the SIP and EPA requirements have not changed in any way for SO_2 since approval. Therefore, Ecology is meeting all requirements for SO_2 NSR.

NWCAA received approval for Section 300 of their regulations covering the NSR rules on June 15, 2020, in 85 FR 36156. EPA requirements have not changed in any way for SO_2 since approval and, therefore, Section 300 regulations meet all requirements for SO_2 new source review.

Chapter 173- 476 WAC "Ambient Air Quality Standards"

Chapter 173-476 WAC ensures that the existing permitting programs codified in the SIP under 40 CFR part 52, subpart WW continue to meet the emission limitation and control measure requirements needed to attain the 2010 SO_2 NAAQS. These permitting programs include minor source, PSD, and nonattainment new source review. EPA approved chapter 173- 476 WAC "Ambient Air Quality Standards," in the SIP (79 FR 12077) on March 3, 2014.

NWCAA rules applicable to sources in nonattainment area

NWCAA has authority to establish nonattainment NSR rules for sources of SO_2 emissions under their oversight. "The Regulation of the NWCAA" is available online at: https://nwcleanairwa.gov/resources/#regulations.

Section 300 of the Regulation of the NWCAA cover the NSR rules and Section 305 covers public involvement and actions subject to a mandatory public comment period. A copy of these sections is available at: https://nwcleanairwa.gov/?wpdmdl=5487. Subsections 300.2, 300.9, and 305.2 of the NWCAA Regulation are specific to nonattainment areas. Pertinent excerpts are quoted below:

Section 300 "New Source Review"

Section 300.2 states:

> "Additionally, any new major stationary source or major modification located in a nonattainment area as defined in WAC 173-400-030 shall be processed in accordance with the requirements of WAC 173-400-112 and WAC 173-400-800 through 173-400-860, as applicable, for the pollutant and for precursors of the pollutant for which the area is in nonattainment."

Section 300.9(B)(3) states:

> "An Order of Approval cannot be issued for the Notice of Construction application until the following criteria are met for those proposed emissions units and pollutants that triggered new source review, as applicable:
>
> (3) Allowable emissions will not cause or contribute to a violation of any ambient air quality standard. In addition, if located in a nonattainment area, allowable emissions will not violate the requirements for reasonable further progress established by the State Implementation Plan (SIP). If NWCAA has reason to be concerned that the construction or modification would cause or contribute to a violation of a NAAQS, NWCAA may require modeling using the guideline models and procedures of Appendix W of 40 CFR Part 51 as referenced in NWCAA 104.2. Written approval from EPA must be obtained for any modification to or substitution for a guideline model."

Section 305 "Public Involvement"

Section 305.2(A)(8) states:

> "The NWCAA shall provide public notice and a public comment period in accordance with NWCAA 305.3, before approving or denying any of the following types of applications or other actions:
>
> (8) An extension of the deadline to begin actual construction of a major stationary source or major modification in a nonattainment area."

In addition to having the NWCAA-specific rules, NWCAA also adopted and implements the 2012 versions of both WAC 173-400-112 and 173-400-113 referenced earlier under the Ecology's rules. EPA approved[38] and listed the rules applicable to sources within NWCAA's jurisdiction at: https://www.epa.gov/sips-wa/washington-sip-epa-approved-regulations-table-5-northwest-clean-air-agency

[38] A SIP revision requesting EPA to approve NWCAA rules is available at: https://apps.ecology.wa.gov/publications/SummaryPages/2002003.html

Conformity

General Conformity

General conformity is a concept and requirement under CAA section 176(c). General conformity requires that actions by federal agencies are consistent or conform to the SIP. This means that federally-funded projects should not:

- cause new air quality violations
- worsen existing violations
- delay timely attainment of the relevant NAAQS

General conformity applies to federal actions, other than certain highway and transportation projects, if the action takes place in a nonattainment or maintenance area for ozone, particulate matter, nitrogen dioxide, carbon monoxide, lead, or SO_2. The EPA's General Conformity Rule[39] establishes the criteria and procedures for determining if a federal action conforms to the SIP. More information about General Conformity and the rule is available on EPA's website: https://www.epa.gov/general-conformity.

With respect to the 2010 SO_2 NAAQS and the Intalco SO_2 Nonattainment Area, should federal agencies propose a federally-funded project within the nonattainment area, they must estimate emissions for conformity analyses. The EPA's General Conformity Rule includes the basic requirement that a federal agency's general conformity analysis be based on the latest and most accurate emission estimation techniques available. EPA expects the federal agency to use updated and improved emission estimation techniques when they become available.

Transportation Conformity

Transportation conformity is a concept and requirement under CAA section 176(c). It requires that federally supported highway and transit project activities are consistent with, or "conform to," the purpose of the SIP. In other words, the federal government would not fund projects that may worsen air quality in specific areas, for specific pollutants.

Code of Federal Regulations under 40 CFR 93.102(b)(1) and (2)(v) outlines applicability of the transportation conformity requirement in the context of the SIP. It specifies that transportation conformity apply only to transportation-related criteria pollutants in the following situations:

1) Nonattainment areas designated nonattainment for that pollutant.
2) Maintenance areas (those nonattainment areas that were redesignated to attainment after 1990 with plans developed under CAA section 175A) also if designated for that pollutant.

[39] https://www.epa.gov/general-conformity/final-revisions-general-conformity-regulations

The EPA's transportation conformity rules provide that they do not apply to SO_2 in most situations due to the relatively small, and decreasing, amounts of sulfur in gasoline and on-road diesel fuel. In the **Emissions Inventory** chapter of this attainment plan, Washington demonstrated that the transportation-related emissions are not a significant source of SO_2 emissions. Furthermore, we assert that the minimal transportation-related emissions of SO_2 within the Intalco SO_2 nonattainment area are not a precursor or a significant contributor to a $PM_{2.5}$ nonattainment problem elsewhere. There are no $PM_{2.5}$ nonattainment areas in Washington at this time. The closest $PM_{2.5}$ areas are in Idaho and Oregon. Their attainment plans did not identify Washington's transportation emissions in Whatcom County as a contributing source to those nonattainment areas. Thus, our attainment plan does not include a budget for such emissions as part of the Reasonable Further Progress, attainment, or maintenance strategy.

Clean Air Act Section 110(l): Antibacksliding and Noninterference

Intalco SO_2 attainment controls do not interfere with NAAQS

Title I of the CAA requires EPA to set NAAQS for those pollutants that are considered harmful to public health or the environment. Accordingly, the air quality standards are divided into two types: primary and secondary. Primary standards are designed for the protection of public health and secondary standards and are intended to protect public welfare, such as decreased visibility and damage to animals, crops, vegetation, and buildings. To date, EPA has established standards for six common air pollutants referred to as criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ground-level ozone (O_3), particulate matter (PM), and sulfur dioxide (SO_2). EPA is also required to periodically evaluate those standards and revise them if scientific analyses indicate new standards would be more protective of public health and welfare.

Under CAA Section 107(d), states must make recommendations and EPA must designate areas that meet (attainment), cannot be classified, or do not meet (nonattainment) new or revised NAAQS. Based on air quality data and other factors, EPA designates areas as "nonattainment" if those areas are found to violate or contribute to violations of a NAAQS. Reasonable further progress is defined in Section 171 of the CAA as "…such annual incremental reductions in emissions of the relevant air pollutant … for the purpose of ensuring attainment of the applicable national ambient air quality standard..." The Intalco SO_2 Nonattainment Area is designated as attainment or unclassifiable for all NAAQS except for the 2010 1-hour SO_2.

The Intalco emission control requirements do not result in any increase in criteria pollutants. Thus they will result in noninterference with the federal NAAQS.

Noninterference with requirements for Regional Haze

Intalco is subject to better than BART FIP requirements for SO_2 under the Regional Haze Program. Under the FIP, Intalco's potline emissions, starting on January 1, 2015, are limited to a not to exceed value of 5,240 tons per calendar year of SO_2 emissions (40 CFR 52.2500, 6/11/14 79 FR 33438). The emission control modifications at Intalco lowers the not to exceed value to 5,000 tons per year, as a facility-wide limit, and requires installation of a wet scrubber. These upgrades and improvements are in accordance with FIP and SIP requirements and thus will result in noninterference with the federal standards for Regional Haze.

Noninterference with NESHAP

Aluminum smelters are required to comply with the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Primary Aluminum Smelting. The applicable NESHAP for primary aluminum production is 40 CFR Part 63, Subpart LL. Intalco is also subject to the secondary aluminum NESHAP (40 CFR Part 63, Subpart RRR), Boiler MACT (40 CFR Part 63, Subpart DDDDD), and RICE MACT (40 CFR Part 63, Subpart ZZZZ). The upgraded controls and

enhancements implemented per the requirements of the AO will comply with CAA Section 112 and thus will result in noninterference with these federal standards.

Environmental Justice Review

Introduction

In the U.S., several historic factors and societal phenomena resulted in more air pollution being routinely allowed in areas where indigenous, people of color, and lower-income individuals live or work. Sometimes, the existing laws, rules, practices, and policies normalize and even make it legal to provide environmental benefits to the privileged classes at the expense of other communities.[40] These factors and phenomena continue harming these communities throughout the country. As a result, regulatory agencies face increasing internal and external pressures to re-evaluate programs, strategies, and legal requirements to address such disparities.

Environmental justice (EJ) is defined in Washington State as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, rules, and policies.

Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies. In developing our attainment strategy, we determined that permitting decisions and the proposed attainment strategy do not facilitate concentrating pollution in historically overburdened or under-served communities.

Meaningful involvement means the public has a fair opportunity to participate in decisions about activities that may affect their environment and/or health; can influence the regulatory agency's decision; and the decision-makers seek out and facilitate the involvement of those potentially affected early and throughout the process. In preparing for the public review, we reviewed our documents and actions to ensure that public engagement opportunities on this attainment plan are not limited to those with knowledge, time, and resources.

In the sections below, we will:

- Review current federal and state EJ legal requirements and describe how implementing the SO_2 NAAQS addresses environmental inequalities and is a step to improve just outcomes for all communities.
- Describe communities living within the Intalco SO_2 nonattainment area using EJ analysis tools such as EPA's EJ Screen and Washington State's Department of Health Environmental Health Disparities layer of the Washington Tracking Network (WTN).
- Highlight the modeling technical analysis and discuss changes in the SO_2 levels due to the proposed attainment strategy.

[40] An example of such historic discriminatory practices and racially motivated policies that continue to dictate how we concentrate pollution in these areas is a zoning policy called red lining. It was designed to legitimize land-use planning that allocated cleaner areas to the privileged white class. See the Mapping Prejudice project at https://www.mappingprejudice.org/index.html.

- Describe actions we took to ensure an accessible public review process.

Federal and state EJ requirements

Federal EJ requirements

Title VI of the Civil Rights Act (Act) of 1964 prohibits discrimination based on race, color, or national origin, including when federal agencies, or agencies that receive federal funding, promulgate new rules, or take any regulatory or quasi-regulatory actions. The Act requires EPA and Ecology, as a recipient of federal funding, to adopt an attainment strategy that is nondiscriminatory.

The 1994 Executive Order 12898 built on the Civil Rights Act required that each Federal agency make achieving environmental justice part of its mission. Thus, when EPA established the new SO_2 NAAQS, it was required to review and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations.

On June 22, 2010, EPA issued "Final Revision to Sulfur Dioxide Primary National Ambient Air Quality Standards." In this final rule, EPA determined that the newly established SO_2 NAAQS "will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health effects on any population, including any minority or low-income population. The final rule will establish uniform national standards for SO_2 in ambient air."

On March 26, 2021, EPA published its final rule "Air Quality Designations for the 2010 Primary Sulfur Dioxide (SO_2) National Ambient Air Quality Standard—Round 4" (86 FR 16055).[41] In this rule, EPA designated the Intalco SO_2 Nonattainment Area. EPA noted the following with regard to the EJ consideration: "Area designations address environmental justice concerns by ensuring that the public is properly informed about the air quality in an area. In locations where air quality does not meet the NAAQS, the CAA requires relevant state authorities to initiate appropriate air quality management actions to ensure that all those residing, working, attending school, or otherwise present in those areas are protected, regardless of minority and economic status." We agree with EPA's assessment regarding the importance of establishing a uniform, health-based ambient air quality standard for sulfur dioxide pollution that protects the public health, with an adequate margin of safety, including the health of at-risk populations with asthma.

State EJ requirements

The Healthy Environment for All Act (HEAL Act) was passed by the Washington Legislature in 2021. This new law, RCW 70A.02, takes a historic step toward making environmental justice a

[41] https://www.govinfo.gov/content/pkg/FR-2021-03-26/pdf/2021-05397.pdf

priority and part of the mission of key state agencies. It is the first statewide law to create a coordinated and collaborative approach to environmental justice. The law requires Ecology (and certain other state agencies) to identify and address environmental health disparities in overburdened communities and underserved populations. Ecology is in the process of incorporating environmental justice assessments into our work as required by the HEAL Act.

Consistent with the HEAL Act requirements, Ecology used the Environmental Health Disparities Map developed by the Washington Department of Health map as part of the EJ analysis for the Intalco SO_2 Nonattainment Area. We utilized air quality modeling to evaluate the amount of reductions in pollution within the SO_2 nonattainment area before and after controls, to demonstrate attainment. However, we do not have sufficient methodology, protocols, and data at this time to calculate and verify the changes in the SO_2 concentrations before and after the proposed controls in the ambient air outside of the nonattainment area.

Future reviews for possible environmental effects

Under the Agreed Order, the Intalco facility will be applying for permits, called Notice of Construction (NOC), to install modifications and control SO_2 pollution. The NOCs will have technical specifications not available at the time of the attainment plan submittals. These projects will require a review under the State Environmental Policy Act (SEPA)[42] to identify possible adverse environmental effects resulting from the proposed activity. Projects that are likely to significantly degrade environmental quality are required to perform an analysis called an environmental impact statement (EIS). The EIS evaluates ways to eliminate or reduce the adverse effects of a proposed project.

During the SEPA process, Ecology and the public will have additional information on potential environmental impacts from removing (scrubbing) SO_2 from the air emissions, including an evaluation of any adverse impacts from the changes to the wastewater discharge. During this process, the public will have the opportunity to engage and comment on the SEPA determination and proposed permits.

Communities within the Intalco SO_2 Nonattainment Area

EJ Screen and Environmental Health Disparities analysis

We reviewed EPA's EJ screen and Washington State's Department of Health Environmental Health Disparities layer of the WTN to analyze whether communities of color, low-income populations, or other overburdened populations are present within the nonattainment area. A copy of the EJ Screen is in **Appendix E. EPA's EJScreen Reports for the Intalco SO_2 Nonattainment Area and Whatcom County**. This analysis accounts for people that would most likely be affected by elevated SO_2 levels from the facility.

[42] https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance

We used the following sources for guidance on environmental justice technical analyses and demographic data:

- Environmental Health Disparities (EHD) Layer of the WTN Map, July 7, 2022.
- U.S. Census Bureau 2015-2019 American Community Survey (ACS) 5-year estimate data for population demographics, median household incomes, ratios of incomes to poverty levels, age, educational attainment, and Limited English Proficiency (LEP) populations and percentages.

The nonattainment area is within Census block group 53073010501 (see **Figure 15**). The area is rural with few homes in the vicinity of the facility. Communities of color were identified using census data for all people who identify as a race other than white alone and/or list their ethnicity as Hispanic or Latino. Low-income populations are defined in this report as the percentage of people living at or below twice the federal poverty level.

Figure 15. EPA's EJScreen map of the nonattainment area.

Community characteristics, including LEP, educational attainment, and age, were also gathered for the purpose of informing the public outreach approach for this plan and the AO.

The analysis found that the there are no communities of color or low-income populations within the Intalco SO_2 Nonattainment area. The analysis also did not identify population demographic characteristics requiring additional public outreach and engagement considerations (such as age, educational attainment, and LEP).

Affected populations

Race and ethnicity characteristics were compiled from the ACS 2015 to 2019 5-year estimates for the nonattainment area. For this analysis, the nonattainment area is identified as a "community of color" if the percentage of people of color within the nonattainment area is greater than the percent of people of color in Whatcom County. Whatcom County's population is 21% people of color. Thus, if the nonattainment area includes a population of more than 21% people of color, it is identified as a community of color. The nonattainment area has 17% people of color, lower than Whatcom County.

Low-income populations are identified using a combination of data from the U.S. Census Bureau and the Washington Department of Health. For this plan, low-income is defined as an income at or below twice the federal poverty level. The 2021 federal poverty level for a four-person household was $26,500. The population of the nonattainment area is identified as a "low-income population" if the percentage of low-income people is greater than the percentage for Whatcom County. Whatcom County is 31% low-income. Thus, if the nonattainment area population is greater than 31% low-income, it is identified as a low-income population. The nonattainment area is 20% low-income, lower than Whatcom County.

This analysis also reviewed Washington Tracking Network (WTN) program data identifying overburdened populations. WTN combines information on a variety of environmental and public health factors and includes a map that ranks environmental health disparities for all state census tracts. Specifically, this analysis used the EHD layer, an interactive tool that compares communities across our state for environmental health disparities. Tracts ranked 9 or 10 are considered as areas with EJ considerations. The EHD ranking was evaluated for Census tract. Census tract 53073010501 is ranked a 1 (WTN, July 7, 2022), which is considered low for environmental health disparities and not an overburdened community.

Potentially affected Tribal communities

Although Tribal reservations do not overlap the nonattainment area, the area was historically used by and is culturally important to the Lummi Nation, Tulalip Tribes, Samish Indian Nation, Nooksack Indian Tribe, Swinomish Indian Tribal Community, and Upper Skagit Indian Tribe. Federally recognized Tribes have been and will continue to be invited to provide guidance and comments on the proposed plan and AO.

Use of air quality modeling in support of EJ analysis

Earlier in the document, we described air quality dispersion modeling used to demonstrate that the proposed controls would reduce short-term SO_2 levels in the ambient air in the entire nonattainment area to acceptable levels. The reductions in the expected concentrations are a result of both net emissions reductions due to installation of a SO_2 wet scrubber and facility-wide and unit-specific emission limits, as well as reducing the downwash effect by raising the stacks.

The net reductions in the SO_2 emissions will have positive effects on the levels of the SO_2 pollution in the ambient air outside the nonattainment area, including any EJ communities located at a significant distance from the nonattainment area.

However, when we raise the stacks there is a possibility for redistribution of SO_2 emissions in such a way that communities outside of the nonattainment area may receive more SO_2 than before the attainment plan was in place. Still, those concentrations are likely to be very low. If such increases were to occur, the total levels would still be significantly below the SO_2 NAAQS. Any increases in SO_2 levels resulting from implementation of the attainment strategy are likely to be so minimal that they would fall within the margins of error for a modeling analysis or monitoring system.

Public engagement and accessibility

Public notice and hearing

Ecology follows both the EPA and state public engagement requirements before making a decision to adopt this attainment plan and submit it to EPA for approval. The federal regulations require that Washington:

- Ensures public participation in matters for which hearings are required; and
- Provide adequate public notification of the opportunity to participate.

Ecology complied with the Code of Federal Regulations (CFR) that specifies under 40 CFR 50.102 "Public hearings" that a state must:

- Provide at least a 30-day public notice before holding a hearing:
    - Ecology and NWCAA published the notice on September 7, 2022, for a hearing on October 10, 2022.
- Make a copy of the proposed plan available for public inspection in at least one location in the affected area to which it will apply, and the availability of the compliance schedule for public inspection in at least one location in the region in which the affected source is located. Ecology and NWCAA:
    - Provided a printed copy of the documents at the City of Ferndale library and at Ecology's Headquarters in Lacey, WA.
    - Posted electronic copies on our website and shared links to them in the public notices, emails, and on the NWCAA's website.
- Provide the opportunity to submit written comments. Ecology and NWCAA:
    - Prepared E-Comment website where the public can submit their comments online and review written comment received by Ecology.
    - Noted mailing address for those who wish to mail their comments.

Ecology and NWCAA prominently advertised public notices in the affected area:

- Published in the local newspaper (Ferndale)
- Distributed to the email distribution lists
- Emailed to interested parties and affected entities

- Provided to EPA and elected officials
- Posted on NWCAA and Ecology's websites

Our notice included the date, place, and time of the public hearing. We scheduled the hearing in an accessible virtual format, which minimizes barriers due to traffic, transportation, childcare, disability, or short-term illness. Additional help is available upon request for those with limited access to internet or computer technology. Should we receive a request, we have the capacity to accommodate sign language and other languages interpretation during the hearing.

The hearing is scheduled to be held after traditional work hours to accommodate schedules of those residents and members of the community who would be unable to attend otherwise.

Based on the EJ evaluation of the communities affected within the Intalco SO_2 nonattainment area, we did not identify a need in the community for translating the documents or public notice into other languages.

Accessible electronic documents

We prepared this document and the AO to be electronically accessible and compliant with assistive technologies. There are some documents in the Appendices that we received from other entities that may have a different level of accessibility and compatibility with assistive technologies. For such cases, we provided contact information in the beginning of the document on how to request further assistance, which we would be happy to provide.

Conclusion

This document describes Washington State's strategy to reduce levels of sulfur dioxide (SO_2) air pollution in the ambient air surrounding the Intalco aluminum smelter – in the Intalco SO_2 Nonattainment Area. Ecology and NWCAA, the two regulatory agencies responsible for air quality in the nonattainment area, have collaborated on the attainment strategy. The proposed attainment strategy ensure that the area will attain the SO_2 standard by the statutory deadline of April 2026 and will maintain it afterwards without any additional actions by EPA or the public. Once EPA reviews and approves this Plan, these reductions will be permanent and enforceable.

In the chapters above, we described the nonattainment area, and the requirements that the state must meet. We introduced the Intalco aluminum smelter, which is the confirmed source of the violation of the SO_2 NAAQS in the **Intalco Primary Metals Works Aluminum Smelter** chapter. We provided detailed air quality monitoring data and analysis in the **Ambient Air Quality Monitoring** chapter. Our Emission Inventory Plan is specific to the nonattainment area and described in detail in the **Emissions Inventory** chapter.

The two main chapters describing the attainment strategy are **Pollution Controls and SO_2 Attainment Strategy** and **Attainment Demonstration**. In them, we provided specific information on permanent and enforceable reductions of SO_2 emissions required at the facility, modifications to the facility's equipment and structures, and changes to the operating and reporting requirements. We demonstrated how these changes would result in attainment using the most current EPA-approved air modeling tools. We also provided critical analysis of the modeling report and findings prepared by the facility's modeling contractor.

After we demonstrated how our attainment strategy would work to achieve attainment, we addressed additional elements of the attainment plan as required under the federal Clean Air Act. In the **Reasonable Further Progress** chapter, we addressed the timing of the installation of controls. In **Contingency Measures** we described what we would do should our monitoring sites record elevated values after the attainment date. Our contingency measures are designed to be activated automatically, without additional action by EPA or the public. They are also designed to require Ecology and the facility to act proactively should higher-than-expected concentrations be recorded at the monitoring sites.

In the **Nonattainment New Source Review Permit Program** chapter, we cited the existing permitting regulations that apply in the nonattainment area. In the **Conformity** chapter, we explained federal requirements for future federal transportation or construction projects, which should take into account the nonattainment area designation and ensure that emissions generated by the projects "conform" to the attainment strategy we laid out in the plan. In one of the two concluding chapters - **Clean Air Act Section 110(l): Antibacksliding and Noninterference** - we reviewed whether our attainment strategy could interfere with other measures to attain any of the NAAQS and found that it would not.

We concluded the Plan with a review of environmental justice considerations that were evaluated in developing this Plan and conducting public outreach in the **Environmental Justice Review** chapter. The analysis showed that the proposed actions within the attainment area do not have a disproportionate impact on communities of color or low-income populations, as well as other population demographic characteristics related to public outreach and engagement (such as age, educational attainment, and Limited English Proficiency).

With this document, we are seeking public review and comments on the proposed attainment strategy, and will review all comments received as part of the public process. The authors of this report thank everyone involved in reviewing the document. We made every effort to make this document thorough, clear, and accessible.

Upon review of the comments, we may update the proposal, return to the drawing board, or proceed with the submittal to EPA. We will provide a formal response to all comments and notify the commenters and the public about our decision following the comment period.

Under federal Clean Air Act requirements, the state must submit this attainment plan to EPA for review and approval, or face sanctions. EPA is the final decision-maker on whether or not the Plan meets federal requirements for completeness and compliance. EPA will hold a separate public comment process on their review and decision on the SIP submittal. Once EPA approves the Plan into the SIP, the public or EPA can enforce it in federal court under the Citizen Suit Provision of the Clean Air Act. Any changes to the Plan after it is SIP-approved would require another SIP submittal and public review process at the state and then federal levels.

Appendices

Appendix A. Whatcom County SO_2 Area Designation

Appendix B. SO_2 Source Categories for the Emissions Inventory

Appendix C. Intalco SO_2 Attainment Plan Modeling Report by AECOM, June 2022

Appendix D. Intalco SO_2 Agreed Order 21310

Appendix E. EPA's EJScreen Reports for the Intalco SO_2 Nonattainment Area and Whatcom County

Appendix F. Copies of Public Notices

Appendix G. Response to Comments

Appendix H. SIP Adoption Order and Transmittal Letter to EPA