Prevention of Significant Deterioration Application

Prepared for:

Outokumpu Stainless USA, LLC

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Calvert, Mobile County, Alabama

This document has been prepared by SOLA Environmental, LLC. The material and data in this report were prepared under the supervision and direction of the undersigned.

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1. INTRODUCTION

Outokumpu Stainless USA, LLC (Outokumpu or OTK) owns and operates a stainless steel mill in Calvert, Mobile County, Alabama and is classified under Standard Industrial Classification (SIC) code 3312: Steel Works, Blast Furnaces (including Coke Ovens), and Rolling Mills. The mill is considered a major stationary source under the Title V Operating Program administered by ADEM under AAC §335-3-16. The mill currently operates under Title V Operating Permit No. 503-0106 which expires November 13, 2023.

1.1 FACILITY DESCRIPTION AND PROJECT OVERVIEW

The process for producing stainless steel at the Outokumpu facility involves several stages:

- Melting: The process begins by melting raw materials, such as scrap, iron, nickel, and chromium, in an electric arc furnace (EAF). The melted metal is then refined in an argon-oxygen-decarburization (AOD) vessel to achieve the desired chemical composition.
- Casting: The molten metal is poured into a continuous casting machine, which produces steel slabs that are then cut to size.
- Cold rolling and annealing: The hot-rolled coils are then cold-rolled to further reduce their thickness and improve their surface finish. The coils are then annealed in a heat treatment furnace to soften the steel and improve its mechanical properties.
- Finishing: The coils are then pickled, passivated, and trimmed to remove any surface defects and achieve the desired surface finish. The coils are then inspected and tested for quality assurance.
- Shipping: The finished coils are then shipped to customers for use in a wide range of applications, including automotive, construction, and household appliances.

Throughout the process, the facility places a strong emphasis on environmental sustainability and strives to minimize its environmental impact. This includes using recycled materials and reducing energy consumption and emissions through the use of advanced technologies and best practices. The maximum steel production for the mill is 1.1 million tons per year based on meltshop production.

The facility submitting this application to request the following changes.

1) The addition of a Mixed Annealing and Pickling Line (MAPL) to increase the facility's capacity to treat stainless steel. The MAPL can operate as a combination of the facility's existing hot and cold annealing and pickling lines (HAPL and CAPL). The project also includes additional mixed acid regeneration capabilities to support the new MAPL operations.
2) Construction of a new Steckel Mill to add additional steel rolling capabilities to the facility. The Steckel mill will be constructed in two phases. The emission sources and potential emissions from both phases are included in this permit application.
3) Additional support sources throughout the mill:
    a. New Cold Rolling Mill
    b. New Meltshop Hotbox
    c. New Passive Annealing Furnace
    d. New Slab Holding Furnace

e. Additional Ladle Treatment Stand

1.2 ORGANIZATION OF AIR PERMIT APPLICATION

This permit application is organized as follows:

Section 1: Introduction
Section 2: Proposed Changes
Section 3: Regulatory Applicability Analysis
Section 4: BACT Analysis

Appendix A Process Flow Diagrams
Appendix B Emissions Calculations
Appendix C BACT RBLC Tables
Appendix D ADEM Application Forms
Appendix E PSD Air Dispersion Modeling Report
Appendix F Proposed Compliance Assurance Monitoring

2. PROPOSED CHANGES

This section of the application includes a complete process description of the proposed changes at the Outokumpu facility. Process flow diagrams for these changes are included in Appendix A of this application.

2.1 MIXED ACID AND PICKLING LINE

The MAPL will operate as a combination of the existing HAPL and CAPL. The major operational differences in the HAPL and CAPL are the shot blasting operation in the HAPL and the degreasing section in CAPL. The MAPL will include both operations, as well as the annealing furnace and pickling operations. The MAPL consists of:

- Degreasing
- Annealing Furnace
- Shot Blaster
- Sodium Sulfate Pickling
- Nitric and Hydrofluoric Acid Pickling

This configuration will allow the MAPL to process hot-rolled or cold-rolled coils as needed, based on operational demands. Hot-rolled or cold-rolled coils are loaded in the entry section. The coils are then uncoiled and joined (incoming strip head with outgoing strip tail) by a welding operation so that the strip will be subject to continuous annealing and descaling through the line. Degreasing

2.1.1 DEGREASING

When the MAPL is processing cold rolled coils, the welded coils will first be passed through a degreasing section. Degreasing is an important step in process that involves the removal of oils, grease, lubricants, and other contaminants from the surface of the steel products. It is performed to ensure the cleanliness of the steel before further processing, such as coating, plating, or painting. The strip will enter a brushing machine where an alkaline solution will be sprayed on the strip, followed by rinsing and drying. The particulate emissions generated in the degreasing section will be ducted to a scrubber and vented through LA43.

2.1.2 ANNEALING FURNACE

Hot-rolled coils or degreased cold-rolled coils are then sent to a continuous annealing furnace with an oxidizing atmosphere and annealed via low-NO_X natural gas burners to a pre-set temperature. The continuous annealing furnace is a specialized type of furnace used to heat-treat steel products in a continuous and controlled manner. The primary purpose of the continuous annealing furnace is to soften the steel, relieve internal stresses, and enhance its mechanical properties. The furnace operates through a carefully controlled heating and cooling process.

Once the steel reaches the desired temperature, it is held there for a prescribed length of time based on targeted qualities. This holding time allows for the desired metallurgical transformations to occur, such as grain growth and recrystallization. The controlled heating and holding time in the furnace facilitate the desired annealing process, which aims to refine the microstructure of the steel and improve its mechanical properties.

After the annealing process is complete, the steel is cooled in a controlled manner. This cooling can be achieved through various methods, such as air cooling, water quenching, or controlled cooling rates in a separate cooling chamber. The cooling process is crucial to achieve the desired material properties and to prevent the formation of unwanted phases or structures.

Ferritic coils will pass through this furnace, but the furnace will be turned off because the coils will already be annealed. At the exit of the furnace, the strip will enter an air-cooling unit followed by a water-cooling unit. No emissions are anticipated from the strip cooling process. During processing of stabilized ferritic hot-rolled strips that have been previously annealed, the furnace will be switched off or operated at low temperatures in standby mode. The annealing furnace will have a maximum natural gas usage rate of 143 MMBtu/hr. Combustion gases are vented through stack LA44.

2.1.3 SHOT BLASTING

Annealing and cooling will be followed by a descaling operation. The strip first will pass a scale-breaker followed by shot blasting units. Dust generated from the descaling operations will be controlled by a baghouse and exhausted through stack LA45.

2.1.4 SODIUM SULFATE PICKLING

The sodium sulfate (Na_2SO_4) pickling process is a method used for the removal of scales and oxides from steel surfaces. The first step in the sodium sulfate pickling process involves the preparation of a pickling bath. A solution is created by dissolving sodium sulfate in water to form an acidic solution. The concentration of sodium sulfate and other additives may vary based on the specific requirements of the steel being pickled.

Once the pickling bath is ready, the steel is immersed in the solution. The acidic nature of the sodium sulfate solution reacts with the scales and oxides present on the steel surface, breaking them down. This reaction helps to dissolve and remove the impurities from the steel, leaving a clean surface.

The pickling time can vary depending on factors such as the thickness of the scales, the type of steel, and the desired surface finish. After the pickling process, the steel is thoroughly rinsed with water to remove any residual pickling solution and neutralize the surface. It is worth noting that the sodium sulfate pickling process is considered milder compared to other pickling methods that use stronger acids like hydrochloric acid or sulfuric acid. This makes it a preferred choice for certain steel types that may be more sensitive to aggressive pickling agents. Particulate matter emissions will be captured and treated in a scrubber and vented through stack LA46.

2.1.5 NITRIC AND HYDROFLUORIC ACID PICKLING

Nitric and hydrofluoric acid pickling is a process commonly used in steel mills for the removal of scales, oxides, and other impurities from steel surfaces. It is an aggressive pickling method that involves the use of a mixture of nitric acid (HNO_3) and hydrofluoric acid (HF). This combination provides effective cleaning and surface preparation for steel prior to further treatments.

The steel is immersed in the pickling bath for a predetermined period. The acidic solution reacts with the scales, oxides, and other impurities on the steel surface, dissolving them and removing them from the steel. Nitric acid acts as an oxidizing agent, breaking down the oxides, while hydrofluoric acid provides the necessary etching action to remove the remaining impurities. The mixed nitric and hydrofluoric acid emissions from the mixed acid pickling process, and associated storage and holding tank emissions, are captured and controlled by a prescrubber. The prescrubber removes hydrofluoric acid and particulate, followed by a de-NO_X SCR designed to remove nitrous oxides in the exhaust pickling gases before being vented to the atmosphere through stack LA47. Weak and spent HNO_3 and HF are pumped to the mixed acid regeneration plant.

2.1.6 ACID REGENERATION

Spent mixed acid from the MAPL pickling operations is pumped to the acid regeneration plant (ARP). The spent acid is pumped into a preconcentrator where it recirculates and contacts hot reactor gases, thereby evaporating some of the water and concentrating the spent acid stream. A side stream of the recirculating preconcentrator flow is diverted to the upper reactor spray section, where the remaining water is evaporated, and metal fluorides are partially decomposed. The solids then enter the high temperature lower reactor section where Fe_2O_3 and HF are formed. The iron oxide will be conveyed to oxide bins. The oxide bins will be operated under negative pressure, and an oxide screw conveyor will transport the oxide to a bag filling machine. Packaging and oxide conveying air will be discharged through a filter and stack LA71.

Hot reactor gases are cooled down in the preconcentrator, and suspended dust is washed out. HF and HNO_3 are concentrated and extracted in the absorption column. The off-gas leaving the column, predominantly NO_X, is cleaned in the jet scrubber, spray coolers, and a final oxidation column. In addition, water is sprayed onto the impeller of the exhaust fan, where further scrubbing occurs. Water is recycled to the absorption column, where additional HNO_3 is regenerated. The exhaust of the fans of the regeneration operations enters a de-NO_X SCR. Remaining trace amounts of NO_X are converted into nitrogen and water. The cleaned exhaust gas is vented from the mixed acid regeneration plant through stack LA72.

2.2 STECKEL MILL

A Steckel mill is a specialized rolling mill used in steel mills for the production of hot-rolled steel strips or plates. It operates through a unique process that allows for the simultaneous reduction and elongation of the steel product. This project includes the addition of two identical lines in the Steckel mill: Phase 1 and Phase 2.

- Small Holding Furnace (2)
- Walking Beam Furnace (2)
- Roughing Mill and Finishing Stand (2)
- Steckel Mill Furnace (2)

2.2.1 SMALL HOLDING FURNACES

Steel entering the Steckel Mill is placed in a small holding furnace to retain temperature before processing in the walking beam furnaces (WBF). There is one furnace proposed for each phase of the project. Each furnace is natural gas-fired with a maximum operating capacity of 24 MMBtu/hr. Emissions from the Phase 1 small holding furnace will exhaust through stack LA21 and emissions from the Phase 2 small holding furnace will exhaust through stack LA22.

2.2.2 WALKING BEAM FURNACES

A WBF is a type of continuous heating furnace used for the thermal processing of steel products. It is a crucial component in the Steckel process, providing controlled and uniform heating to achieve desired metallurgical properties. There is one WBF proposed for each phase of the project.

The furnace consists of a horizontal chamber with a series of refractory-lined hearths or beams. The steel products, such as billets, slabs, or blooms, are loaded onto the hearths at one end of the furnace. The hearths are designed to move in a reciprocating motion, known as walking, which facilitates the controlled advancement of the steel products through the furnace.

As the steel products move forward, burners located above and below the hearths provide heat to the chamber. The burners use various fuels, such as natural gas or oil, to generate high-temperature flames. The refractory lining in the furnace helps to retain the heat and maintain a consistent temperature throughout the chamber.

The walking beam mechanism is responsible for the movement of the hearths. It consists of a set of mechanical arms that lift and push the hearths forward in a synchronized manner. The walking motion allows the steel products to be heated evenly and gradually as they progress through the furnace. This controlled heating ensures that the steel reaches the desired temperature for subsequent processing, such as rolling or forging.

There is a WBF proposed for each phase of the project. Each furnace is natural gas-fired with a maximum operating capacity of 305 MMBtu/hr. Emissions from the Phase 1 WBF will exhaust through stack LA23 and emissions from the Phase 2 WBF will exhaust through stack LA24.

2.2.3 ROUGHING MILL AND FINISHING STAND

In the roughing mill, the steel slab is heated to a high temperature and then passed through a series of rolling stands. These stands contain pairs of rolls that gradually reduce the thickness of the slab while maintaining its width. The roughing mill's primary function is to reduce the thickness of the steel and prepare it for further processing in the finishing mill.

Once the steel leaves the roughing mill, it enters the finishing mill. The finishing mill consists of a series of rolling stands that further reduce the thickness of the steel and control its final dimensions. The unique feature of a Steckel mill is its ability to elongate the steel during this process. By controlling the speed difference between the upper and lower rolls, the mill elongates the steel strip while maintaining a consistent thickness. Particulate emissions from the Phase 1 and Phase 2 roughing mills and finishing stands are ducted together and exhausted through a singular stack, LA25.

2.2.4 STECKEL MILL FURNACES

Coiler drums are integral components of the Steckel mill reversing hot strip rolling process. Coiler drums are located inside two Steckel furnaces, which are positioned on both sides of the mill stand. As the strip thickness is reduced during each pass, the length increases. In order to obtain high rolling speeds and retain temperature, the strip is successively coiled and uncoiled, under tension, onto and from the heated coiler drums during processing. There is a Steckel furnace proposed for each phase of the project. Each furnace has two natural gas-fired coil drums each with a maximum operating capacity of 10.4 MMBtu/hr. Emissions from the Phase 1 Steckel furnace will exhaust through stack LA26 and emissions from the Phase 2 Steckel furnace will exhaust through stack LA27.

2.3 ADDITIONAL SUPPORT SOURCES

This project includes a number of additional equipment to be added to the facility to support.

2.3.1 COLD ROLLING MILL

This project will add an additional cold rolling mill to the facility to increase capacity and to support the additional annealing and pickling capacity. A cold rolling mill is used to reduce the thickness and improve the surface finish of metal coils or sheets. It operates by passing the metal through a series of rollers at room temperature, exerting high pressure to deform and elongate the material.

The hot-rolled annealed and pickled coils will be loaded in the cold rolling mill and uncoiled. The strip thickness will be reduced by several reversible passes through the mill stand, where force will be applied to the strip under high tension via a rolls arrangement. The heat generated during thickness reduction will be removed by spraying mineral oil directly onto the strip. The mineral oil also will serve as the lubricating agent for the roll assemblies and for the rolling bearings inside the mill stand. Oil mist generated during cold rolling will be sent to an oil mist eliminator and vented through stack LO51.

2.3.2 MELTSHOP HOTBOX

The facility will add a recirculating heating system to the existing small hotbox in the meltshop. The system will include a total of 6 MMBtu/hr in natural gas burners used to maintain the hotbox at approximately 750°F for extended periods of time. The existing hotbox used residual heat to maintain slab temperature but this was ultimately insufficient to keep the slab at the prescribed temperature. The combustion emissions will vent through the Argon Oxygen Decarburization (AOD) baghouse stack LO2.

2.3.3 PASSIVE ANNEALING FURNACE

This project is adding additional passive annealing capabilities to the facility. Unstabilized ferritic hot-rolled coils will be annealed in the passive annealing furnace, which can anneal several coils simultaneously. The passive annealing process is also called self-annealing because it takes advantage of the remaining heat in the coils exiting the hot rolling mill. As the coils exit the hot rolling mill, they will be top-charged into a box-type annealing furnace, where they will be heated to a predetermined temperature and kept for several hours. The passive annealing furnace will have a maximum natural gas usage rate of 30 MMBtu/hr and will use ULNBs to control NO_X emissions. The combustion emissions from the passive annealing furnaces will be vented through stack LO41B.

2.3.4 SLAB HOLDING FURNACE

The facility will add a secondary slab holding furnace to serve as a buffer between the meltshop slab yard and hot strip mill charging furnace. The natural gas fired furnace will be located outside the meltshop. The furnace will be charged with a single slab using an overhead crane. The slab holding furnace is utilized for the ferritic grade of stainless steel as this material must be maintained at a certain temperature while waiting to be processed in the hot rolling mill. The furnace will combust natural gas and is sized to 25 MMBtu/hr. The combustion emissions from the furnace will be ducted to and exhaust through existing stack LO11.

2.3.5 LADLE TREATMENT STAND

The facility will add an additional ladle treatment stand (LTS) to the AOD section of the meltshop. The ladle treatment stand is equipped with various technologies and equipment to facilitate the refining operations. These will include inert gas injection systems for deoxidation, desulfurization agents, and devices for accurate temperature measurement and control. Stirring mechanisms will be employed to promote homogeneity and ensure proper mixing of the molten steel. Sampling devices are also present to extract steel samples for analysis, enabling operators to monitor and adjust the refining process as needed. This third LTS will include a natural-gas fired preheater rated at 10 MMBtu/hr (similar to the existing LTS). The combustion emissions will vent through the Argon Oxygen Decarburization (AOD) baghouse stack LO2.

It is important to note that the addition of the LTS will not increase meltshop production or debottleneck any part of the existing process or facility as a whole. The purpose of the additional LTS is to prevent future bottlenecking due to steel grade changes associated with other parts of this project.

3. REGULATORY APPLICABILITY ANALYSIS

Federal and state air quality regulations were reviewed for applicability to affected sources at the facility. Air permitting requirements and key air quality regulations that potentially apply to the facility are addressed in the following sub-sections. Specifically, regulatory applicability to New Source Review (NSR), Title V, New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAP), and ADEM Administrative Code Rules are addressed.

3.1 FEDERAL REGULATIONS

3.1.1 NON-ATTAINMENT NEW SOURCE REVIEW

Non-attainment NSR (NNSR) regulations are codified in 40 CFR Part 51, Appendix S. NNSR pertains to facilities in nonattainment areas. The Outokumpu facility is in Mobile County, which is an attainment area for all criteria pollutants. As such, NNSR review is not applicable to the proposed project.

3.1.2 PREVENTION OF SIGNIFICANT DETERIORATION

The Prevention of Significant Deterioration (PSD) regulations, codified in 40 CFR 52.21, specify that any major new stationary source or major modification within an air quality attainment area must undergo PSD review prior to the commencement of construction. Alabama's PSD regulations are codified under ADEM Administrative Code Rule 335- 3-14-.04. PSD applicability thresholds are used to define whether or not a project is a major source or major modification. The thresholds are a function of source category and emissions. The PSD regulations apply to:

- Any source type listed in any of 28 industrial source categories designated as having a potential emission permitting threshold of 100 tons per year (tpy) or more of any NSR pollutant regulated under the Clean Air Act (CAA);
- Any other source having potential emissions of 250 tpy or more of any NSR pollutant regulated under the CAA; and
- Any source having potential lead emissions greater than 5 tpy.

The PSD applicability threshold is 100 tpy, because the facility belongs to one of the 28 designated industrial source categories with a 100 tpy PSD threshold. The facility is classified as a PSD major source and the net emissions increases from the proposed project must be evaluated and compared to the major modification Significant Emission Rate (SER) thresholds for NSR permitting applicability under the PSD program.

The results of this comparison for the project are presented in Table 3-1.

Table 3-1: PSD Applicability Summary

POLLUTANT	PROJECT INCREASE (TPY)	SIGNIFICANT EMISSION RATE (TPY)	SER EXCEEDED? (YES/NO)
PM	56.6	25	Yes
PM_{10}	52.7	15	Yes
$PM_{2.5}$	43.3	10	Yes
NO_X	323	40	Yes
SO_2	2.38	40	No
VOC	21.9	40	No
CO	189	173	Yes
Lead	0.002	0.6	No
GHG	476,359	75,000	Yes

As shown in Table 3-1, the net emissions increase for PM, PM_{10}, $PM_{2.5}$, NO_X, CO, and greenhouse gases (GHG) are greater than the respective PSD SERs and therefore, these pollutants are subject to PSD review. Detailed emissions calculations are provided in Appendix B.

3.1.3 NEW SOURCE PERFORMANCE STANDARDS (NSPS), 40 CFR PART 60

NSPS are established for specific industrial source categories in 40 CFR Part 60. NSPS require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the application provisions. The applicability of an NSPS to a facility can be readily ascertained based on the industrial source category covered. There are currently over 70 source-specific performance standards promulgated in 40 CFR Part 60.

3.1.3.1 40 CFR 60 Subpart Db/Dc - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units

NSPS Subparts DB and Dc regulate emissions from industrial steam generating units. Db applies to steam generating units that have a maximum heat firing rate of less than 100 MMBtu/hr and Dc applies to steam generating units that have a maximum heat firing rate greater than 100 MMBtu/h. The regulations define a steam generating unit as not just a unit that produces steam, but any unit that combusts fuel to heat "any other heat transfer medium." The definition of a steam generating unit excludes process heaters, which are defined as a "device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst."

The continuous annealing furnace (LA44) is considered subject to Db as it uses a heat transfer medium to indirectly heat the steel. The passive annealing furnace is not subject to Dc as it is a direct fired combustion unit.

The continuous annealing furnace is subject to Db as it applies to units greater than 100 MMBtu/hr maximum heat input which are installed, reconstructed, or modified after June 19, 1984. As the unit is fired by natural gas only, it is only subject to the NO_2 emission standard in 40 CFR §60.44b and reporting and recordkeeping requirements in §60.49b(a) and (d). Outokumpu has proposed a BACT limit of 0.06 lb NO_2/MMBtu which is much lower than the 0.20 lb/MMBtu limit in §60.44b(l)(1). Outokumpu will comply by submitting the required notification of construction in §60.49b(a) and will track fuel usage as required in §60.49b(d).

In a walking beam furnace slabs are directly heated not just to increase the temperature so the slabs can be more easily be rolled but also to burn off impurities and to redefine the crystalline structures within the slab. The latter two purposes are chemical reactions within and on the slab. Therefore, the WBF are considered process heaters and therefore are exempt from the rule.

3.1.4 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

NESHAPs are established for specific pollutants and source categories in 40 CFR Part 61 and Part 63 in accordance with the CAA Amendments of 1990, which required the development of standards for sources of HAP.

The Maximum Achievable Control Technology (MACT) standards apply to major sources of HAP emissions. The HAP emissions from the facility are above major source thresholds, i.e., the facility has the potential to emit more than 10 tpy of an individual HAP, and/or the potential to emit more than 25 tpy of total HAP. Therefore, the facility and project emission sources are subject to applicable MACT standards.

Regulations under 40 CFR Part 61 and 40 CFR 63 were reviewed for applicability to the project. The following regulations were found to be potentially applicable.

3.1.4.1 40 CFR 61 Subpart M - National Emissions Standard for Asbestos

The facility was constructed beginning in 2008, and it therefore unlikely that the infrastructure contains asbestos. Outokumpu will comply with the standards for demolition and renovation in §60.145, as applicable.

3.1.4.2 40 CFR 63 Subpart A- General Provisions

The general provisions contained in 40 CFR Part 63, Subpart A apply to certain emission sources that are subject to a NESHAP standard per 40 CFR §63.1(b). The general provisions of Subpart A apply to the owner or operator of a stationary source which contains an affected facility that is subject to any applicable subpart contained within 40 CFR Part 63. Outokumpu will comply with applicable requirements of Subpart A.

3.1.4.3 40 CFR 63 Subpart DDDDD - National Emission Standard for Hazardous Air Pollutants for Industrial Boilers and Process Heaters

40 CFR 63 Subpart DDDDD regulates HAP emissions from industrial boilers and process heaters. The rule pertains primarily to HAP emissions from boilers and heaters that are fired with solid and liquid fuels (TK proposes no such units), but units fired with natural gas are also addressed. Any new natural gas-fired unit having a maximum firing rate greater than 10 million Btu/hr is limited to CO emissions of less than 400 ppm

at 3% O_2. Compliance with this standard is demonstrated using a continuous emission monitor (CEM) for CO (30-day average) for units with a firing rate greater than 100 MMBtu/hr. For units with a lower firing rate, compliance is demonstrated by a stack test with the 3-hour average less than this value.

This rule includes process heaters in the definition of regulated units. The rule states that:

> *Process heater means an enclosed device using controlled flame, that is not a boiler, and the unit's primary purpose is to transfer heat indirectly to a process material (liquid, gas, or solid) or to a heat transfer material for use in a process unit, instead of generating steam. Process heaters are devices in which the combustion gases do not directly come into contact with process materials. Process heaters do not include units used for comfort heat or space heat, food preparation for on-site consumption, or autoclaves.*

The continuous annealing furnace falls under the category of process heaters by this definition because it will indirectly heat steel. The passive annealing furnace, walking beam furnaces, Steckel mill holding furnaces, and Steckel furnaces do not meet this definition because they will directly heat the steel. Therefore, this rule applies to the continuous annealing furnace in the MAPL.

Pursuant to 40 CFR 63.7500(a), affected boilers and process heaters must comply with the emission limits and work practice standards presented in Tables 1 through 3 of the Boiler MACT and the operating limitations found in Table 4. Table 1 specifies emissions limitations for new boilers and process heaters, but this table only includes emissions limitations for units designed to burn solid, liquid, and gaseous fuels defined under the “gas 2” fuel category. All affected units are classified under the “units designed to burn gas 1 fuels” subcategory of the Boiler MACT. As such, they are not subject to any emissions standards. However, these units are subject to a limited number of work practice standards detailed in Table 3 of the Boiler MACT. These include the requirement to conduct periodic tune-ups where the frequency of the tune-up is dependent on the heat input capacity of the boiler and the presence of a continuous oxygen trim system that maintains an optimum air-to-fuel ratio. The requirements of the work practice standards are included in the State Implementation Plan (SIP) Forms in Appendix C.

3.1.5 COMPLIANCE ASSURANCE MONITORING (CAM)

Compliance Assurance Monitoring (CAM) is required for major sources that are required to obtain a Title V Operating Permit with emission units subject to an emission standard, use a control device to achieve compliance with the emission standard, and that have potential pre-control emissions of at least 100 tpy, as stated in 40 CFR Part 64. Outokumpu will submit the initial CAM plans for the equipment with the application of the Temporary Authorizations to Operate (TAO).

3.2 STATE OF ALABAMA REGULATIONS

The ADEM Air Division – Air Pollution Control Program regulations are codified in the Alabama Administrative Code, Title 335, Division 3, Chapters 1 through 21. A high-level overview of potentially applicable chapters is included below. Chapters that are clearly not applicable to the emissions sources at the facility are not included and no further explanation is provided.

3.2.1 ADEM ADMIN. CODE R. 335-3-3-.01 OPEN BURNING

ADEM Admin. Code R. 335-3-3-.01 restricts open fires except as allowed for specified conditions. Outokumpu will conduct all activities in accordance with this rule.

3.2.2 ADEM ADMIN. CODE R. 335-3-4-.01(1)(A) VISIBLE EMISSIONS

In accordance with Alabama Rule 335-3-4-.01(1), process units at the facility must not discharge particulate matter with an opacity greater than 20% as determined by a six-minute average, with certain exceptions. Outokumpu will continue to ensure compliance with this rule by monitoring opacity, as required by the facility's current MSOP and subsequently issued air permit.

3.2.3 ADEM ADMIN. CODE R. 335-3-4-.01(2) FUGITIVE DUST AND FUGITIVE EMISSIONS

In accordance with Alabama Rule 335-3-4-.02(1), reasonable precautions should be taken to prevent particulate matter from becoming airborne. Outokumpu will continue to take appropriate precautions to prevent fugitive dust from becoming airborne.

3.2.4 ADEM ADMIN. CODE R. 335-3-4-.03 PM FROM FUEL BURNING EQUIPMENT

ADEM Admin. Code R. 335-3-4-3-.03 regulates PM emissions from fuel-burning equipment. Per 335-3-1-.02(ee), fuel burning equipment is defined as "any equipment, device, or contrivance and all appurtenances thereto, including ducts, breechings, fuel-feeding equipment, ash removal equipment, combustion controls, stacks, and chimney, used primarily, but not exclusively, to burn any fuel for the purpose of indirect heating in which the material being heated is not contacted by and adds no substance to the products of combustion".

The continuous annealing furnace in the MAPL is considered fuel burning equipment and will be subject to this rule. These units are subject to Best Available Control (BACT) review and limits which will ensure compliance with this rule. The additional proposed furnaces and heaters do not serve as indirect heating equipment. Therefore, those units are not subject to this rule.

3.2.5 ADEM ADMIN. CODE R. 335-3-4-.04 PM FROM PROCESS INDUSTRIES

This regulation limits particulate emissions from manufacturing processes in Class I and Class II Counties. The Outokumpu facility is in Mobile County which is classified as a Class I County. As such, the maximum allowable PM emissions for units at the facility are determined using the following equations:

$$E = 3.59P^{0.62} \qquad P < 30 \text{ tons/hr}$$

$$E = 17.31P^{0.16} \qquad P > 30 \text{ tons/hr}$$

where:
E = allowable particulate emissions [lb/hr]
P = process weight rate [tons/hr]

$E = 17.31P^{0.16}$ P > 30 tons/hr

where:
E = allowable particulate emissions [lb/hr]
P = process weight rate [tons/hr]

This regulation applies to all process emission sources at the facility that do not have a unit-specific PM or PM_{10} emission limit. Outokumpu will comply with this rule by proper operation of the units. In addition, all PM emitting units are subject to BACT review and limits which will ensure compliance with this rule.

3.3 ADEM ADMIN. CODE R. 335-3-5 CONTROL OF SULFUR COMPOUND EMISSIONS

Chapter 335-3-5, Control of Sulfur Compound Emissions, regulates sulfur compound emissions in Alabama. The only section that applies to Outokumpu is the section on fuel burning:

- 335-3-5-.01Fuel Combustion

For Category I counties, the sulfur dioxide emissions are limited to 1.8 lb/MMBtu, which will be easily achieved because the only fuel combusted will be natural gas.

4. BEST AVAILABLE CONTROL ANALYSIS

4.1 INTRODUCTION

Sources undergoing a PSD review must apply BACT to any new or modified emission unit that emits a PSD triggered pollutant in an amount above significant impact levels. Federal PSD regulations define BACT as "an emission limitation (including a visible emission standard) based on the maximum degree of reduction of each pollutant subject to regulation under the Clean Air Act, emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including cleaning or treatment or innovative fuel combustion techniques for control of each such pollutant." No BACT determination may be less stringent than the applicable NSPSs, NESHAPs, or SIP limits.

On December 1, 1987, the USEPA Assistant Administrator for Air and Radiation issued a memorandum that implemented certain program initiatives designed to improve the effectiveness of the NSR programs in the confines of existing regulations and SIPs. Among these was the 'top-down’ method for determining BACT. The top-down process provides that available control technologies be ranked in descending order of control effectiveness. The first step of this process is to evaluate the most stringent or "top" alternative. This represents BACT, unless it can be demonstrated, and the permitting authority agrees, that technical considerations or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not "achievable" in a particular case. If the most stringent technology is eliminated in this fashion, then the next most stringent alternative is considered, and so on, until the most appropriate control strategy is selected for each source.

BACT is required for any emission unit that emits a PSD triggering pollutant. Table 4-1 identifies all PSD triggering pollutants as NO_X, CO, GHG, and $PM/PM_{10}/ PM_{2.5.}$ A BACT analysis is required for any emission unit that emits any one of these pollutants.

Table 4-1 Unit Operations in the Mill Requiring a BACT Review

EMISSION UNIT	EMISSION UNIT ID(S)	NO_X	CO	$PM/PM_{10}/PM_{2.5}$	GHG
Reheat Furnaces – Walking Beam Furnaces	LA23, LA24	Yes	Yes	Yes	Yes
Annealing Furnaces – Passive and Continuous	LO41B, LA44	Yes	Yes	Yes	Yes
Miscellaneous Natural Gas Combustion Sources: • Meltshop Hot Box • Ladle Treatment Stand Furnace • Small Holding Furnaces • Steckel Furnaces • Slab Holding Furnace	LO2A, LO2B, LA21, LA22, LA26, LA27, LO42B	Yes	Yes	Yes	Yes
Roughing Mill and Finishing Stand	LA25	--	--	Yes	--
MAPL Degreasing	LA43	--	--	Yes	--
MAPL Shot Blaster	LA45	--	--	Yes	--
MAPL H_2SO_4 Pickling	LA46	--	--	Yes	--
MAPL HNO_3/HF Pickling	LA47	Yes	--	Yes	--
Cold Rolling Mill	LO51	--	--	Yes	--

EMISSION UNIT	EMISSION UNIT ID(S)	NO_X	CO	$PM/PM_{10}/PM_{2.5}$	GHG
ARP Iron Oxide	LA71	--	--	Yes	--
ARP Process Gas Exhaust	LA72	Yes	Yes	Yes	Yes

4.2 KEY STEPS IN A TOP-DOWN BACT ANALYSIS

To develop the BACT analysis, the key steps outlined in the USEPA PSD Guidance Document (1990) were followed. These steps include:

Step 1 - Identify All Control Technologies

- List is comprehensive (Lowest Achievable Emission Rate [LAER] included)

Step 2 - Eliminate Technically Infeasible Options

- A demonstration of technical infeasibility should be clearly documented and should show, based on physical, chemical, and engineering principles, that technical difficulties would preclude the successful use of the control option on the specific emissions unit under review.

Step 3 - Rank Remaining Technically Feasible Control Options

Should include:
- Control effectiveness (percent compound removed)
- Expected emission rate (ton per year)
- Expected emission reduction (tons per year)
- Energy impacts (Btu, kilowatt hour [kWh])
- Environmental impacts (other media and the emission of toxic and hazardous air pollutants)
- Economic impacts (total cost effectiveness, incremental cost effectiveness, in annualized cost per ton of compound reduced)

Step 4 - Evaluate Remaining Control Technologies

- Case-by-case consideration of energy, environmental, and economic impacts
- If the top (most effective control) option is not selected as BACT, evaluate the next most effective control option

Step 5 - Selection of BACT

- Most effective option not rejected is BACT

Table 4-2 summarizes the proposed BACT levels for all units. This table provides the overall conclusions of all the analyses that follow. To develop these analyses, MACTEC obtained information from the following databases and listings to identify emission limits and control technologies which apply to sources being proposed for the Project:

- USEPA Reasonably Achievable Control Technology (RACT)/BACT/LAER Clearinghouse (RBLC)
- Various air pollution control technology vendors
- Recently issued permits in various states
- Best Available Techniques Reference Document on the Production of Iron and Steel December 200I Integrated Pollution Prevention and Control (IPPC)

Reviewing the information provided in these documents ensures that the latest appropriate control technology results of these reviews provide a comprehensive list of control technologies that are used in industry today.

Table 4-2 BACT Analysis Summary Table

EMISSION UNIT	EMISSION UNIT ID(S)	PROPOSED NO_X BACT	PROPOSED CO BACT	PROPOSED $PM/PM_{10}/PM_{2.5}$ BACT	PROPOSED GHG BACT
Reheat Furnaces – Walking Beam Furnaces	LA23, LA24	0.070 lb/MMBtu	0.035 lb/MMBtu	1.9 lb/MMscf Filterable 7.6 lb/MMscf Total PM	157,193 TPY (per unit)
Annealing Furnaces – Passive	LO41B	0.0825 lb/MMBtu	0.05 lb/MMBtu	1.9 lb/MMscf Filterable 7.6 lb/MMscf Total PM	15,770 TPY
Annealing Furnaces – Continuous	LA44	0.06 lb/MMBtu	0.06 lb/MMBtu	1.9 lb/MMscf Filterable 7.6 lb/MMscf Total PM	64,419 TPY
Miscellaneous Natural Gas Combustion Sources: • Meltshop Hot Box • Ladle Treatment Stand Furnace • Small Holding Furnaces • Steckel Furnaces • Slab Holding Furnace	LO2A, LO2B, LA21, LA22, LA26, LA27, LO42B	0.100 lb/MMBtu 0.085 lb/MMBtu for LO42B	84 lb/MMscf	1.9 lb/MMscf Filterable 7.6 lb/MMscf Total PM	in TPY: LO2A- 3,092 LO2B – 5,154 LA21 – 12,368 LA22 – 12,368 LA26 – 5,353 LA27 – 5,353 LO42B – 12,884
Roughing Mill and Finishing Stand	LA25	--	--	in gr/dscf: Filterable PM - 0.0044 Total PM_{10} - 0.0044 Total $PM_{2.5}$ - 0.0025	--

EMISSION UNIT	EMISSION UNIT ID(S)	PROPOSED NO_X BACT	PROPOSED CO BACT	PROPOSED $PM/PM_{10}/PM_{2.5}$ BACT	PROPOSED GHG BACT
MAPL Degreasing	LA43	--	--	0.0022 gr/dscf	--
MAPL Shot Blaster	LA45	--	--	Filterable PM – 0.0030 gr/dscf Total PM_{10} – 14.3% Filterable PM Total $PM_{2.5}$ – 14.3% Filterable PM	--
MAPL H_2SO_4 Pickling	LA46	--	--	0.0022 gr/dscf	--
MAPL HNO_3/HF Pickling	LA47	100 ppm	--	0.0022 gr/dscf	--
Cold Rolling Mill	LO51	--	--	in gr/dscf: Filterable PM - 0.0025 Total PM_{10} - 0.0024 Total $PM_{2.5}$ - 0.0013	--
ARP Iron Oxide	LA71	--	--	0.0020 gr/dscf	--
ARP Process Gas Exhaust	LA72	100 ppm	84 lb/MMscf	0.0043 gr/dscf	5,540 TPY

4.3 REHEAT FURNACES

The two WBFs in the Steckel mill are considered reheat furnaces that will be used to heat stainless steel slabs to working temperatures. The length of time that a slab will be "walked" through each zone of a WBF and the temperature to which each slab will be exposed will vary depending on the grade and dimensions of the steel. The quantity and concentration of emissions leaving the furnaces will vary, depending on the slab characteristics and desired properties.

The furnaces will be fueled only with natural gas; therefore, particulate emissions will be negligible.

4.3.1 BACT DEMONSTRATION FOR FILTERABLE PM, TOTAL PM_{10}, AND TOTAL $PM_{2.5}$ EMISSIONS FROM REHEAT FURNACES

Step 1 - Identify All Control Technologies

The BACT analysis began with identifying all technically feasible control technologies. Because the emissions from the furnaces will be products of combustion and only natural gas (a clean burning fuel) will be used as a fuel, no add-on control technologies for particulate emissions will be incorporated. The only potential control technology will be to ensure good combustion to prevent soot, the only potential particulate emission from the unit, from being formed.

Step 2 - Eliminate Technically Infeasible Options

Good combustion techniques will be the only applicable control technology.

Step 3 - Rank Remaining Technically Feasible Control Options

Good combustion techniques will be the only applicable control technology.

Step 4 - Evaluate Remaining Control Technologies

Table C-1 lists the $PM_{10}/PM_{2.5}$ emission limits and controls that are currently in place for reheat furnaces in the USEPA RBLC database. As indicated, only good combustion techniques will be applicable, and it is doubtful that particulate emissions have ever been tested coming from a gas-fired furnace. Therefore, it is likely that the emission limits listed have their origin in natural gas combustion emission factors listed in AP-42 for boilers.

Step 5 - Selection of BACT

Because none of the emission limits have been verified through testing, Outokumpu is proposing 7.6 lb/MMscf as BACT, which is the equivalent of the emission factor listed in AP-42 for natural gas-firing in boilers. Outokumpu will periodically verify that the natural gas burners on the furnaces will be tuned to manufacturer specifications for proper combustion is ensured.

4.3.2 BACT DEMONSTRATION FOR NO_X EMISSIONS FROM REHEAT FURNACES

Step 1 - Identify All Control Technologies

Nitrogen oxides are products of combustion at the reheat furnace. Because there is little fuel bound nitrogen in the natural gas fuel, NO_x, is generally formed in combustion processes by a process known as thermal NO_x. Thermal NO_x is the direct conversion of the nitrogen in the combustion air to NO_x due to the high temperatures within the flame region. The volume of thermal NO_x being formed is largely dependent on temperatures in the flame zone of the burner.

NO_x control technologies include combustion control techniques such as operating with low excess air or operating staged combustion technologies to reduce combustion temperatures in the flame zone. Low NO_x burners use staged combustion; in the first stage, the fuel is burned in an oxygen-lean environment to reduce combustion temperature, which is then followed by a more oxygen rich stage to complete the combustion process. The net effect of this is to reduce temperatures in the hottest portion of the flame zone and thereby reduce thermal NO_x. The ultra-low NO_x levels will be achieved by combining air staging with fuel pre-mixing to minimize dependency on excess air levels, a common problem on other staged "low NO_x" burners. This results in a reduction of the temperatures in the combustion zone and in turn reduces thermal NO_x.

FGR is also a common technology used to reduce NO_x emissions in some combustion operations. FGR, which also lowers flame temperature, is typically practiced in boiler operations but generally is not feasible in a reheat furnace. In a boiler, only one or two burners typically vent out the same stack, which makes it easy to recirculate the exhaust from the flue to the intake of the burner. However, in a reheat furnace, many burners are in numerous areas around the furnace (floor, walls and ceiling) to provide a specific temperature for each zone in the furnace. That temperature setting may vary, depending on the grade of steel and the size of the slab. The exhaust from all burners in the furnace vents through a common flue, and the heat is recovered in a waste heat boiler. The resulting exhaust gas leaving the furnace is then an average exhaust from all the burners that would have to be manifolded back to each burner. The operation of each burner would then have to be compensated differently to meet the specific temperature setting for the burner required.

In addition to these combustion controls, a few add-on control technologies have been successful in controlling NO_x from some combustion operations. These include selective non-catalytic reduction (SNCR), SCR, and oxidation/reduction scrubbing. In SNCR, urea or ammonia (NH_3) is injected into the furnace in the combustion zone so that the urea or NH_3 mixes with the combustion gases where the temperatures are between 1,600 to 1,900 °F. When injected, the NH_3 and NO_x that were formed at higher temperatures breaks down to form nitrogen and water. This reaction can only occur within the temperature ranges found within the combustion chamber. How effective the process is at reducing NO_x depends on how well the gases mix and the temperature. Reduction efficiencies for this process vary from 20 to 70% depending on the application. SCR also uses NH_3/urea injection to complete the same reaction, but the reaction occurs in a large catalytic bed downstream of the combustion device. The flue gases must be within a certain temperature range (typically between 500 to 800 °F) for the process to work, depending on the specific catalyst. SCR units have been able to reduce NO_x emissions from boiler applications by as much as 90%. Both technologies have been successfully used to control NO_x emissions from boilers but, due to the geometry of the reheat furnace, SNCR is not a viable control technology. The injection of NH_3 or urea at each burner would not likely result in lower NO_x because the furnace will be a large open volume (compared to a combustion chamber in a boiler), so the potential for NH_3 mixing with the NO_x, at the right temperature is unlikely. Therefore, SNCR is not a viable technology, but SCR in which the entire exhaust stream is treated is a viable technology. One negative impact of this technology is NH_3 emissions. Some unreacted NH_3 will always leave the process and vent out the stack. Concentrations of NH_3 in the exhaust gas typically are less than I0 ppm.
One other add-on control technology has been successful in reducing NO_x in certain specialized applications, and that is a NO_x scrubber. In an oxidation/reduction scrubber the gases are cooled to dew point temperature, and ozone is injected into the exhaust stream to oxidize the NO_x further to a form nitrogen pentoxide (N_2O_5) that can be absorbed in a wet scrubber. The resulting scrubbant becomes a weak nitric acid solution, which can be neutralized with sodium hydroxide (NaOH). Such a scrubber would also control CO and SO_2 with the same mechanism. These scrubbers have a very limited application; they are successful when the NO_x stream is highly concentrated, as in the chemical process industry, but are less successful when the stream contains relatively low concentrations, such as those from combustion processes. Therefore, this technology is not viable for the reheat furnace.

Step 2 - Eliminate Technically Infeasible Options

The technologies that were deemed applicable in step 1 are low-NO_x burners, ULNBs, and SCR technologies. Of these technologies, SCR could be deemed infeasible. One reheat furnace that has an SCR in operation is at Beta Steel mill in Portage, Indiana, which manufactures hot-rolled coiled steel strip (band) carbon steel. The mill has a reheat furnace that is natural gas-fired with maximum heat input capacity for the burners of 264.6 MMBtu per hour (MMBtu/hr). When first permitted in the 1990s, the NO_x emissions were permitted to be 14.7 pounds per million standard cubic feet (lb/MMSCF) of natural gas burned or 0.015 lb/MMBtu, which was what permitted boilers equipped with SCRs had been achieving at that time. This transfer technology seemed to be a direct application of a similar operation; however, on startup these low levels were never achieved. As much as seven times more NO_x than anticipated was emitted from the SCR. After much study and numerous attempts at process changes, Beta Steel and the state environmental agency concluded that SCR was not as successful as hoped for the following reasons:

1. The main reason the reheat furnace operation is a non-steady state operation; emission rates vary depending on the heat input rate and material being heated. This not only affects the emissions sent to the SCR, but it also impacts the quantity and temperature of the exhaust gas sent to the unit. A catalytic bed is designed for a certain distribution of reactant across the surface of the bed at a certain temperature. The more variations there are in these factors, the less effective the control technology becomes.

2. Varying flue gas temperature at the inlet of SCR caused fluctuations in the catalyst performance. The flue gas temperature drops to 750 °F, well beyond the optimum performance range for the catalyst between 850 and 950 °F.

3. The catalyst performance is affected due to deposition of $PM_{10}/PM_{2.5}$ from the flue gas stream. Some scales leave the furnace that tends to plug the catalytic bed. Because it is not possible to run the gas through any kind of add-on control before the SCR, this deleterious operating factor is inherent to this application of SCR.

Because of these issues, the unit was repermitted with a much higher emission limit of 0.077 lb/MMBtu based on one specific stack test. It is yet to be seen whether this level of performance can be repeated consistently. Because this emission rate is equivalent to or higher than the other comparable technologies, SCR is not considered further in this BACT analysis.

In addition to the technical hurdles with operating SCRs on reheat furnaces, there would be significant energy, cost, and environmental implications as well. The reheat furnaces utilize heat recovery, which allows for a significant amount of energy savings and reduces the overall energy consumption at the mill. SCRs, however, require a minimum inlet temperature of 650 °F in order to be effective. As the temperature drops below this level, the effectiveness will drop significantly. The furnaces would, therefore, in effect need to have reduced energy efficiencies in order to have exhaust temperatures in the required temperature window. This derating would result in increased energy consumption at the furnace, which would correlate to increased operating costs and increased NO_x emissions as well as other products of combustion. The only alternative to this approach would be a complete reengineering of the furnace design to allow for the recovery of energy atter the SCR.

As indicated previously, the SCR applications on reheat furnaces have had catalyst fouling because of scale from the steel. It is therefore expected that a baghouse would need to be operated after the reheat furnace, but prior to the SCR in order to prevent fouling of the catalyst bed.

Based on the failed application and SCR at previous mills and the additional concerns from high temperature ranges, additional control to prevent fouling; SCR is considered infeasible for this application.

Step 3 - Rank Remaining Technically Feasible Control Options

Low-NO_x burners and ULNBs that rely on staged combustion and premixing of air and fuel combustion techniques are the only remaining NO_x control techniques. Therefore, the control technology is limited to the type of burner that can achieve the performance necessary for this application.

Step 4 - Evaluate Remaining Control Technologies

Table C-2 provides a listing generated from the RBLC of NO_x emissions from reheat furnaces. Not all the emission limits have been demonstrated. The lowest listing is 0.064 lb/MMBtu, which is for a Nucor Steel furnace in Stanton, Nebraska. The furnace has not been constructed. The next lowest emission rate is listed for three units at 0.070 lb/MMBtu. The control technology stated is ULNBs and LNB. The reason for this is the uniqueness of this specific proposed furnace. The walking beam furnaces will handle stainless steel slabs of various sizes with each slab requiring a certain heat demand to achieve the temperature that is required for that particular slab. To do this not only ULNB burners will be required but a small number of standard low NO_x burners which supply heat on demand in a much shorter time.

Step 5 - Selection of BACT

The control technology that meets BACT is ULNBs as much as the process will allow. The add-on control technology of SCR, which is used for boiler operations, was found to be incompatible with the variable operation of a reheat furnace and therefore not technically achievable. Outokumpu proposes to use ULNBs in the furnace at the proposed mill to the maximum extent possible. A serious concern is the large variation in the type of steel that will be heated in these furnaces. The end use of the Outokumpu product generally will be automotive and specialty steels which requires the furnace to be operated at higher temperatures. The product specifications can vary daily; therefore, the feed to the furnace will also vary. It is expected that this variation will affect the NO_x emissions from the unit due to the throttling of the burners and the variation in heat patterns necessary to accommodate the grade change. Despite all of the aforementioned challenges, Outokumpu is proposing a BACT limit of 0.070 lb/MMBtu for the walking beam furnaces.

4.3.3 BACT DEMONSTRATION FOR CO EMISSIONS FROM REHEAT FURNACES

Step 1 - Identify All Control Technologies

CO is a result of incomplete combustion; therefore, it can typically be minimized using good combustion practices including assurance of sufficient air to fuel ratios. Good combustion practices can be enhanced using staged combustion, which involves the injection of combustion air at different areas of the burners. Beyond combustion controls, the remaining CO could be oxidized to carbon dioxide (CO_2) in a second downstream control device. Large quantities of CO could be reduced by installing an oxidizer or afterburner downstream of the device. This is practiced whenever CO levels are elevated above 1,000 ppm, such as in certain chemical processes or combustion units that have a wet fuel or for some reason promote incomplete combustion. In the case of a gas fired burner, an afterburner or downstream oxidizer would be of no benefit because CO emissions typically are less than I 00 ppm, and further oxidation would generate more NO_x emissions and have little impact on the CO. One add-on technology that potentially reduces CO emissions is the addition of a catalytic oxidizer, which would allow the oxidation process to occur at a lower temperature by moving the gases across a bed of catalyst material (usually consisting of a precious metal such as palladium).

Step 2 - Eliminate Technically Infeasible Options

Other than good combustion practices, CO emissions could be further reduced through the addition of oxidation technology such as a catalytic oxidizer. This is a transfer technology from industrial boiler control but has never been attempted on a reheat furnace. Judging from the results of trials with SCRs, which are also catalytic units, the expected operation of such a bed would not approach its stated control efficiency of 80% reduction and would probably be a fraction of that. In addition, if this technology were feasible, the exhaust gas stream temperature would be significantly higher for an oxidation catalyst to be effective. At exhaust gas temperatures below 800°F, the oxidation catalyst becomes ineffective. The average exhaust temperature of the reheat furnaces exhaust gases is roughly 350°F because the last step of the process involves heat recovery. An oxidation catalyst would, therefore, be ineffective at reducing CO emissions unless the exhaust gas temperature were raised considerably by reheating. Raising the temperature of the gases would require significant heat injection through additional fuel firing or through eliminating the waste heat boiler, which would require a fuel burning boiler. In either case, significant energy costs would result. Furthermore, significant emissions would result from the additional combustion needed. In either case, significant increases of a higher priority pollutant such as NO_x would result. Based on these energy and environmental costs, oxidation alone or with a catalyst is not considered feasible or beneficial.

Step 3 - Rank Remaining Technically Feasible Control Options

Good combustion operations practices are considered the only feasible control method.

Step 4 - Evaluate Remaining Control Technologies

Table C-3 provides a listing from the RBLC database of the CO emissions limits and controls that are currently in place for the reheat furnaces. As discussed, the only technology in use for minimizing CO emissions from reheat furnaces is good combustion operation practices. The lowest confirmed CO emission limit is 0.035 lb/MMBtu. One listing lower than this was for 0.013 lb/MMBtu, but a check of the permit for this unit found this listing to be in error; it should have read 0.084 lb/MMBtu.

Step 5 -Selection of BACT

Outokumpu proposes BACT for CO emission from the WBFs as 0.035 lb/MMBtu using good combustion practices.

4.3.4 BACT DEMONSTRATION FOR GHG EMISSIONS FROM REHEAT FURNACES

This section contains a high-level review of pollutant formation and possible control technologies for natural gas combustion.

Step 1 - Identify All Control Technologies

Outokumpu searched for potentially applicable emission control technologies for CO_2 from natural gas combustion researching the U.S. EPA control technology database, guidance from U.S. EPA and other sources, technical literature, control equipment vendor information, state permitting authority files, and by using process knowledge and engineering experience. Based on the RBLC search, the control method described for one of the facilities was thermally efficient combustion and good operating practices (i.e., no add-on control). No control method was listed for the rest of RBLC search results. The following potential CO_2 control strategies were considered as part of this BACT analysis:

- Carbon Capture and Storage
- Good Design and Operating Practices

Step 2 - Eliminate Technically Infeasible Options

Carbon Capture and Storage - CCS involves cooling, separation and capture of CO_2 emissions from the flue gas prior to being emitted from the stack, compression of the captured CO_2, transportation of the compressed CO_2 (usually via pipeline), and finally injection of the captured CO_2 into a geologic formation. For CCS to be technically feasible, all three components needed for CCS must be technically feasible.

Since there are no other CO_2 pipelines in the area, Outokumpu would need to construct a CO_2 pipeline to a storage location if it were to pursue carbon sequestration as a CO_2 control option. While it may be technically feasible to construct a CO_2 pipeline, considerations regarding the land use and availability need to be made. The closest operating CO_2 sequestration project site to the facility is the Citronelle oil field, located east of Citronelle, Alabama and approximately 25 miles from the facility. It is not plausible to consider Outokumpu responsible for the construction of a major pipeline for that distance. Therefore, CCS is considered technically infeasible for this application and will not be considered any further in this BACT analysis. Table C-19 provides the cost analysis.

Good Design and Operating Practices - As the baseline of most analyses, pollutant formation can be most cost-effectively minimized by good design and proper operation. Within combustion units, operators can control the localized peak combustion temperature and combustion stoichiometry to achieve efficient fuel combustion. Good design can include minimizing the energy loss by providing sufficient insulation to the combustion units and associated duct work.

For the purposes of this GHG control technology assessment, it is important to note that good operating practices includes periodic maintenance by abiding by an operations and maintenance (O&M) plan. Maintaining the combustion units to the designed combustion efficiency and operating parameters is important for compliance on energy efficiency related requirements.

Step 3 - Rank Remaining Technically Feasible Control Options

Since only a single control option was ascertained to be technically feasible, no ranking of control alternatives has been provided.

Step 4 - Evaluate Remaining Control Technologies

Use of high efficiency burners, fueled by natural gas and employing good combustion/operating practices are the remaining control technologies and represent the base case. The only option remaining is good design and operating practices.

Step 5 -Selection of BACT

Outokumpu proposes a CO_2e BACT of 157,193 TPY for each walking beam furnace. The proposed emission limits are based on the proposed maximum heat capacity and the established CO_2e emission factors[1].

4.4 ANNEALING FURNACES (CONTINUOUS AND PASSIVE)

Outokumpu is proposing to add two types of annealing furnaces:

- Passive annealing
- Continuous annealing

In passive annealing, the rolled coil is placed under a dome. The coils are then directly heated in this manner for many hours to days, depending on the steel specifications. In passive annealing, the coils are taken from the previous process while they are still hot, and in this way the heat is used for annealing. Some heat is still supplied by gas burners in passive annealing.

In continuous annealing, the strip is continuously fed through an annealing oven that is indirectly heated by a continuous gas-fired furnace that surrounds the oven. Inside the oven, the strip is exposed to an atmosphere of hydrogen and nitrogen so that annealing can properly proceed.

Because the only emissions from the process are the result of natural gas combustion and the primary pollutants of concern are NO_X and CO, the BACT assessment for only those pollutants is presented. In addition, these pollutants are being reviewed as a group because they are both products of combustion; NO_X is the more critical pollutant. Particulate matter is emitted in relatively minor amounts; for the BACT assessment for PM refer to the information presented in Section 4.3.1, which discusses this pollutant for the reheat furnaces.

4.4.1 BACT DEMONSTRATION FOR NO_X AND CO FROM ANNEALING FURNACES

The NO_x generated from the process is thermal NO_x from the combustion of natural gas.

Step 1 - Identify All Control Technologies

Five available technologies were evaluated to control NO_x emissions from the stainless steel annealing line furnace operations. They are:

- SCR
- SNCR
- Low-NO_X burner
- Ultra-low NO_X burners
- Exhaust gas recirculation
- Good Process Operation

These control technologies are described in Section 4.3.

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[1] 40 CFR 98 Subpart C, Tables C-1 and C-2

Step 2 - Eliminate Technically Infeasible Options

Selective Catalytic Reduction

SCR uses a catalyst to react with injected NH_3 to chemically reduce NO_X. It can achieve up to a 94% destruction removal efficiency (DRE) and is one of the most effective NO_X abatement techniques. The key to SCR is a chemical reduction reaction between NH_3 and NO_X under certain conditions. The reaction between NO_X and NH_3 can occur without the use of a catalyst, but only at temperatures more than 1,500 °F. To achieve NO_X reduction at a lower temperature, the reaction must be assisted by the use of catalysts such as titanium or vanadium plated onto a honeycomb or plate-type module placed in the exhaust gas path. This assembly is called an SCR reactor. When NH_3 is mixed with NO_X in the exhaust gases and passed through the reactor, NO_X is converted to nitrogen and water vapor.

The successful application of SCR requires the availability of a temperature "window" that is stable and suitable for the SCR reaction, and sufficient static pressure to accommodate the added pressure drop across the SCR catalyst. The ideal temperature range for SCR application is 600 to 800 °F. The SCR also requires space in the gas path for both an NH_3 injection system and the SCR reactor. The space requirements or pressure drop caused by the injection system are usually not a problem. The SCR reactor, however, requires the most space and entails considerable pressure loss.

The exhaust from the continuous annealing furnaces meets this temperature window somewhat on the lower side (550 °F) and, because the furnace is continuously running, the exhaust is generally stable. However, for both passive and batch annealing the temperature often is below this window and because the operation is a batch process with numerous furnaces coming on and off the exhaust stage, the units cannot be classified as a standby-state process. Therefore, this technology is considered plausible for the continuous annealing furnaces but not for the passive or batch furnaces.

Selective Non-Catalytic Reduction

As noted in the SCR section, the reaction of NH_3 with NO_x to form nitrogen and water vapor is the same for both SCR and SNCR. SNCR differs from SCR because it requires higher temperatures and does not require the use of a catalyst. The ideal temperature range for SNCR is 1600 to 2000 °F. Both NH_3- and urea-based SNCR systems are available, and they are similar in their effectiveness and technical feasibility for this application.

The advantage of SNCR is that it does not require a reactor and, hence, imposes minimal space requirements and pressure drops compared with SCR. SNCR simply requires NH_3 (or urea) injection into the exhaust gases at a location that provides adequate temperature, gas mixing, and residence time. However, the control efficiency of SNCR generally is much less than that of SCR. SNCR requires stable flame conditions, which are prevalent for continuous annealing but not for batch annealing. Therefore, SNCR technology is not an appropriate control technology for consideration.

Ultra-low-NO_x Burners and Exhaust Gas Re-Circulation

By combining EGR with ULNBs, NO_X control can be enhanced more than by using either technology alone. This combination reduces NO_X formation by two mechanisms. The recycled exhaust gas contains combustion products that act as inerts during combustion and lower the peak flame temperature, reducing thermal NO_x formation. To a lesser extent, EGR also reduces thermal NO_x formation by lowering the oxygen concentration in the primary flame zone. As explained above, the ULNB also reduces NO_x

by reducing flame temperature. The use of the two technologies together is technically feasible.

Step 3 - Rank Remaining Technically Feasible Control Options

Adding air curtains at the furnace doors is technically feasible and will increase the effectiveness of EGR system by decreasing air intrusion into the furnace. EGR has the potential for high NO_x reduction, is more effective than air curtains, and can be effectively used in AK Steel's annealing furnaces. It has already been installed and is in operation. ULNBs can produce up to 60% DRE and can be one of the least expensive NO_x prevention technologies to operate. With a 60% DRE, this technology is probably more effective than EGR technology. This technology has also been installed in the annealing furnaces.

ULNB with EGR has been demonstrated as feasible for both continuous and passive annealing furnaces. SCR has been demonstrated as feasible for continuous annealing furnaces, but not passive annealing furnaces.

Step 4 - Evaluate Remaining Control Technologies

Tables C-4 and C-5 list NO_x and CO emissions from annealing furnaces. The majority of these listings were for continuous annealing furnaces. The lowest confirmed NO_x emission limit is 0.06 lb/MMBtu. The corresponding CO limit for this NO_x limit is also 0.06 lb/MMBtu. This level has been achieved by both SCR and ULNB with EGR.

For passive annealing, the most effective control is the use of ULNBs in conjunction with EGR and/or air curtains. The expected efficiency of this control is 60% reduction over uncontrolled emissions. It should be noted that a majority of the RBLC entries are for carbon steel annealing. Uncontrolled emissions when annealing stainless steel can be as high as 0.19 lb/MMBtu, so the proposed BACT level for passive annealing is 0.0825 lb/MMBtu. The corresponding CO emission rate for this level is 0.05 lb/MMBtu.

As demonstrated in the RBLC tables, the addition of SCR would not reduce emissions below the proposed levels. As such, the use of ultralow NO_X burners with EGR is proposed as the technology to achieve BACT.

Step 5 - Selection of BACT

Based on a review of technology and the emission levels demonstrated in practice, two emission levels are proposed - one for the continuous annealing furnace and one for the passive annealing furnace. These levels are based on ULNBs with EGR. Using this technology continuous annealing furnaces should achieve emission levels of 0.06 lb/MMBtu for both NO_x and CO. For passive annealing, ULNBs with EGR is proposed, which should achieve levels of 0.0825 lb/MMBtu and 0.05 lb/MMBtu for NO_X and CO, respectively. This matches the existing passive annealing furnace.

4.4.2 BACT DEMONSTRATION FOR GHG EMISSIONS FROM ANNEALING FURNACES

This section contains a high-level review of pollutant formation and possible control technologies for natural gas combustion.

Steps 1-4: Identify, Eliminate, Rank, and Evaluate All Control Technologies

Steps 1-4 are identical to the BACT analysis for the WBFs.

Step 5 - Selection of BACT

Outokumpu proposes a CO_2e BACT of 73,695 TPY for the MAPL annealing furnace and 15,770 TPY for the passive annealing furnace. The proposed emission limits are based on the proposed maximum heat capacity and the established CO_2e emission factors.

4.5 MISCELLANEOUS NATURAL GAS COMBUSTION SOURCES

The proposed project will utilize several small natural gas-fired heaters, dryers, and furnaces throughout the facility. Table 4-7 below identifies the natural gas combustion units covered in this section.

EMISSION UNIT	EMISSION UNIT ID	MAXIMUM HEAT INPUT (MMBTU/HR)
Meltshop Hot Box	LO2A	6.0
Ladle Treatment Stand Furnace	LO2B	10
Small Holding Furnace - Phase 1	LA21	24
Small Holding Furnace - Phase 2	LA22	24
Steckel Mill Furnace – Phase 1	LA26	20.8
Steckel Mill Furnace – Phase 2	LA27	20.8
Slab Holding Furnace	LO42B	25

Particulate matter is emitted in relatively minor amounts; for the BACT assessment for PM refer to the information presented in Section 4.3.1, which discusses this pollutant for the reheat furnaces.

4.5.1 BACT DEMONSTRATION FOR NO_X EMISSIONS FROM MISCELLANEOUS NATURAL GAS COMBUSTION SOURCES

The NO_x generated from these processes is thermal NO_x from the combustion of natural gas.

Step 1 - Identify All Control Technologies

Four available technologies were evaluated to control NO_x emissions from the stainless steel annealing line furnace operations. They are:

- SCR
- SNCR
- Low-NO_X burner
- Good Combustion practices

These control technologies were described in Section 4.3.

Step 2 - Eliminate Technically Infeasible Options

All technologies are considered feasible for the control of NO_X.

Step 3 - Rank Remaining Technically Feasible Control Options

Table 4-3 shows the rankings of the options for controlling NO_X emissions from the miscellaneous natural gas combustion units listed in this section.

Table 4-3 Ranking of Control Technologies for NO_X from Miscellaneous Natural Gas Combustion Sources

CONTROL TECHNOLOGY	EFFICIENCY	RANK
SCR	70-90%	1
Low-NOX Burners	Up to 80%	1
SNCR	25-75%	2
Good Combustion Practices	Varies	3

For these sources, the highest ranking control technologies for the control of NO_X include SCR and SNCR. Outokumpu evaluated the cost effectiveness for both SCR and SNCR following inlet emissions from low-NO_X burners. As low-NOX burners lower the inlet loading of NO_X to the potential control device, SCR or SNCR would not achieve the high end of their respective control efficiencies.

Step 4 - Evaluate Remaining Control Technologies

A cost analysis for SCR and SNCR determined that both technologies are beyond the acceptable range of BACT cost effectiveness for this type of emission unit. Cost analysis calculations are based on the OAQPS Control Cost Manual. A summary of the cost feasibility analysis is provided in Table 4-4 below. Tables C-20 through C-29 provide the costs analyses for these units.

Table 4-4 Control Equipment Cost Analyses

EMISSION UNIT	SCR EMISSION REDUCTION (TPY)	COST ($/TON)	SNCR EMISSION REDUCTION (TPY	COST ($/TON)
Meltshop Hot Box	2.37	$20,500	1.31	$34,100
Ladle Treatment Stand Furnace	3.94	$17,100	2.19	$25,700
Small Holding Furnaces	9.46	$12,800	5.26	$15,900
Steckel Mill Furnaces	8.20	$13,400	4.56	$17,200
Slab Holding Furnace	9.86	$12,600	5.48	$15,600

Tables C-6 provides the RBLC results for similarly sized natural gas fired units. The RBLC database search results range from 0.06 lb/MMBtu to 0.1 lb/MMBtu with the majority of the limits at 0.1 lb/MMBtu for similar natural gas combustion units at steel mills. Additionally, recently issued permits for Steel Dynamics Texas (2020) and Big River Steel (2021) contain BACT emission limits of 0.1 lb/MMBtu for similarly sized natural gas combustion units.

Step 5 - **Selection of BACT**

Outokumpu proposes to utilize Low-NOx Burners, good combustion practices, and an emission rate of 0.1 lb NO_X/MMBtu as BACT from the miscellaneous natural gas combustion sources.

4.5.2 BACT DEMONSTRATION FOR CO EMISSIONS FROM MISCELLANEOUS NATURAL GAS COMBUSTION SOURCES

Steps 1-4: Identify, Eliminate, Rank, and Evaluate All Control Technologies

Steps 1-4 are identical to the BACT analysis for the WBFs. Table C-7 provides the RBLC results for similarly sized natural gas units. The RBLC database search results range from 0.082 lb/MMBtu to 0.687 lb/MMBtu with the majority of the limits at 0.082 lb/MMBtu for similar natural gas combustion units at steel mills. Additionally, recently issued permits for Steel Dynamics Texas (2020) ang Big River Steel (2021) contain BACT emission limits of 0.082. This is equivalent to 84 lb/MMscf of natural gas.

Step 5 - **Selection of BACT**

Outokumpu proposes to utilize good combustion practices and an emission rate of 84 lb CO/MMscf as BACT from the miscellaneous natural gas combustion sources.

4.5.3 BACT DEMONSTRATION FOR GHG EMISSIONS FROM MISCELLANEOUS NATURAL GAS COMBUSTION SOURCES

This section contains a high-level review of pollutant formation and possible control technologies for natural gas combustion.

Steps 1-4: Identify, Eliminate, Rank, and Evaluate All Control Technologies

Steps 1-4 are identical to the BACT analysis for the WBFs.

Step 5 - **Selection of BACT**

Outokumpu proposes a CO_2e BACT for the miscellaneous natural gas combustion sources as follows:

- Meltshop Hot Box- 3,092 TPY CO_2e
- Ladle Treatment Stand Furnace – 5,154 CO_2e
- Small Holding Furnaces – 12,368 CO_2e
- Steckel Mill Furnaces – 5,353 CO_2e
- Slab Holding Furnace – 12,884 CO_2e

The proposed emission limits are based on the proposed maximum heat capacity and the established CO_2e emission factors.

4.6 ROUGHING MILL AND FINISHING STAND

The proposed Steckel mill will include two roughing mill and two finishing stands. The roughing mill is responsible for reducing the thickness of the steel slab through a series of heavy-duty rollers, preparing it for further processing. The finishing stands perform the final shaping and sizing of the steel, achieving the desired dimensions and surface quality before it is ready for use or subsequent manufacturing processes.

4.6.1 BACT DEMONSTRATION FOR FILTERABLE PM, TOTAL PM_{10}, AND TOTAL $PM_{2.5}$ EMISSIONS FROM ROUGHING MILL AND FINISHING STANDS

Filterable PM, $PM_{10,}$ and $PM_{2.5}$ are emitted from the process due to the friction between the rollers and the steel, the presence of scale or surface contaminants on the steel, and the movement of materials during the rolling process.

Step 1 - Identify All Control Technologies

Four available technologies were evaluated to control particulate emissions from the roughing mill and finishing stands operations. They are:

- Baghouse/Fabric Filter
- Electrostatic Precipitator
- Wet Scrubber/Mist Eliminator
- Cyclone

Step 2 - Eliminate Technically Infeasible Options

Any control technology must be technically feasible and effective and economical in reducing PM emissions from the roughing mill and finishing stands operations. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

Baghouse/Fabric Filter

Process exhaust gas passes through a tightly woven or felted fabric arranged in sheets, cartridges, or bags that collect PM via sieving and other mechanisms. The dust cake that accumulates on the filters increases collection efficiency. Various cleaning techniques include pulse-jet, reverse-air, and shaker technologies.

Electrostatic Precipitator (ESP)

Electrodes stimulate the waste gas and induce an electrical charge in the entrained particles. The resulting electrical field forces the charged particles to the collector walls from which the material may be mechanically dislodged and collected in dry systems or washed with a water deluge in wet systems.

Wet Scrubber/Mist Eliminator

A scrubbing liquid introduced into the gas stream captures and collects entrained particles. In the case of a venturi scrubber, the turbulent airflow atomizes the scrubbing liquid to increase droplet-particle interaction. The droplets containing particles are typically separated from the exhaust gas in a downstream cyclonic separator and/or mist eliminator.

Cyclone

Centrifugal forces drive particles in the gas stream toward the cyclone walls as the waste gas flows through the conical unit. The captured particles are collected in a material hopper below the unit.

Step 3 - Rank Remaining Technically Feasible Control Options

All technologies are determined to be technically feasible.

Step 4 - Evaluate Remaining Control Technologies

Table C-8 lists filterable PM emissions from roughing mill and finishing stand operations taken from the RBLC database. The lowest limit identified in the RBLC database, 0.0002 gr/dscf, was associated with two sources at the Nucor Gallatin Mill (6-Stand Finishing Mill and 2 Stand Roughing Mill) using Good Work Practices (GWP) for control. This source has not yet been installed. The second lowest value is 0.0044 gr/dscf for two finishing stands at what is now AM/NS Calvert using a wet ESP (WESP) as control. Outokumpu is proposing this emission level of 0.0044 gr/dscf using a WESP as BACT for the roughing mill and finishing stands combined source.

Table C-9 lists total PM_{10} emissions from roughing mill and finishing stand operations taken from the RBLC database. The lowest limits identified in the RBLC database, 0.0002 and 0.0003 gr/dscf, were associated with two sources at the Nucor Gallatin Mill (6-Stand Finishing Mill and 2 Stand Roughing Mill) using Good Work Practices (GWP) for control. This source has not yet been installed. The second lowest value is 0.0044 gr/dscf for two finishing stands at what is now AM/NS Calvert using a WESP as control. The sources are only listed for filterable PM in the RBLC, however a review of the permit indicates that the 0.0044 gr/dscf is applicable to PM_{10} emissions as well. Outokumpu is proposing this emission level of 0.0044 gr/dscf using a WESP as BACT for the roughing mill and finishing stands combined source.

Table C-10 lists total $PM_{2.5}$ emissions from roughing mill and finishing stand operations taken from the RBLC database. The lowest limit identified in the RBLC database, 0.0001 gr/dscf, was associated with two sources at the Nucor Gallatin Mill (6-Stand Finishing Mill and 2 Stand Roughing Mill) using Good Work Practices (GWP) for control. These sources have not yet been installed. The second lowest value is 0.0025 gr/dscf a Steckel Mill Finishing Stand at Nucor Brandenburg. Outokumpu is proposing this emission level of 0.0025 gr/dscf using a WESP as BACT for the roughing mill and finishing stands combined source.

4.7 MAPL DEGREASING, SODIUM SULFATE PICKLING, AND MIXED ACID PICKLING

In the proposed MAPL, the degreasing and pickling lines will produce a liquid pickling liquor mist as particulate emissions. These units are assessed under BACT in the same section. The mixed acid pickling line will also form NO_X emissions, which are discussed in Section 4.7.2.

4.7.1 BACT DEMONSTRATION FOR FILTERABLE PM, TOTAL PM_{10}, AND TOTAL $PM_{2.5}$ EMISSIONS FROM DEGREASING AND PICKLING

Filterable PM, $PM_{10,}$ and $PM_{2.5}$ are emitted from the pickling process as liquid pickling liquor mist. This type of stream is also created in the degreasing operation. The following analysis provides the BACT determination for PM mist emissions.

Step 1 - Identify All Control Technologies

The alternatives that are potentially available to control PM emissions from the pickling and degreasing processes include the following:

- Wet scrubbers
- Mesh pad mist eliminators

Step 2 - Eliminate Technically Infeasible Options

Any control technology must be technically feasible and effective and economical in reducing PM mist emissions from the pickling process. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

Wet Scrubbers

Wet scrubbers are technically feasible but have some disadvantages when compared to a static mist elimination system. Scrubber systems require pumps to provide a constant spray of water/solution and have high-pressure drops. These combine in relatively high system operating costs. They also require water treatment and possible sludge disposal. Research did identify scrubbers used to control particulates from pickling processes. Based on the operational, energy, and environmental issues, this technology is considered viable for this application and is suitable for controlling all types of pickling liquor solutions.

Mesh Pad Mist Eliminators

The principles of operation of mesh pad mist eliminators are based on the principle of impingement and coalescing. Mesh pad mist eliminators are not as efficient as scrubbers in separating water particles from a gas stream but have other advantages. The advantage of mist eliminators is that no large pumps are required to circulate and atomize a spray solution, as required in a scrubber. Mist eliminator installations are technically feasible with all pickling liquors and are widely used in the pickling process to control PM emissions.

Step 3 - Rank Remaining Technically Feasible Control Options

The control technologies were reviewed for technical feasibility in controlling PM emissions from the pickling process. The highest-ranking and most efficient control option is a wet scrubber.

Step 4 - Evaluate Remaining Control Technologies

Table C-11 lists PM emissions from pickling operations taken from the RBLC database. The lowest limit identified in the RBLC database, 0.0015 gr/dscf, was associated with a pickling line at the Nucor Gallatin Mill using wet scrubber and mist eliminator in tandem that was never installed. The second lowest value is 0.0022 gr/dscf for two sources at Big River Steel using a wet scrubber as control. Outokumpu is proposing this emission level of 0.0022 gr/dscf using a wet scrubber as BACT for the degreasing, electrolytic pickling, and mixed acid pickling.

Table C-12 lists total PM_{10} emissions from pickling operations taken from the RBLC database. The lowest limit identified in the RBLC database, 0.0013 gr/dscf, was associated with a pickling line at the Nucor Gallatin Mill using wet scrubber and mist eliminator in tandem that was never installed. The second lowest value is 0.0022 gr/dscf for two sources at Big River Steel using a wet scrubber as control. Outokumpu is proposing this emission level of 0.0022 gr/dscf using a wet scrubber as BACT for the degreasing, electrolytic pickling, and mixed acid pickling.

Table C-13 lists $PM_{2.5}$ emissions from pickling operations taken from the RBLC database. The lowest limit identified in the RBLC database, 0.0013 gr/dscf, was associated with a pickling line at the Nucor Gallatin Mill using wet scrubber and mist eliminator in tandem that was never installed. The second lowest value is 0.0022 gr/dscf for two sources at Big River Steel using a wet scrubber as control. Outokumpu is proposing this emission level of 0.0022 gr/dscf using a wet scrubber as BACT for the degreasing, electrolytic pickling, and mixed acid pickling.

Step 5 - Selection of BACT

Outokumpu is proposing the following limits as BACT for this process using a wet scrubber:

- 0.0022 gr/dscf of PM (filterable only)
- 0.0022 gr/dscf of total PM_{10}
- 0.0022 gr/dscf of total $PM_{2.5}$

4.7.2 BACT DEMONSTRATION FOR NO_X EMISSIONS FROM MIXED ACID PICKLING AND ACID REGENERATION

The stainless steel pickling process uses a combination of nitric and hydrofluoric acids to clean the surface of the stainless steel. As a result of the reaction between the steel and nitric acid, NO_X is generated and released. The NO_X emissions are similarly generated in the Acid Regeneration Plant – Process Gas exhaust stream.

Step 1 - Identify All Control Technologies

The alternatives that are potentially available to control NO_X emissions from the pickling and ARP process include the following:

- Wet scrubbers
- De-NO_X SCR

Step 2 - Eliminate Technically Infeasible Options

Any control technology must be technically feasible and effective and economical at reducing NO, emissions from the pickling process.

Wet Scrubbers

The principles of operation of wet scrubbers are similar to that described in Section 4.8.1. Wet scrubbers are technically feasible but their efficiency is very susceptible to fluctuations in inlet process conditions. Scrubber systems are traditionally used as acid and NO, control devices. Research indicated scrubbers are being used to control NO, and other emissions from the pickling processes. Based on the operational, energy and environmental issues, this technology is considered viable for this application.

De-NO_X Selective Catalytic Reduction

SCR uses a catalyst to react with injected NH_3 to chemically reduce NO_X. It can achieve up to a 94% destruction removal efficiency (DRE) and is one of the most effective NO_X abatement techniques. The key to SCR is a chemical reduction reaction between NH_3 and NO_X under certain conditions. The reaction between NO_X and NH_3 can occur without the use of a catalyst, but only at temperatures more than 1,500 °F. To achieve NO_X reduction at a lower temperature, the reaction must be assisted by the use of catalysts such as titanium or vanadium plated onto a honeycomb or plate-type module placed in the exhaust gas path. This assembly is called an SCR reactor. When NH_3 is mixed with NO_X in the exhaust gases and passed through the reactor, NO_X is converted to nitrogen and water vapor.

The successful application of SCR requires the availability of a temperature "window" that is stable and suitable for the SCR reaction, and sufficient static pressure to accommodate the added pressure drop across the SCR catalyst. The ideal temperature range for SCR application is 600 to 800 °F. The SCR also requires space in the gas path for both an NH_3 injection system and the SCR reactor. The space requirements or pressure drop caused by the injection system are usually not a problem. The SCR reactor, however, requires the most space and entails considerable pressure loss.

The principle of operation of any SCR catalyst technology is to convert pollutant molecules into N_2, CO_2, and H_2O at reduced temperatures by passing the pollutant molecules over a catalyst in the presence of NH_3/urea molecules. In the de-NO_X technology, NO_X is converted to molecular nitrogen (N_2). The advantage of de-NOx SCR is that it can operate efficiently under a wide range of fluctuating process conditions. However, fluoride and other corrosive gases generated during the HF acid pickling stage is corrosive to the SCR unit and must first be removed in a pre-scrubber before entering the SCR unit. The technology is considered technically feasible for this application.

Step 3 - Rank Remaining Technically Feasible Control Options

Various alternatives were reviewed for technical feasibility in controlling NO_X emissions from the pickling process. The highest-ranking and most widely used control option in the industry is the wet scrubber. Traditional NO_X control measures for pickling processes have included scrubbers that achieve exit concentrations in the range 100 to 175 ppm. Modern steel mills that have undertaken recent modifications or construction of new stainless steel pickling lines, have identified de-NO_X, SCR technology as the most effective and economical control device to limit NO, emissions. The economic justification of using a de-NO_X SCR stems from the operational flexibility provided by this type of control system, specifically when the stainless strip pickling process changes from austenitic to ferritic and vice versa. The change in the type of stainless requires different solutions of pickling liquors. Traditional scrubber control systems are incapable of responding to the instant process change and are very unstable, resulting in wide fluctuations in control efficiency.

Step 4 - Evaluate Remaining Control Technologies

Table C-14 lists NO_X emissions from pickling operations taken from the RBLC database. In reviewing the emission, the typical emission limit identified is an exhaust concentration of 100 ppm. While this is listed as achievable using scrubber technology only, Outokumpu will utilize the pre-scrubber and de-NOX SCR to meet this limit.

Step 5 - Selection of BACT

BACT for stainless steel pickling operations has been identified as de-NO_X SCR and associated pre-scrubber (as required by the PM BACT analysis) with an emission factor of 100 ppm.

4.8 COLD ROLLING MILL

In a cold rolling mill, the steel strip is passed through an enclosed mill, where a series of rolls reduces the sheet thickness in small increments. The rolls are sprayed with an emulsion of mineral oil and which is liberally applied to both the sheet and the rolls. The application of this emulsion is necessary to reduce the friction between the roll and the sheet, and without it cold rolling would not be practical. The entire cold-roll machine is kept under negative pressure by a fan that is ducted to the control device, which is typically a mist eliminator. The air contains small droplets of oil entrained in the air. Because oil at standard temperatures is a liquid and the air temperature in this stream is not much higher than ambient, the stream is a mist and is best described as entrained particulate that would be detected as particulate in standard USEPA method testing. The volatile portion of the stream is negligible and, therefore, no VOCs are emitted from these units.

4.8.1 BACT DEMONSTRATION FOR FILTERABLE PM, TOTAL PM_{10}, AND TOTAL $PM_{2.5}$ EMISSIONS FROM COLD ROLLING MILLS

Step 1 - Identify All Control Technologies

The following technologies were identified as potentially applicable:

- Cyclone
- Mist eliminator
- Oxidizer
- scrubber

Oxidizer

The stream could be treated by passing it through a large oxidizer that would combust the oil droplets as it passes through.

Cyclone

The oil droplets could be separated by centrifugal forces imparted in a cyclone.

Mist Eliminator

The air could be passed through a mesh cloth filter, and the oil droplets would coalesce on the filter and drain from the bottom of the unit and are collected.

Scrubber

A traditional venturi scrubber could be used to reduce oil droplets by inertial impaction.

Step 2 - Eliminate Technically Infeasible Options

These streams generally have high flowrates of air ranging from 50,000 to 250,000 cubic feet per minute (cfm). Oxidizing such a stream would require a regenerative thermal oxidizer (RTO). The RTO would require up to 45 MMBtu/hr of natural gas feed, which would create 10 tons per year of NO_x and require considerable electrical energy to surpass the pressure drop in the RTO. In addition, it is plausible that oil would coat the face of the RTO, causing a fire hazard. These facts eliminate this technology as being feasible.

A cyclone could not achieve a very good separation because the oil droplet density is not great enough to allow the smaller-diameter emulsion droplets to separate from the stream. A water scrubber would create a large stream of effluent that would be difficult to treat, and because the density of the particle is low, a significant amount of separation is unlikely.

Step 3 - Rank Remaining Technically Feasible Control Options

The only technology remaining is a mist eliminator.

Step 4 - Evaluate Remaining Control Technologies

Table C-15 lists the filterable PM emissions limits and controls from various recently permitted steel mills. Only four such listings were found in the USEPA RBLC database. As previously discussed, only mist eliminators have been used for this application. The lowest listing for filterable PM has been tested and is following its permit limit of 0.0025 grains per dry standard cubic foot (gr/dscf).

Table C-16 lists the total PM_{10} emissions limits and controls from various recently permitted steel mills. Only four such listings were found in the USEPA RBLC database. As previously discussed, only mist eliminators have been used for this application. The lowest listing for total PM_{10} is 0.0024 gr/dscf which has not been installed. The lowest established limit is 0.0063 gr/dscf at Nucor Berkeley. Nevertheless, Outokumpu is proposing to go lower than BACT to meet ambient air quality requirements for the facility.

Table C-17 lists the total $PM_{2.5}$ emissions limits and controls from various recently permitted steel mills. Only three such listings were found in the USEPA RBLC database. As previously discussed, only mist eliminators have been used for this application. The lowest listing for total $PM_{2.5}$ is 0.0013 gr/dscf which has not been installed. The lowest established limit is 0.0066 gr/dscf at Nucor Berkeley. Nevertheless, Outokumpu is proposing to go lower than BACT to meet ambient air quality requirements for the facility.

Step 5 - Selection of BACT

Outokumpu is proposing BACT for filterable PM and more stringent limits than BACT for total PM_{10} and total $PM_{2.5}$ for this process using a properly sized mist eliminator:

- 0.0025 gr/dscf of PM (filterable only)
- 0.0024 gr/dscf of total PM_{10}
- 0.0013 gr/dscf of total $PM_{2.5}$

4.9 MIXED ACID REGENERATION

4.9.1 BACT DEMONSTRATION FOR FILTERABLE PM, TOTAL PM_{10}, AND TOTAL $PM_{2.5}$ EMISSIONS FROM MIXED ACID REGENERATION

PM_{10}/$PM_{2.5}$ is emitted from the acid regeneration process as Fe_20_3 from the bagging operations and as fine traces of dust from the absorption column. The following analysis provides the BACT determination for PM/PM_{10}/$PM_{2.5}$ mist emissions.

Step 1 - Identify All Control Technologies

The alternatives that are potentially available to control PM/PM_{10}/$PM_{2.5}$ emissions from the acid regeneration process include:

- Baghouse (Fe_2O_3 process)
- Wet scrubbers (acid fumes)
- Mesh pad mist eliminators

Step 2 - **Eliminate Technically Infeasible Options**

Control technology must be technically feasible and effective and economical in reducing PM/PM_{10}/$PM_{2.5}$ emissions from the process. The acid regeneration process generates both dust and fume emissions, requiring different control technologies.

Step 3 - **Rank Remaining Technically Feasible Control Options**

Various control alternatives were reviewed for technical feasibility in controlling PM/PM_{10}/$PM_{2.5}$ emissions from the acid regeneration process. The highest-ranking and most efficient control option is a baghouse for the Fe_2O_3 and a caustic scrubber at the acid absorber exhaust.

Step 4 - Evaluate Remaining Control Technologies

The USEPA RBLC database did not list information for any pickling acid regeneration process. A review of Title V permits was completed, and an acid regeneration process was identified for Steel Dynamics in Butler, Indiana, which has a permitted emission limit of 0.04 gr/dscf. The control technology associated with this process is a wet scrubber. Therefore, the lowest emission factor identified from the various sources is 0.04 gr/dscf.

Step 5 - **Selection of BACT**

A review of available information identified a baghouse for the Fe_2O_3 and a caustic scrubber using sodium thiosulphate and caustic soda as a scrubber liquid at the acid absorber exhaust.

BACT for the iron oxide handling (LA71) determined to be a baghouse with a concentration of 0.0020 gr/dscf. BACT to control particulates from the acid regeneration process is determined to be concentration of 0.0043 gr/dscf using a wet scrubber.

4.9.2 BACT DEMONSTRATION FOR CO EMISSIONS FROM MIXED ACID REGENERATION

The BACT analysis for CO emissions from the Miscellaneous Natural Gas Combustion Sources in Section 4.5.2 is also applicable to this source. Outokumpu proposes to utilize good combustion practices and an emission rate of 84 lb CO/MMscf as BACT.

4.9.3 BACT DEMONSTRATION FOR GHG EMISSIONS FROM MIXED ACID REGENERATION

This section contains a high-level review of pollutant formation and possible control technologies for natural gas combustion from the roaster in the ARP.

Steps 1-4: Identify, Eliminate, Rank, and Evaluate All Control Technologies

Steps 1-4 are identical to the BACT analysis for the WBFs.

Step 5 - Selection of BACT

Outokumpu proposes a CO_2e BACT of 5,540 TPY for the ARP Process Gas. The proposed emission limit is based on the proposed maximum heat capacity and the established CO_2e emission factors.

4.9.4 BACT DEMONSTRATION FOR FILTERABLE PM, TOTAL PM_{10}, AND TOTAL $PM_{2.5}$ EMISSIONS FROM COLD ROLLING MILLS

Step 1 - Identify All Control Technologies

The following technologies were identified as potentially applicable:

- Cyclone
- Mist eliminator
- Oxidizer
- Scrubber

Oxidizer

The stream could be treated by passing it through a large oxidizer that would combust the oil droplets as it passes through.

Cyclone

The oil droplets could be separated by centrifugal forces imparted in a cyclone.

Mist Eliminator

The air could be passed through a mesh cloth filter, and the oil droplets would coalesce on the filter and drain from the bottom of the unit and are collected.

Scrubber

A traditional venturi scrubber could be used to reduce oil droplets by inertial impaction.

Step 2 - Eliminate Technically Infeasible Options

These streams generally have high flowrates of air ranging from 50,000 to 250,000 cubic feet per minute (cfm). Oxidizing such a stream would require a regenerative thermal oxidizer (RTO). The RTO would require up to 45 MMBtu/hr of natural gas feed, which would create 10 tons per year of NO_x and require considerable electrical energy to surpass the pressure drop in the RTO. In addition, it is plausible that oil would coat the face of the RTO, causing a fire hazard. These facts eliminate this technology as being feasible.

A cyclone could not achieve a very good separation because the oil droplet density is not great enough to allow the smaller-diameter emulsion droplets to separate from the stream. A water scrubber would create a large stream of effluent that would be difficult to treat, and because the density of the particle is low, a significant amount of separation is unlikely.

Step 3 - Rank Remaining Technically Feasible Control Options

The only technology remaining is a mist eliminator.

Step 4 - Evaluate Remaining Control Technologies

Table C-15 lists the filterable PM emissions limits and controls from various recently permitted steel mills. Only four such listings were found in the USEPA RBLC database. As previously discussed, only mist eliminators have been used for this application. The lowest listing for filterable PM has been tested and is following its permit limit of 0.0025 grains per dry standard cubic foot (gr/dscf).

Table C-16 lists the total PM_{10} emissions limits and controls from various recently permitted steel mills. Only four such listings were found in the USEPA RBLC database. As previously discussed, only mist eliminators have been used for this application. The lowest listing for total PM_{10} is 0.0024 gr/dscf which has not been installed. The lowest established limit is 0.0063 gr/dscf at Nucor Berkeley. Nevertheless, Outokumpu is proposing to go lower than BACT to meet ambient air quality requirements for the facility.

Table C-17 lists the total $PM_{2.5}$ emissions limits and controls from various recently permitted steel mills. Only three such listings were found in the USEPA RBLC database. As previously discussed, only mist eliminators have been used for this application. The lowest listing for total $PM_{2.5}$ is 0.0013 gr/dscf which has not been installed. The lowest established limit is 0.0066 gr/dscf at Nucor Berkeley. Nevertheless, Outokumpu is proposing to go lower than BACT to meet ambient air quality requirements for the facility.

Step 5 - Selection of BACT

Outokumpu is proposing BACT for filterable PM and more stringent limits than BACT for total PM_{10} and total $PM_{2.5}$ for this process using a properly sized mist eliminator:

- 0.0025 gr/dscf of PM (filterable only)
- 0.0024 gr/dscf of total PM_{10}
- 0.0013 gr/dscf of total $PM_{2.5}$

4.10 SHOTBLASTING

Particulate emissions are generated from the shotblasting operation.

4.10.1 BACT DEMONSTRATION FOR FILTERABLE PM, TOTAL PM_{10}, AND TOTAL $PM_{2.5}$ EMISSIONS FROM SHOTBLASTING

Step 1 - Identify All Control Technologies

The following technologies were identified as potentially applicable:

- Baghouse/Fabric Filter
- Cyclone
- Wet Scrubber

Baghouse/Fabric Filter

The principles of operation of fabric filters are described in Section 4.6.1. Fabric filters are one of the most efficient means of separating particles from a gas stream. The advantage of fabric filters is that the efficiency is largely insensitive to the physical characteristics of the gas stream and changes in the dust loading. Baghouse installations are technically feasible and are the industry standard for controlling PM emissions from shotblasting operations.

Oxidizer

The stream could be treated by passing it through a large oxidizer that would combust the oil droplets as it passes through.

Cyclone

The dust particles could be separated by centrifugal forces imparted in a cyclone. However, high velocities must be established, and fine dust would not be effectively removed. Based on the operational, energy, and environmental issues, this technology is not considered viable for this application.

Wet Scrubber

The principles or operation for wet scrubbers are similar to that described in Section 4.6.1. Wet scrubbers are technically feasible but have some disadvantages compared to static filter media systems. Scrubber systems require pumps to provide a constant spray or water/solution and have high pressure drops. These combine in relatively high system operating costs. They also require water treatment and possible sludge disposal. Based on the operational, energy, and environmental issues this technology is not considered viable for this application.

Step 2 - Eliminate Technically Infeasible Options

A cyclone could not achieve a very good separation because the density of some dust types may not be great enough to allow the smaller-diameter particles to separate from the stream. A water scrubber would create a large stream of effluent that would be difficult to treat.

Step 3 - Rank Remaining Technically Feasible Control Options

The only technology remaining is a baghouse.

Step 4 - Evaluate Remaining Control Technologies

Table C-18 lists the filterable PM emissions limits and controls from various recently permitted steel mills. Only five such listings were found in the USEPA RBLC database. As previously discussed, only baghouses have been used for this application. The lowest listing for filterable PM has been tested and is following its permit limit of 0.0030 grains per dry standard cubic foot (gr/dscf).

For total PM_{10} and $PM_{2.5}$, the RBLC database provides two recently permitted units (Big River Steel and Nucor Brandenburg) with matching 0.0030 gr/dscf emission limits for both PM_{10} and $PM_{2.5}$. Outokumpu is using lower proposed limits derived from abrasive blasting data provided by the US EPA's AP-42, Compilation of Air Pollutant Emissions Factors. Section 13.2.6 provides emissions factors for abrasive blasting including reference to shotblasting. The section and its background document[2] provide breakdowns of PM_{10} and $PM_{2.5}$ of 14.3% and 1.43% of total PM. Outokumpu is conservatively assuming $PM_{2.5}$ is equal to PM_{10}.

Step 5 - Selection of BACT

Outokumpu is proposing BACT for filterable PM and more stringent limits than BACT for total PM_{10} and total $PM_{2.5}$ for this process using a baghouse for control:

- 0.0030 gr/dscf of PM (filterable only)
- total PM_{10} is 14.3% of PM emissions
- total $PM_{2.5}$ is 14.3% of PM emissions

---

[2] J. S. Kinsey, S. Schliesser, P. Murowchick, and C. Cowherd, Development Of Particulate Emission Factors For Uncontrolled Abrasive Blasting Operations, EPA Contract No. 68-D2-0159, Midwest Research Institute, Kansas City, MO, February 1995.

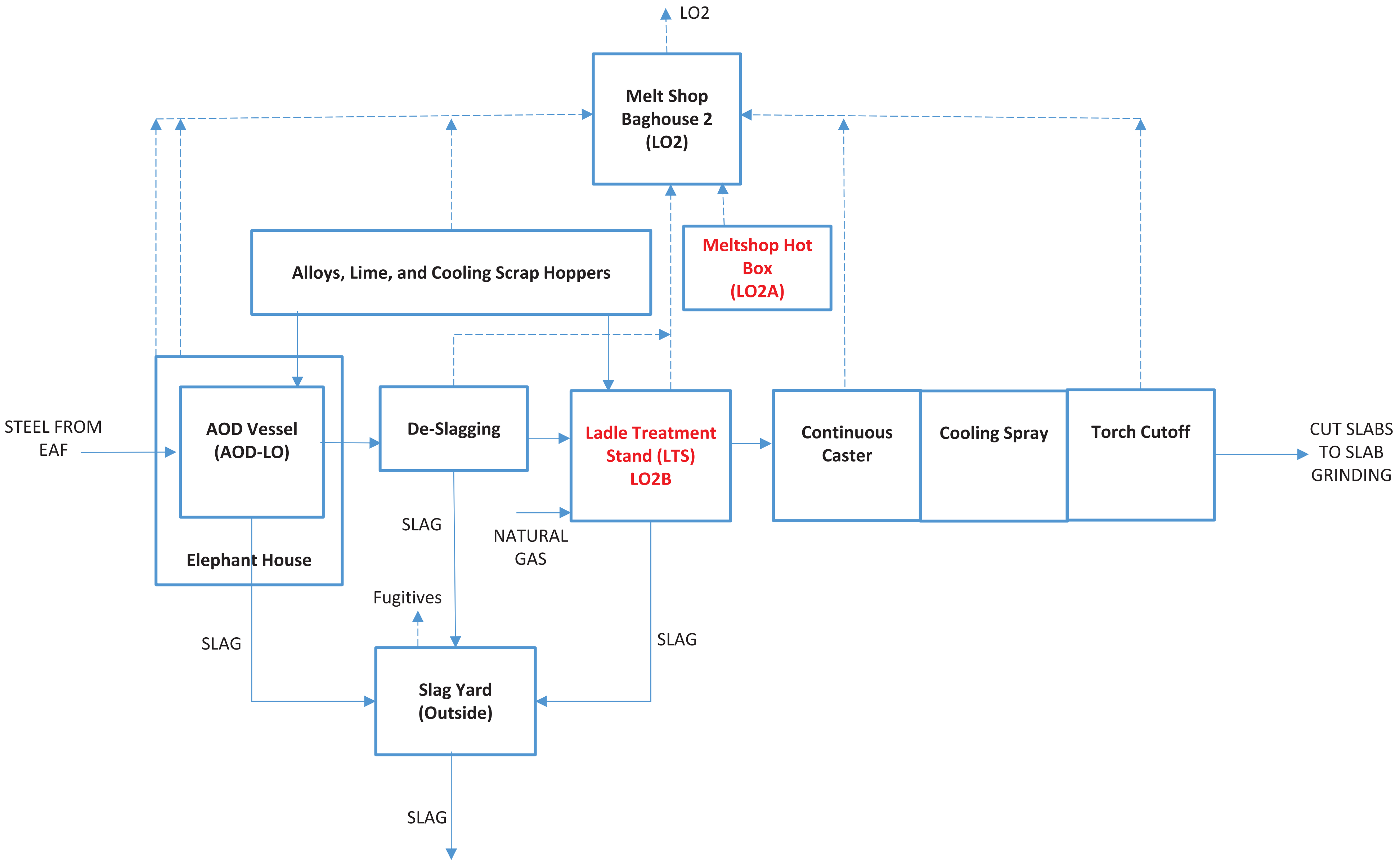
APPENDIX A

PROCESS FLOW DIAGRAMS

Prevention of Significant Deterioration Application

Outokumpu Stainless USA, LLC
1 Steel Drive
Calvert, Mobile County, Alabama

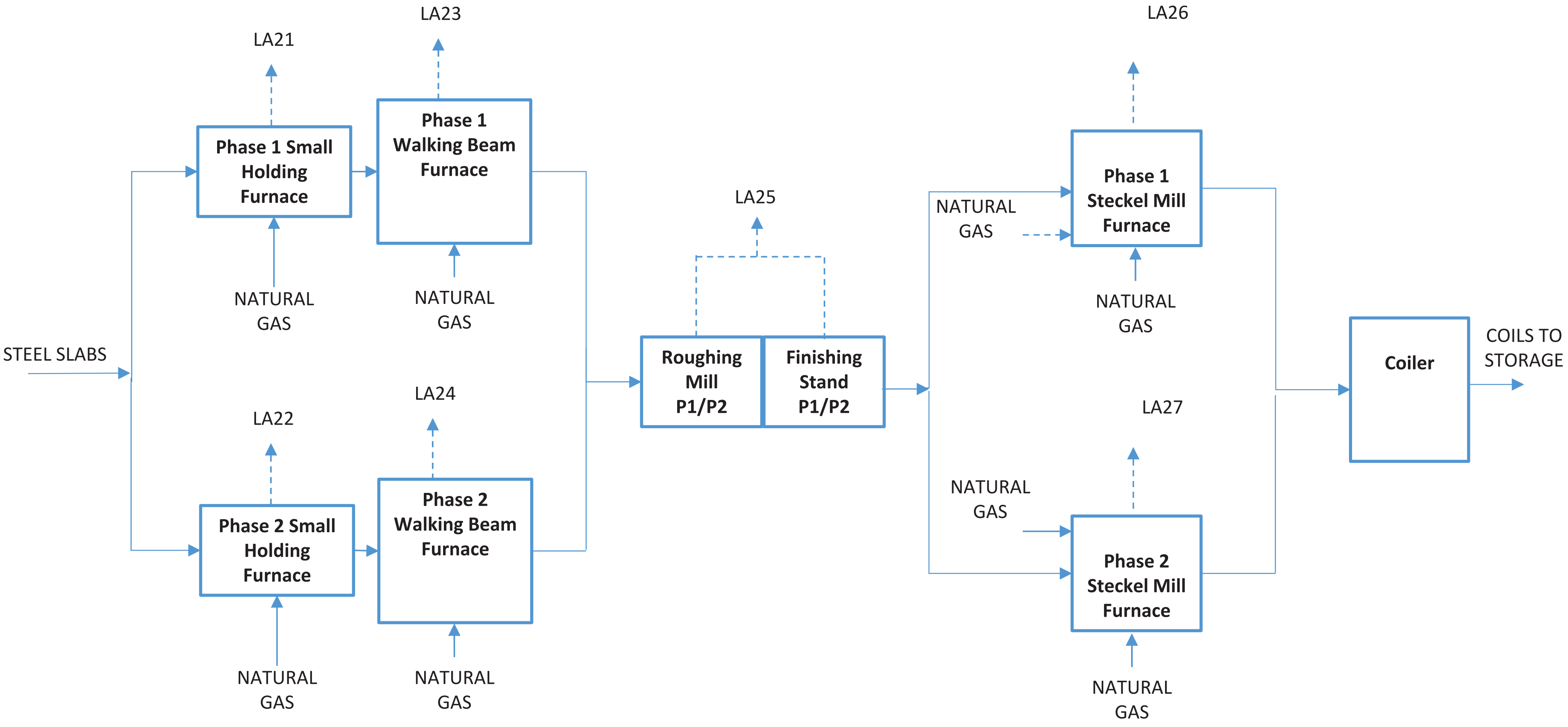
September 2023



No.	Symbol	Operation Name
1	→	Process Flow Direction
2	▭	Process Step
3	↑	Air Emission Point

Meltshop Changes
Process Flow Diagram
Outokumpu Stainless USA, LLC
Calvert, Alabama

Figure 1

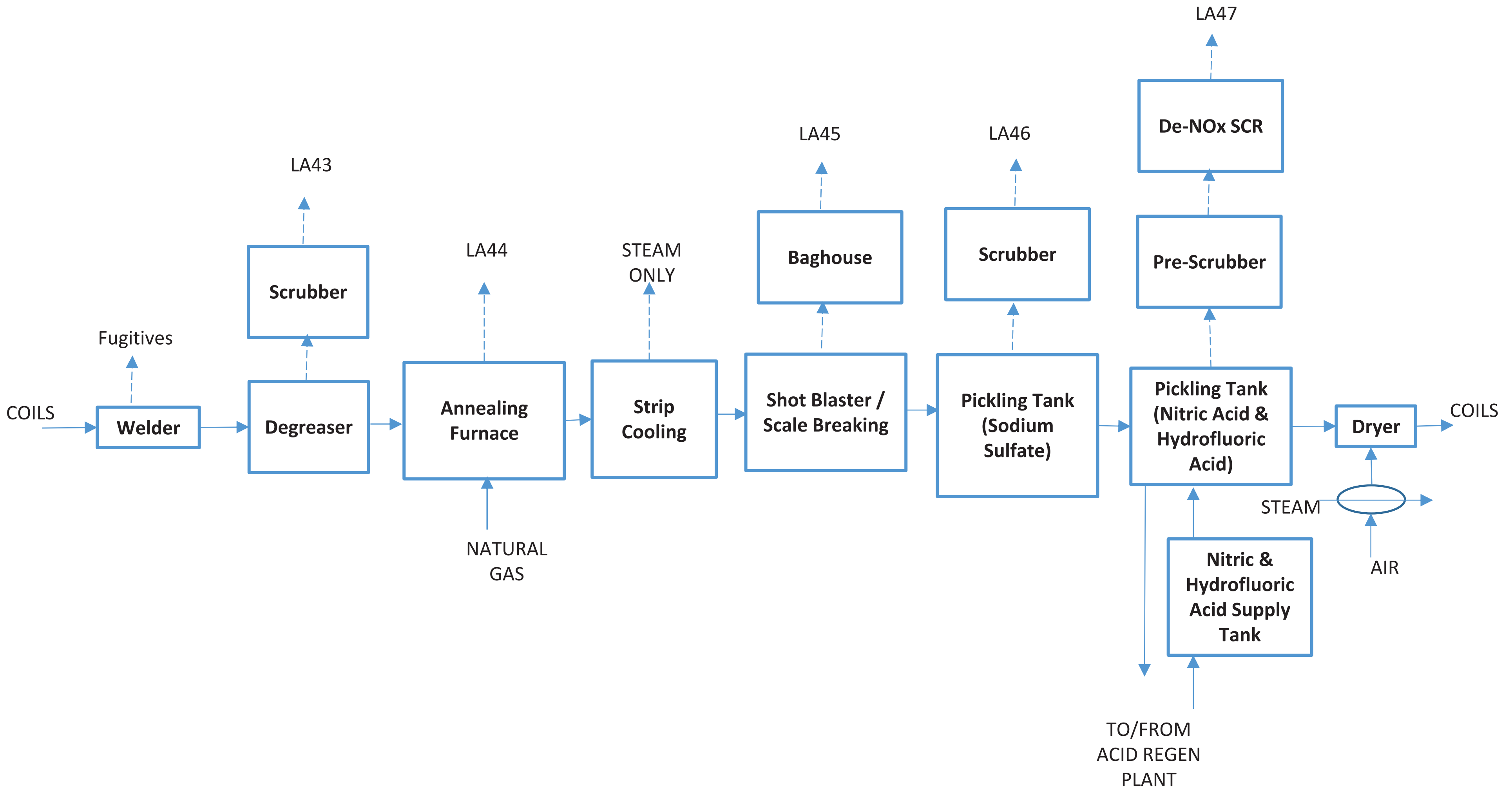


No.	Symbol	Operation Name
1	→	Process Flow Direction
2	▭	Process Step
3	⇡	Air Emission Point

SOLA ENVIRONMENTAL

Steckel Mill Process Flow Diagram
Outokumpu Stainless USA, LLC
Calvert, Alabama

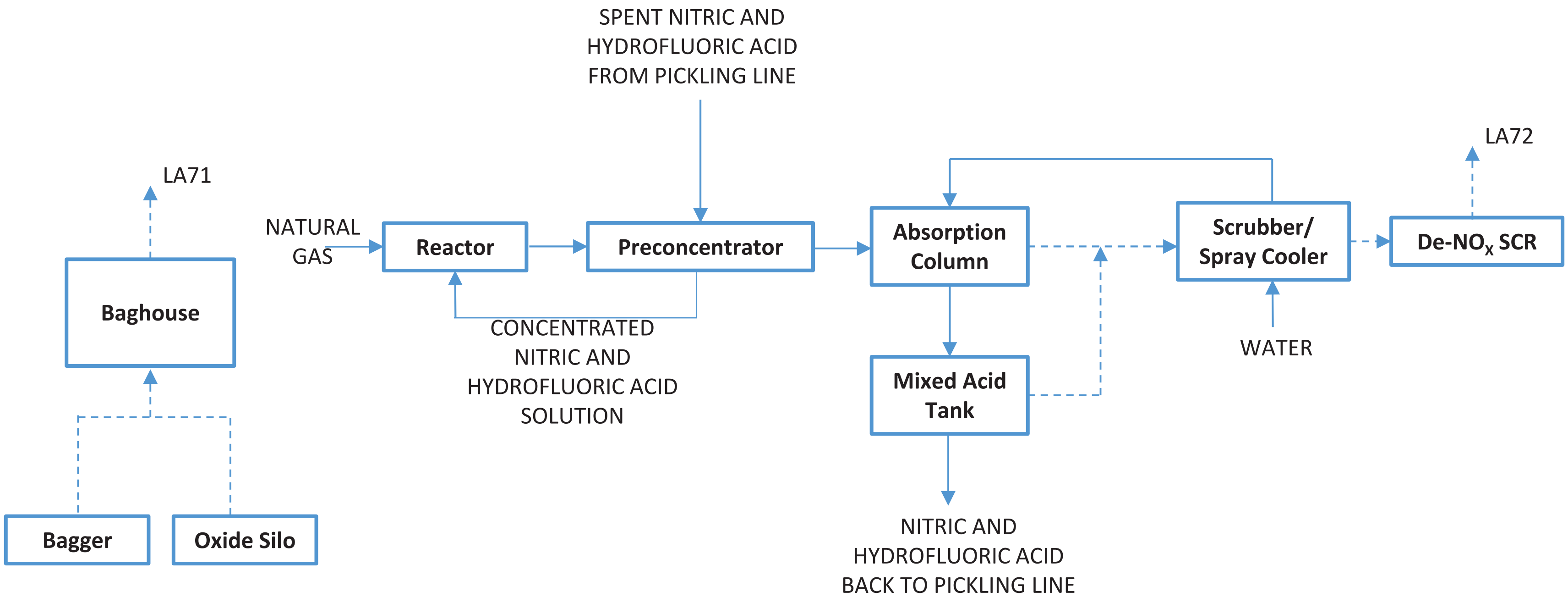
Figure 2



No.	Symbol	Operation Name
1	→	Process Flow Direction
2	▭	Process Step
3	↑	Air Emission Point

Mixed Annealing and Pickling Line
(MAPL)
Process Flow Diagram
Outokumpu Stainless USA, LLC
Calvert, Alabama

Figure 3



No.	Symbol	Operation Name
1	→	Process Flow Direction
2	▭	Process Step
3	↑	Air Emission Point

SOLA ENVIRONMENTAL

Mixed Acid Regeneration Plant (ARP)
Flow Diagram
Outokumpu Stainless USA, LLC
Calvert, Alabama

Figure 4

APPENDIX B

EMISSIONS CALCULATIONS

Prevention of Significant Deterioration Application

Outokumpu Stainless USA, LLC
1 Steel Drive
Calvert, Mobile County, Alabama

September 2023

Table B-1: Emissions Summary

Source Name		**TSP**	**PM_{10}**	**$PM_{2.5}$**	**NOx**	**SO_2**	**CO**	**VOC**	**Lead (Pb)**	**CO_2e[1]**
Steckel Mill Sources										
Small Holding Furnace Phase 1	LA21	0.78	0.783	0.783	10.5	6.18E-02	8.66	0.567	5.15E-05	12,368
Small Holding Furnace Phase 2	LA22	0.78	0.783	0.783	10.5	6.18E-02	8.66	0.567	5.15E-05	12,368
Walking Beam Furnace Phase 1	LA23	9.95	9.95	9.95	93.5	0.786	46.8	7.20	6.55E-04	157,193
Walking Beam Furnace Phase 2	LA24	9.95	9.95	9.95	93.5	0.786	46.8	7.20	6.55E-04	157,193
Roughing Mill and Finishing Stand	LA25	14.0	14.0	7.98	--	--	--	--	--	--
Steckel Mill Furnace Phase 1	LA26	0.68	0.678	0.678	9.10	0.054	7.49	0.491	4.46E-05	10,706
Steckel Mill Furnace Phase 2	LA27	0.68	0.678	0.678	9.10	0.054	7.49	0.491	4.46E-05	10,706
Annealing and Pickling Line Sources										
APL Degreasing	LA43	0.486	0.486	0.486	--	--	--	--	--	--
APL Annealing Furnace	LA44	4.67	4.67	4.67	37.6	0.368	37.6	3.44	3.07E-04	73,695
APL Shot Blaster	LA45	4.16	0.595	0.595	--	--	--	--	--	--
APL H2SO4 Pickling	LA46	0.347	0.347	0.347	--	--	--	--	--	--
APL HNO3/HF Pickling	LA47	0.661	0.661	0.661	25.1	--	--	--	--	--
Other Sources										
Meltshop Hot Box	LO2A	0.196	0.196	0.196	2.58	0.015	2.16	0.142	1.29E-05	3,092
Ladle Treatment Stand	LO2B	0.326	0.326	0.326	4.29	0.026	3.61	0.236	2.15E-05	5,154
Passive Annealing Furnace	LO41B	0.979	0.979	0.979	10.8	0.077	6.57	0.709	6.44E-05	15,461
Slab Holding Furnace	LO42B	0.816	0.816	0.816	9.31	0.064	9.02	0.590	5.37E-05	12,884
Cold Rolling Works	LO51	6.41	6.15	3.33	--	--	--	--	--	--
Mixed Acid Regeneration Plant (ARP) Analysis										
ARP Oxide Transportation	LA71	0.272	0.272	0.272	--	--	--	--	--	--
ARP DeNox	LA72	0.362	0.362	0.362	7.03	0.028	3.88	0.254	2.31E-05	5,540
Total Project Emissions Increase		56.6	52.7	43.8	323	2.38	189	21.9	0.002	476,359
PSD Major Mod Threshold		25.0	15.0	10.00	40.0	40.0	100.0	40.0	0.6	75,000
PSD Major? (Y/N)		Yes	Yes	Yes	Yes	No	Yes	No	No	Yes

Emission Point Source Calculations

Emission Point Identifier: **LO2A**
Description: **Meltshop Hot Box**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	6	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [4]	100	lb/MMscf
CO Emission Factor [4]	84	lb/MMscf
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4: *Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	0.04	0.20
PM_{10}	0.04	0.20
$PM_{2.5}$	0.04	0.20
NOx	0.59	2.58
SO_2	0.00	0.02
CO	0.49	2.16
VOC	0.03	0.14
Lead (Pb)	2.94E-06	1.29E-05
CO_2e[1]	706	3,092

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
TSP	6	0.007	0.04	0.20
PM_{10}	6	0.007	0.04	0.20
$PM_{2.5}$	6	0.007	0.04	0.20
SO_2	6	5.88E-04	0.00	0.02

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
CO	6	0.08	0.49	2.16
NOx	6	0.10	0.59	2.58
VOC	6	0.005	0.03	0.14
Lead (Pb)	6	4.90E-07	0.000	0.000

GHG Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	(kg/MMBtu)	(lb/hr)	(tons/yr)
CO_2	6	53.06	702	3,075
N_2O[3]	6	1.00E-03	0.01	0.06
CH_4	6	1.00E-04	0.00	0.01

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Firing Rate	Emission Factor [1]	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
Benzene	6	2.06E-06	1.24E-05	5.41E-05
Dichlorobenzene	6	1.18E-06	7.06E-06	3.09E-05
Formaldehyde	6	7.35E-05	4.41E-04	1.93E-03
n-Hexane	6	1.76E-03	1.06E-02	4.64E-02
Naphthalene	6	5.98E-07	3.59E-06	1.57E-05
Toluene	6	3.33E-06	2.00E-05	8.76E-05
PAH	6	8.24E-08	4.94E-07	2.16E-06
Arsenic	6	1.96E-07	1.18E-06	5.15E-06
Barium	6	4.31E-06	2.59E-05	1.13E-04
Beryllium	6	1.18E-08	7.06E-08	3.09E-07
Cadmium	6	1.08E-06	6.47E-06	2.83E-05
Chromium	6	1.37E-06	8.24E-06	3.61E-05
Cobalt	6	2.94E-06	1.76E-05	7.73E-05
Copper	6	8.33E-07	5.00E-06	2.19E-05
Manganese	6	2.94E-06	1.76E-05	7.73E-05
Mercury	6	2.55E-07	1.53E-06	6.70E-06
Molybdenum	6	1.08E-06	6.47E-06	2.83E-05
Nickel	6	2.06E-06	1.24E-05	5.41E-05
Selenium	6	2.35E-08	1.41E-07	6.18E-07
Vanadium	6	2.25E-06	1.35E-05	5.93E-05
Zinc	6	2.84E-05	1.71E-04	7.47E-04

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Point Source Calculations

Emission Point Identifier: **LO2B**
Description: **Ladle Treatment Stand**

Inputs

Description	**Value**	**Units**
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	10	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [4]	100	lb/MMscf
CO Emission Factor [4]	84	lb/MMscf
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4: *Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2

Emissions Summary

Pollutant	**Average Emission Rate (lb/hr)**	**Annual Emission Rate (tpy)**
TSP	0.07	0.33
PM_{10}	0.07	0.33
$PM_{2.5}$	0.07	0.33
NOx	0.98	4.29
SO_2	0.01	0.03
CO	0.82	3.61
VOC	0.05	0.24
Lead (Pb)	4.90E-06	2.15E-05
CO_2e[1]	1,177	5,154

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	**Firing Rate**	**Emission Factor**	**Hourly Emission Rate**	**Annual Emission Rate**
	(MMBtu/hr)	**(lb/MMBtu)**	**(lb/hr)**	**(tons/yr)**
TSP	10	0.007	0.07	0.33
PM_{10}	10	0.007	0.07	0.33
$PM_{2.5}$	10	0.007	0.07	0.33
SO_2	10	5.88E-04	0.01	0.03

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
CO	10	0.08	0.82	3.61
NOx	10	0.10	0.98	4.29
VOC	10	0.005	0.05	0.24
Lead (Pb)	10	4.90E-07	0.000	0.000

GHG Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	(kg/MMBtu)	(lb/hr)	(tons/yr)
CO_2	10	53.06	1,170	5,124
N_2O[3]	10	1.00E-03	0.02	0.10
CH_4	10	1.00E-04	0.00	0.01

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Firing Rate	Emission Factor [1]	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
Benzene	10	2.06E-06	2.06E-05	9.02E-05
Dichlorobenzene	10	1.18E-06	1.18E-05	5.15E-05
Formaldehyde	10	7.35E-05	7.35E-04	3.22E-03
n-Hexane	10	1.76E-03	1.76E-02	7.73E-02
Naphthalene	10	5.98E-07	5.98E-06	2.62E-05
Toluene	10	3.33E-06	3.33E-05	1.46E-04
PAH	10	8.24E-08	8.24E-07	3.61E-06
Arsenic	10	1.96E-07	1.96E-06	8.59E-06
Barium	10	4.31E-06	4.31E-05	1.89E-04
Beryllium	10	1.18E-08	1.18E-07	5.15E-07
Cadmium	10	1.08E-06	1.08E-05	4.72E-05
Chromium	10	1.37E-06	1.37E-05	6.01E-05
Cobalt	10	2.94E-06	2.94E-05	1.29E-04
Copper	10	8.33E-07	8.33E-06	3.65E-05
Manganese	10	2.94E-06	2.94E-05	1.29E-04
Mercury	10	2.55E-07	2.55E-06	1.12E-05
Molybdenum	10	1.08E-06	1.08E-05	4.72E-05
Nickel	10	2.06E-06	2.06E-05	9.02E-05
Selenium	10	2.35E-08	2.35E-07	1.03E-06
Vanadium	10	2.25E-06	2.25E-05	9.88E-05
Zinc	10	2.84E-05	2.84E-04	1.25E-03

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Point Source Calculations

Emission Point Identifier: **LO41B**
Description: **Passive Annealing Furnace**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	30.0	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [5]	0.0825	lb/MMBtu
CO Emission Factor [5]	0.05	lb/MMBtu
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4: *Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2
5. Established by BACT.

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	0.22	0.98
PM_{10}	0.22	0.98
$PM_{2.5}$	0.22	0.98
NOx	2.48	10.84
SO_2	0.02	0.08
CO	1.50	6.57
VOC	0.16	0.71
Lead (Pb)	1.47E-05	6.44E-05
CO_2e [1]	3,530	15,461

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
TSP	30	0.007	0.22	0.98
PM_{10}	30	0.007	0.22	0.98
$PM_{2.5}$	30	0.007	0.22	0.98
SO_2	30	5.88E-04	0.02	0.08

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	**(lb/MMBtu)**	**(lb/hr)**	**(tons/yr)**
CO	30	0.05	1.50	6.57
NOx	30	0.08	2.48	10.84
VOC	30	0.005	0.16	0.71
Lead (Pb)	30	4.90E-07	0.000	0.000

GHG Emissions

Pollutant	Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	**(kg/MMBtu)**	**(lb/hr)**	**(tons/yr)**
CO_2	30	53.06	3,510	15,373
N_2O[3]	30	1.00E-03	0.07	0.29
CH_4	30	1.00E-04	0.01	0.03

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Firing Rate	Emission Factor [1]	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
Benzene	30	2.06E-06	6.18E-05	2.71E-04
Dichlorobenzene	30	1.18E-06	3.53E-05	1.55E-04
Formaldehyde	30	7.35E-05	2.21E-03	9.66E-03
n-Hexane	30	1.76E-03	5.29E-02	2.32E-01
Naphthalene	30	5.98E-07	1.79E-05	7.86E-05
Toluene	30	3.33E-06	1.00E-04	4.38E-04
PAH	30	8.24E-08	2.47E-06	1.08E-05
Arsenic	30	1.96E-07	5.88E-06	2.58E-05
Barium	30	4.31E-06	1.29E-04	5.67E-04
Beryllium	30	1.18E-08	3.53E-07	1.55E-06
Cadmium	30	1.08E-06	3.24E-05	1.42E-04
Chromium	30	1.37E-06	4.12E-05	1.80E-04
Cobalt	30	2.94E-06	8.82E-05	3.86E-04
Copper	30	8.33E-07	2.50E-05	1.10E-04
Manganese	30	2.94E-06	8.82E-05	3.86E-04
Mercury	30	2.55E-07	7.65E-06	3.35E-05
Molybdenum	30	1.08E-06	3.24E-05	1.42E-04
Nickel	30	2.06E-06	6.18E-05	2.71E-04
Selenium	30	2.35E-08	7.06E-07	3.09E-06
Vanadium	30	2.25E-06	6.76E-05	2.96E-04
Zinc	30	2.84E-05	8.53E-04	3.74E-03

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Point Source Calculations

Emission Point Identifier: **LO42B**
Description: **Slab Holding Furnace**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	25	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [4]	0.085	lb/MMBtu
CO Emission Factor [4]	84	lb/MMscf
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4: *Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	0.19	0.82
PM_{10}	0.19	0.82
$PM_{2.5}$	0.19	0.82
NOx	2.13	9.31
SO_2	0.01	0.06
CO	2.06	9.02
VOC	0.13	0.59
Lead (Pb)	1.23E-05	5.37E-05
CO_2e[1]	2,941	12,884

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
TSP	25	0.007	0.19	0.82
PM_{10}	25	0.007	0.19	0.82
$PM_{2.5}$	25	0.007	0.19	0.82
SO_2	25	5.88E-04	0.01	0.06

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
CO	25	0.08	2.06	9.02
NOx	25	0.09	2.13	9.31
VOC	25	0.005	0.13	0.59
Lead (Pb)	25	4.90E-07	0.000	0.000

GHG Emissions

Pollutant	Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	(kg/MMBtu)	(lb/hr)	(tons/yr)
CO_2	25	53.06	2,925	12,811
N_2O[3]	25	1.00E-03	0.06	0.24
CH_4	25	1.00E-04	0.01	0.02

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Firing Rate	Emission Factor [1]	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
Benzene	25	2.06E-06	5.15E-05	2.25E-04
Dichlorobenzene	25	1.18E-06	2.94E-05	1.29E-04
Formaldehyde	25	7.35E-05	1.84E-03	8.05E-03
n-Hexane	25	1.76E-03	4.41E-02	1.93E-01
Naphthalene	25	5.98E-07	1.50E-05	6.55E-05
Toluene	25	3.33E-06	8.33E-05	3.65E-04
PAH	25	8.24E-08	2.06E-06	9.02E-06
Arsenic	25	1.96E-07	4.90E-06	2.15E-05
Barium	25	4.31E-06	1.08E-04	4.72E-04
Beryllium	25	1.18E-08	2.94E-07	1.29E-06
Cadmium	25	1.08E-06	2.70E-05	1.18E-04
Chromium	25	1.37E-06	3.43E-05	1.50E-04
Cobalt	25	2.94E-06	7.35E-05	3.22E-04
Copper	25	8.33E-07	2.08E-05	9.13E-05
Manganese	25	2.94E-06	7.35E-05	3.22E-04
Mercury	25	2.55E-07	6.37E-06	2.79E-05
Molybdenum	25	1.08E-06	2.70E-05	1.18E-04
Nickel	25	2.06E-06	5.15E-05	2.25E-04
Selenium	25	2.35E-08	5.88E-07	2.58E-06
Vanadium	25	2.25E-06	5.64E-05	2.47E-04
Zinc	25	2.84E-05	7.11E-04	3.11E-03

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Source Calculations

Emission Point Identifier: **LO51**
Description: **Cold Rolling Mill**

Operating Parameters

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Exhaust Flow Rate [1]	68,300	dcfm
Exhaust Filterable PM Concentration [2]	0.0025	gr/dscf
Exhaust Total PM_{10} Concentration [2]	0.0024	gr/dscf
Exhaust Total $PM_{2.5}$ Concentration [2]	0.0013	gr/dscf

1. Exhaust flow rate provided by manufacturer.
2. Exhaust PM Concentration (grain loading) determined by BACT.

Emissions Summary

Pollutant	Hourly Emission Rate	Annual Emission Rate
	(lb/hr)	(tons/yr)
PM	1.46	6.41
PM_{10}	1.41	6.15
$PM_{2.5}$	0.76	3.33

Emissions

Pollutant	Exhaust Flow Rate	Exhaust PM Concentration	Hourly Emission Rate	Annual Emission Rate
	(ft^3/min)	(gr/dscf)	(lb/hr)	(tons/yr)
PM	68,300	0.0025	1.46	6.41
PM_{10}	68,300	0.0024	1.41	6.15
$PM_{2.5}$	68,300	0.0013	0.76	3.33

Emission Point Source Calculations

Emission Point Identifier: **LA21**
Description: **Small Holding Furnace - Phase 1**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	24.0	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [4]	0.100	lb/MMBtu
CO Emission Factor [4]	84	lb/MMscf
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4: *Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	0.18	0.78
PM_{10}	0.18	0.78
$PM_{2.5}$	0.18	0.78
NOx	2.40	10.51
SO_2	0.01	0.06
CO	1.98	8.66
VOC	0.13	0.57
Lead (Pb)	1.18E-05	5.15E-05
CO_2e [1]	2,824	12,368

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	Emission Factor	Firing Rate	Hourly Emission Rate	Annual Emission Rate
	(lb/MMBtu)	(MMBtu/hr)	(lb/hr)	(tons/yr)
TSP	0.007	24	0.18	0.78
PM_{10}	0.007	24	0.18	0.78
$PM_{2.5}$	0.007	24	0.18	0.78
SO_2	5.88E-04	24	0.01	0.06

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
CO	24	0.08	1.98	8.66
NOx	24	0.10	2.40	10.51
VOC	24	0.005	0.13	0.57
Lead (Pb)	24	4.90E-07	0.000	0.000

GHG Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	(kg/MMBtu)	(lb/hr)	(tons/yr)
CO_2	24	53.06	2,808	12,299
N_2O^3	24	1.00E-03	0.05	0.23
CH_4	24	1.00E-04	0.01	0.02

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Total NG Firing Rate (MMBtu/hr)	Emission Factor [1] (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
Benzene	24	2.06E-06	4.94E-05	2.16E-04
Dichlorobenzene	24	1.18E-06	2.82E-05	1.24E-04
Formaldehyde	24	7.35E-05	1.76E-03	7.73E-03
n-Hexane	24	1.76E-03	4.24E-02	1.86E-01
Naphthalene	24	5.98E-07	1.44E-05	6.29E-05
Toluene	24	3.33E-06	8.00E-05	3.50E-04
PAH	24	8.24E-08	1.98E-06	8.66E-06
Arsenic	24	1.96E-07	4.71E-06	2.06E-05
Barium	24	4.31E-06	1.04E-04	4.53E-04
Beryllium	24	1.18E-08	2.82E-07	1.24E-06
Cadmium	24	1.08E-06	2.59E-05	1.13E-04
Chromium	24	1.37E-06	3.29E-05	1.44E-04
Cobalt	24	2.94E-06	7.06E-05	3.09E-04
Copper	24	8.33E-07	2.00E-05	8.76E-05
Manganese	24	2.94E-06	7.06E-05	3.09E-04
Mercury	24	2.55E-07	6.12E-06	2.68E-05
Molybdenum	24	1.08E-06	2.59E-05	1.13E-04
Nickel	24	2.06E-06	4.94E-05	2.16E-04
Selenium	24	2.35E-08	5.65E-07	2.47E-06
Vanadium	24	2.25E-06	5.41E-05	2.37E-04
Zinc	24	2.84E-05	6.82E-04	2.99E-03

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Point Source Calculations

Emission Point Identifier: **LA22**
Description: **Small Holding Furnace - Phase 2**

Inputs

Description	**Value**	**Units**
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	24.0	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [4]	0.100	lb/MMBtu
CO Emission Factor [4]	84	lb/MMscf
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4:*Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2

Emissions Summary

Pollutant	**Average Emission Rate (lb/hr)**	**Annual Emission Rate (tpy)**
TSP	0.18	0.78
PM_{10}	0.18	0.78
$PM_{2.5}$	0.18	0.78
NOx	2.40	10.51
SO_2	0.01	0.06
CO	1.98	8.66
VOC	0.13	0.57
Lead (Pb)	1.18E-05	5.15E-05
CO_2e[1]	2,824	12,368

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	**Emission Factor**	**Firing Rate**	**Hourly Emission Rate**	**Annual Emission Rate**
	(lb/MMBtu)	**(MMBtu/hr)**	**(lb/hr)**	**(tons/yr)**
TSP	0.007	24	0.18	0.78
PM_{10}	0.007	24	0.18	0.78
$PM_{2.5}$	0.007	24	0.18	0.78
SO_2	5.88E-04	24	0.01	0.06

Pollutant	Firing Rate (MMBtu/hr)	Emission Factor (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
CO	24	0.08	1.98	8.66
NOx	24	0.10	2.40	10.51
VOC	24	0.005	0.13	0.57
Lead (Pb)	24	4.90E-07	0.000	0.000

GHG Emissions

Pollutant	Total NG Firing Rate (MMBtu/hr)	Emission Factor [1] (kg/MMBtu)	Hourly Emission Rate [2] (lb/hr)	Annual Emission Rate (tons/yr)
CO_2	24	53.06	2,808	12,299
N_2O[3]	24	1.00E-03	0.05	0.23
CH_4	24	1.00E-04	0.01	0.02

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
Benzene	24	2.06E-06	4.94E-05	2.16E-04
Dichlorobenzene	24	1.18E-06	2.82E-05	1.24E-04
Formaldehyde	24	7.35E-05	1.76E-03	7.73E-03
n-Hexane	24	1.76E-03	4.24E-02	1.86E-01
Naphthalene	24	5.98E-07	1.44E-05	6.29E-05
Toluene	24	3.33E-06	8.00E-05	3.50E-04
PAH	24	8.24E-08	1.98E-06	8.66E-06
Arsenic	24	1.96E-07	4.71E-06	2.06E-05
Barium	24	4.31E-06	1.04E-04	4.53E-04
Beryllium	24	1.18E-08	2.82E-07	1.24E-06
Cadmium	24	1.08E-06	2.59E-05	1.13E-04
Chromium	24	1.37E-06	3.29E-05	1.44E-04
Cobalt	24	2.94E-06	7.06E-05	3.09E-04
Copper	24	8.33E-07	2.00E-05	8.76E-05
Manganese	24	2.94E-06	7.06E-05	3.09E-04
Mercury	24	2.55E-07	6.12E-06	2.68E-05
Molybdenum	24	1.08E-06	2.59E-05	1.13E-04
Nickel	24	2.06E-06	4.94E-05	2.16E-04
Selenium	24	2.35E-08	5.65E-07	2.47E-06
Vanadium	24	2.25E-06	5.41E-05	2.37E-04
Zinc	24	2.84E-05	6.82E-04	2.99E-03

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Point Source Calculations

Emission Point Identifier: **LA23**
Description: **Steckel Mill Reheat Furnace 1**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	305	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [5]	0.070	lb/MMBtu
CO Emission Factor [5]	0.035	lb/MMBtu
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4:*Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2
5. Established by BACT.

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	2.27	9.95
PM_{10}	2.27	9.95
$PM_{2.5}$	2.27	9.95
NOx	21.35	93.52
SO_2	0.18	0.79
CO	10.68	46.76
VOC	1.64	7.20
Lead (Pb)	1.50E-04	6.55E-04
CO_2e[1]	35,889	157,193

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	Emission Factor	Firing Rate	Hourly Emission Rate	Annual Emission Rate
	(lb/MMBtu)	(MMBtu/hr)	(lb/hr)	(tons/yr)
TSP	0.007	305	2.27	9.95
PM_{10}	0.007	305	2.27	9.95
$PM_{2.5}$	0.007	305	2.27	9.95
SO_2	5.88E-04	305	0.18	0.79

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	**(lb/MMBtu)**	**(lb/hr)**	**(tons/yr)**
CO	305	0.035	10.68	46.76
NOx	305	0.07	21.35	93.52
VOC	305	0.005	1.64	7.20
Lead (Pb)	305	4.90E-07	0.000	0.001

GHG Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	**(kg/MMBtu)**	**(lb/hr)**	**(tons/yr)**
CO_2	305	53.06	35,687	156,308
N_2O[3]	305	1.00E-03	0.67	2.95
CH_4	305	1.00E-04	0.07	0.29

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
Benzene	305	2.06E-06	6.28E-04	2.75E-03
Dichlorobenzene	305	1.18E-06	3.59E-04	1.57E-03
Formaldehyde	305	7.35E-05	2.24E-02	9.82E-02
n-Hexane	305	1.76E-03	5.38E-01	2.36E+00
Naphthalene	305	5.98E-07	1.82E-04	7.99E-04
Toluene	305	3.33E-06	1.02E-03	4.45E-03
PAH	305	8.24E-08	2.51E-05	1.10E-04
Arsenic	305	1.96E-07	5.98E-05	2.62E-04
Barium	305	4.31E-06	1.32E-03	5.76E-03
Beryllium	305	1.18E-08	3.59E-06	1.57E-05
Cadmium	305	1.08E-06	3.29E-04	1.44E-03
Chromium	305	1.37E-06	4.19E-04	1.83E-03
Cobalt	305	2.94E-06	8.97E-04	3.93E-03
Copper	305	8.33E-07	2.54E-04	1.11E-03
Manganese	305	2.94E-06	8.97E-04	3.93E-03
Mercury	305	2.55E-07	7.78E-05	3.41E-04
Molybdenum	305	1.08E-06	3.29E-04	1.44E-03
Nickel	305	2.06E-06	6.28E-04	2.75E-03
Selenium	305	2.35E-08	7.18E-06	3.14E-05
Vanadium	305	2.25E-06	6.88E-04	3.01E-03
Zinc	305	2.84E-05	8.67E-03	3.80E-02

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Point Source Calculations

Emission Point Identifier: **LA24**
Description: **Steckel Mill Reheat Furnace 2**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	305	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [5]	0.070	lb/MMBtu
CO Emission Factor [5]	0.035	lb/MMBtu
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4:*Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2
5. Established by BACT.

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	2.27	9.95
PM_{10}	2.27	9.95
$PM_{2.5}$	2.27	9.95
NOx	21.35	93.52
SO_2	0.18	0.79
CO	10.68	46.76
VOC	1.64	7.20
Lead (Pb)	1.50E-04	6.55E-04
CO_2e[1]	35,889	157,193

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	Emission Factor	Firing Rate	Hourly Emission Rate	Annual Emission Rate
	(lb/MMBtu)	(MMBtu/hr)	(lb/hr)	(tons/yr)
TSP	0.007	305	2.27	9.95
PM_{10}	0.007	305	2.27	9.95
$PM_{2.5}$	0.007	305	2.27	9.95
SO_2	5.88E-04	305	0.18	0.79

Pollutant	Firing Rate (MMBtu/hr)	Emission Factor (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
CO	305	0.035	10.68	46.76
NOx	305	0.07	21.35	93.52
VOC	305	0.005	1.64	7.20
Lead (Pb)	305	4.90E-07	0.000	0.001

GHG Emissions

Pollutant	Total NG Firing Rate (MMBtu/hr)	Emission Factor [1] (kg/MMBtu)	Hourly Emission Rate [2] (lb/hr)	Annual Emission Rate (tons/yr)
CO_2	305	53.06	35,687	156,308
N_2O[3]	305	1.00E-03	0.67	2.95
CH_4	305	1.00E-04	0.07	0.29

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Total NG Firing Rate (MMBtu/hr)	Emission Factor [1] (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
Benzene	305	2.06E-06	6.28E-04	2.75E-03
Dichlorobenzene	305	1.18E-06	3.59E-04	1.57E-03
Formaldehyde	305	7.35E-05	2.24E-02	9.82E-02
n-Hexane	305	1.76E-03	5.38E-01	2.36E+00
Naphthalene	305	5.98E-07	1.82E-04	7.99E-04
Toluene	305	3.33E-06	1.02E-03	4.45E-03
PAH	305	8.24E-08	2.51E-05	1.10E-04
Arsenic	305	1.96E-07	5.98E-05	2.62E-04
Barium	305	4.31E-06	1.32E-03	5.76E-03
Beryllium	305	1.18E-08	3.59E-06	1.57E-05
Cadmium	305	1.08E-06	3.29E-04	1.44E-03
Chromium	305	1.37E-06	4.19E-04	1.83E-03
Cobalt	305	2.94E-06	8.97E-04	3.93E-03
Copper	305	8.33E-07	2.54E-04	1.11E-03
Manganese	305	2.94E-06	8.97E-04	3.93E-03
Mercury	305	2.55E-07	7.78E-05	3.41E-04
Molybdenum	305	1.08E-06	3.29E-04	1.44E-03
Nickel	305	2.06E-06	6.28E-04	2.75E-03
Selenium	305	2.35E-08	7.18E-06	3.14E-05
Vanadium	305	2.25E-06	6.88E-04	3.01E-03
Zinc	305	2.84E-05	8.67E-03	3.80E-02

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Source Calculations

Emission Point Identifier: **LA25**
Description: **Roughing/Finishing Stand**

Operating Parameters

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Exhaust Flow Rate [1]	85,000	dcfm
Exhaust Filterable PM Concentration [2]	0.0044	gr/dscf
Exhaust Total PM_{10} Concentration [2]	0.0044	gr/dscf
Exhaust Total $PM_{2.5}$ Concentration [2]	0.0025	gr/dscf

1. Exhaust flow rate provided by manufacturer.
2. Exhaust PM Concentration (grain loading) determined by BACT.

Emissions Summary

Pollutant	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
PM	3.21	14.04
PM_{10}	3.21	14.04
$PM_{2.5}$	1.82	7.98

Emissions

Pollutant	Exhaust Flow Rate (ft^3/min)	Exhaust PM Concentration (gr/dscf)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
PM	85,000	0.0044	3.21	14.04
PM_{10}	85,000	0.0044	3.21	14.04
$PM_{2.5}$	85,000	0.0025	1.82	7.98

Emission Point Source Calculations

Emission Point Identifier: **LA26**
Description: **Steckel Mill Furnace - Phase 1**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	20.8	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [4]	0.100	lb/MMBtu
CO Emission Factor [4]	84	lb/MMscf
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4: *Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	0.15	0.68
PM_{10}	0.15	0.68
$PM_{2.5}$	0.15	0.68
NOx	2.08	9.10
SO_2	0.01	0.05
CO	1.71	7.49
VOC	0.11	0.49
Lead (Pb)	1.02E-05	4.46E-05
CO_2e [1]	2,444	10,706

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	Emission Factor	Firing Rate	Hourly Emission Rate	Annual Emission Rate
	(lb/MMBtu)	(MMBtu/hr)	(lb/hr)	(tons/yr)
TSP	0.007	21	0.15	0.68
PM_{10}	0.007	21	0.15	0.68
$PM_{2.5}$	0.007	21	0.15	0.68
SO_2	5.88E-04	21	0.01	0.05

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
CO	21	0.08	1.71	7.49
NOx	21	0.10	2.08	9.10
VOC	21	0.005	0.11	0.49
Lead (Pb)	21	4.90E-07	0.000	0.000

GHG Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	(kg/MMBtu)	(lb/hr)	(tons/yr)
CO_2	21	53.06	2,430	10,645
N_2O[3]	21	1.00E-03	0.05	0.20
CH_4	21	1.00E-04	0.00	0.02

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Total NG Firing Rate (MMBtu/hr)	Emission Factor [1] (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
Benzene	21	2.06E-06	4.28E-05	1.87E-04
Dichlorobenzene	21	1.18E-06	2.44E-05	1.07E-04
Formaldehyde	21	7.35E-05	1.53E-03	6.69E-03
n-Hexane	21	1.76E-03	3.67E-02	1.61E-01
Naphthalene	21	5.98E-07	1.24E-05	5.44E-05
Toluene	21	3.33E-06	6.92E-05	3.03E-04
PAH	21	8.24E-08	1.71E-06	7.49E-06
Arsenic	21	1.96E-07	4.07E-06	1.78E-05
Barium	21	4.31E-06	8.96E-05	3.92E-04
Beryllium	21	1.18E-08	2.44E-07	1.07E-06
Cadmium	21	1.08E-06	2.24E-05	9.81E-05
Chromium	21	1.37E-06	2.85E-05	1.25E-04
Cobalt	21	2.94E-06	6.11E-05	2.68E-04
Copper	21	8.33E-07	1.73E-05	7.58E-05
Manganese	21	2.94E-06	6.11E-05	2.68E-04
Mercury	21	2.55E-07	5.30E-06	2.32E-05
Molybdenum	21	1.08E-06	2.24E-05	9.81E-05
Nickel	21	2.06E-06	4.28E-05	1.87E-04
Selenium	21	2.35E-08	4.89E-07	2.14E-06
Vanadium	21	2.25E-06	4.68E-05	2.05E-04
Zinc	21	2.84E-05	5.91E-04	2.59E-03

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Point Source Calculations

Emission Point Identifier: **LA27**
Description: **Steckel Mill Furnace - Phase 2**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV) [1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	20.8	MMBtu/hr
PM Emission Factor [3,4]	7.6	lb/MMscf
NO_X Emission Factor [4]	0.100	lb/MMBtu
CO Emission Factor [4]	84	lb/MMscf
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.5	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4:*Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	0.15	0.68
PM_{10}	0.15	0.68
$PM_{2.5}$	0.15	0.68
NOx	2.08	9.10
SO_2	0.01	0.05
CO	1.71	7.49
VOC	0.11	0.49
Lead (Pb)	1.02E-05	4.46E-05
CO_2e[1]	2,444	10,706

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	Emission Factor	Firing Rate	Hourly Emission Rate	Annual Emission Rate
	(lb/MMBtu)	(MMBtu/hr)	(lb/hr)	(tons/yr)
TSP	0.007	21	0.15	0.68
PM_{10}	0.007	21	0.15	0.68
$PM_{2.5}$	0.007	21	0.15	0.68
SO_2	5.88E-04	21	0.01	0.05

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
CO	21	0.08	1.71	7.49
NOx	21	0.10	2.08	9.10
VOC	21	0.005	0.11	0.49
Lead (Pb)	21	4.90E-07	0.000	0.000

GHG Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	(kg/MMBtu)	(lb/hr)	(tons/yr)
CO_2	21	53.06	2,430	10,645
N_2O[3]	21	1.00E-03	0.05	0.20
CH_4	21	1.00E-04	0.00	0.02

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Total NG Firing Rate (MMBtu/hr)	Emission Factor [1] (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
Benzene	21	2.06E-06	4.28E-05	1.87E-04
Dichlorobenzene	21	1.18E-06	2.44E-05	1.07E-04
Formaldehyde	21	7.35E-05	1.53E-03	6.69E-03
n-Hexane	21	1.76E-03	3.67E-02	1.61E-01
Naphthalene	21	5.98E-07	1.24E-05	5.44E-05
Toluene	21	3.33E-06	6.92E-05	3.03E-04
PAH	21	8.24E-08	1.71E-06	7.49E-06
Arsenic	21	1.96E-07	4.07E-06	1.78E-05
Barium	21	4.31E-06	8.96E-05	3.92E-04
Beryllium	21	1.18E-08	2.44E-07	1.07E-06
Cadmium	21	1.08E-06	2.24E-05	9.81E-05
Chromium	21	1.37E-06	2.85E-05	1.25E-04
Cobalt	21	2.94E-06	6.11E-05	2.68E-04
Copper	21	8.33E-07	1.73E-05	7.58E-05
Manganese	21	2.94E-06	6.11E-05	2.68E-04
Mercury	21	2.55E-07	5.30E-06	2.32E-05
Molybdenum	21	1.08E-06	2.24E-05	9.81E-05
Nickel	21	2.06E-06	4.28E-05	1.87E-04
Selenium	21	2.35E-08	4.89E-07	2.14E-06
Vanadium	21	2.25E-06	4.68E-05	2.05E-04
Zinc	21	2.84E-05	5.91E-04	2.59E-03

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Source Calculations

Emission Point Identifier: **LA71**
Description: **ARP Iron Oxide**

Operating Parameters

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Exhaust Flow Rate [1]	3,625	dcfm
Exhaust PM Concentration [2]	0.0020	gr/dscf
PM_{10} Mass Fraction [3]	100%	%
$PM_{2.5}$ Mass Fraction [3]	100%	%

1. Exhaust conditions based on similar operations onsite.
2. Established by BACT.
3. PM_{10} and $PM_{2.5}$ are conservatively estimated to be equivalent to PM.

Emissions Summary

Pollutant	Hourly Emission Rate	Annual Emission Rate
	(lb/hr)	(tons/yr)
PM	0.06	0.27
PM_{10}	0.06	0.27
$PM_{2.5}$	0.06	0.27

Emissions

Pollutant	Exhaust Flow Rate	Exhaust PM Concentration	Mass Fraction of PM	Hourly Emission Rate	Annual Emission Rate
	(ft^3/min)	(gr/dscf)	%	(lb/hr)	(tons/yr)
PM	3,625	0.002	100%	0.06	0.27
PM_{10}	3,625	0.002	100%	0.06	0.27
$PM_{2.5}$	3,625	0.002	100%	0.06	0.27

Emission Point Source Calculations

Emission Point Identifier: **LA72**
Description: **ARP Process Gas Exhaust**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV)[1]	1,020	Btu/scf
Natural Gas Burner Rating [2]	10.75	MMBtu/hr
Exhaust Gas Flowrate [2]	2,240	dscfm
PM Emission Factor [3]	0.0043	gr/dscf
NO_X Emission Factor [3]	100	ppm
HF Emission Factor [2]	10	ppm
CO Emission Factor [4]	84	lb/MMscf
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	5.500	lb/MMscf
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. Project specification.
3. Established by BACT.
2. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4:*Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	0.08	0.36
PM_{10}	0.08	0.36
$PM_{2.5}$	0.08	0.36
NOx	1.61	7.03
SO_2	0.006	0.03
CO	0.89	3.88
VOC	0.06	0.25
Lead (Pb)	5.27E-06	2.31E-05
CO_2e[1]	1,265	5,540

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Emissions

Pollutant	Exhaust Flow Rate	Exhaust PM Concentration	Mass Fraction of PM	Hourly Emission Rate	Annual Emission Rate
	dscfm	(gr/dscf)	%	(lb/hr)	(tons/yr)
PM	2,240	0.004	100%	0.083	0.36
PM_{10}	2,240	0.004	100%	0.083	0.36
$PM_{2.5}$	2,240	0.004	100%	0.083	0.36

Pollutant	Exhaust Flow Rate	Emission Factor	Volume of Gas	Molecular Weight	Hourly Emission Rate	Annual Emission Rate
	dscfm	ppm	scf/lb-mole	lb/lb-mole	(lb/hr)	(tons/yr)
NOx	2,240	100	385	46.00	1.61	7.03
HF	2,240	10	385	20.01	6.99E-02	3.56E-02

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
SO_2	11	0.0006	0.006	0.03
CO	11	0.08	0.89	3.88
VOC	11	0.005	0.06	0.25
Lead (Pb)	11	4.90E-07	5.27E-06	2.31E-05

GHG Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	(kg/MMBtu)	(lb/hr)	(tons/yr)
CO_2	11	53.06	1,258	5,509
N_2O[3]	11	1.00E-03	0.02	0.10
CH_4	11	1.00E-04	0.00	0.01

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Total NG Firing Rate (MMBtu/hr)	Emission Factor [1] (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
Benzene	11	2.06E-06	2.21E-05	9.69E-05
Dichlorobenzene	11	1.18E-06	1.26E-05	5.54E-05
Formaldehyde	11	7.35E-05	7.90E-04	3.46E-03
n-Hexane	11	1.76E-03	1.90E-02	8.31E-02
Naphthalene	11	5.98E-07	6.43E-06	2.82E-05
Toluene	11	3.33E-06	3.58E-05	1.57E-04
PAH	11	8.24E-08	8.85E-07	3.88E-06
Arsenic	11	1.96E-07	2.11E-06	9.23E-06
Barium	11	4.31E-06	4.64E-05	2.03E-04
Beryllium	11	1.18E-08	1.26E-07	5.54E-07
Cadmium	11	1.08E-06	1.16E-05	5.08E-05
Chromium	11	1.37E-06	1.48E-05	6.46E-05
Cobalt	11	2.94E-06	3.16E-05	1.38E-04
Copper	11	8.33E-07	8.96E-06	3.92E-05
Manganese	11	2.94E-06	3.16E-05	1.38E-04
Mercury	11	2.55E-07	2.74E-06	1.20E-05
Molybdenum	11	1.08E-06	1.16E-05	5.08E-05
Nickel	11	2.06E-06	2.21E-05	9.69E-05
Selenium	11	2.35E-08	2.53E-07	1.11E-06
Vanadium	11	2.25E-06	2.42E-05	1.06E-04
Zinc	11	2.84E-05	3.06E-04	1.34E-03

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Source Calculations

Emission Point Identifier: **LA43**
Description: **APL Degreasing**

Operating Parameters

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Exhaust Flow Rate [1]	5,880	dcfm
Exhaust Filterable PM Concentration [2]	0.0022	gr/dscf
Exhaust Total PM_{10} Concentration [2]	100%	%
Exhaust Total $PM_{2.5}$ Concentration [2]	100%	%

1. Exhaust flow rate provided by manufacturer.
2. Exhaust PM Concentration (grain loading) determined by BACT.

Emissions Summary

Pollutant	Hourly Emission Rate	Annual Emission Rate
	(lb/hr)	(tons/yr)
PM	0.11	0.49
PM_{10}	0.11	0.49
$PM_{2.5}$	0.11	0.49

Emissions

Pollutant	Exhaust Flow Rate	Exhaust PM Concentration	Mass Fraction of PM	Hourly Emission Rate	Annual Emission Rate
	(ft^3/min)	(gr/dscf)	%	(lb/hr)	(tons/yr)
PM	5,880	0.0022	100%	0.11	0.49
PM_{10}	5,880	0.0022	100%	0.11	0.49
$PM_{2.5}$	5,880	0.0022	100%	0.11	0.49

Emission Point Source Calculations

Emission Point Identifier: **LA44**
Description: **APL Annealing Furnace**

Inputs

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Normal Natural Gas Heating Value (LHV)[1]	1,020	Btu/scf
Natural Gas Burner Rating	143	MMBtu/hr
PM Emission Factor [2]	7.6	lb/MMscf
NO_X Emission Factor [3]	0.060	lb/MMBtu
CO Emission Factor [4]	0.060	lb/MMBtu
SO_2 Emission Factor [4]	0.6	lb/MMscf
VOC Emission Factor [4]	0.0055	lb/MMBtu
Lead Emission Factor [4]	0.0005	lb/MMscf

1. Lower Heating Value (LHV) is based on AP-42 Table 1.4-1 footnote.
2. The PM Emission Factor includes both Filterable and Condensable PM. Per AP-42 Chapter 1.4:*Combustion of Natural Gas,* assume all PM <1 micrometer in diameter.
3. NOx uncontrolled emission rate based on projected BACT results.
4. Emission factors from AP-42 Chapter 1.4 Tables 1.4-1 and 1.4-2

Emissions Summary

Pollutant	Average Emission Rate (lb/hr)	Annual Emission Rate (tpy)
TSP	1.07	4.67
PM_{10}	1.07	4.67
$PM_{2.5}$	1.07	4.67
NOx	8.58	37.58
SO_2	0.084	0.37
CO	8.58	37.58
VOC	0.79	3.44
Lead (Pb)	7.01E-05	3.07E-04
CO_2e[1]	16,825	73,695

1. Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1

Calculate Emissions

Pollutant	Emission Factor	Firing Rate	Hourly Emission Rate	Annual Emission Rate
	(lb/MMBtu)	(MMBtu/hr)	(lb/hr)	(tons/yr)
TSP	0.0075	143	1.07	4.67
PM_{10}	0.0075	143	1.07	4.67
$PM_{2.5}$	0.0075	143	1.07	4.67
SO_2	5.88E-04	143	0.08	0.37

Pollutant	Firing Rate	Emission Factor	Hourly Emission Rate	Annual Emission Rate
	(MMBtu/hr)	(lb/MMBtu)	(lb/hr)	(tons/yr)
CO	143	0.06	8.58	37.58
NOx	143	0.06	8.58	37.58
VOC	143	0.006	0.79	3.44
Lead (Pb)	143	4.90E-07	0.000	0.000

GHG Emissions

Pollutant	Total NG Firing Rate	Emission Factor [1]	Hourly Emission Rate [2]	Annual Emission Rate
	(MMBtu/hr)	(kg/MMBtu)	(lb/hr)	(tons/yr)
CO_2	143	53.06	16,731	73,280
N_2O[3]	143	1.00E-03	0.32	1.38
CH_4	143	1.00E-04	0.03	0.14

1. Emission Factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

HAP Emissions

Pollutant	Total NG Firing Rate (MMBtu/hr)	Emission Factor [1] (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
Benzene	143	2.06E-06	2.94E-04	1.29E-03
Dichlorobenzene	143	1.18E-06	1.68E-04	7.37E-04
Formaldehyde	143	7.35E-05	1.05E-02	4.61E-02
n-Hexane	143	1.76E-03	2.52E-01	1.11E+00
Naphthalene	143	5.98E-07	8.55E-05	3.75E-04
Toluene	143	3.33E-06	4.77E-04	2.09E-03
PAH	143	8.24E-08	1.18E-05	5.16E-05
Arsenic	143	1.96E-07	2.80E-05	1.23E-04
Barium	143	4.31E-06	6.17E-04	2.70E-03
Beryllium	143	1.18E-08	1.68E-06	7.37E-06
Cadmium	143	1.08E-06	1.54E-04	6.75E-04
Chromium	143	1.37E-06	1.96E-04	8.60E-04
Cobalt	143	2.94E-06	4.21E-04	1.84E-03
Copper	143	8.33E-07	1.19E-04	5.22E-04
Manganese	143	2.94E-06	4.21E-04	1.84E-03
Mercury	143	2.55E-07	3.65E-05	1.60E-04
Molybdenum	143	1.08E-06	1.54E-04	6.75E-04
Nickel	143	2.06E-06	2.94E-04	1.29E-03
Selenium	143	2.35E-08	3.36E-06	1.47E-05
Vanadium	143	2.25E-06	3.22E-04	1.41E-03
Zinc	143	2.84E-05	4.07E-03	1.78E-02

1. Emission factors from AP-42 Table 1.4-2 and 1.4-3.

Emission Source Calculations

Emission Point Identifier: **LA45**
Description: **APL Shot Blaster**

Operating Parameters

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Exhaust Flow Rate [1]	36,960	dcfm
Exhaust Filterable PM Concentration [2]	0.0030	gr/dscf
Exhaust Total PM_{10} Concentration [2]	14.3%	%
Exhaust Total $PM_{2.5}$ Concentration [2]	14.3%	%

1. Exhaust flow rate provided by manufacturer.
2. Exhaust PM Concentration (grain loading) determined by BACT.

Emissions Summary

Pollutant	Hourly Emission Rate	Annual Emission Rate
	(lb/hr)	(tons/yr)
PM	0.95	4.16
PM_{10}	0.14	0.59
$PM_{2.5}$	0.14	0.59

Emissions

Pollutant	Exhaust Flow Rate	Exhaust PM Concentration	Mass Fraction of PM	Hourly Emission Rate	Annual Emission Rate
	(ft^3/min)	(gr/dscf)	%	(lb/hr)	(tons/yr)
PM	36,960	0.003	100%	0.95	4.16
PM_{10}	36,960	0.003	14%	0.14	0.59
$PM_{2.5}$	36,960	0.003	14%	0.14	0.59

Emission Source Calculations

Emission Point Identifier: **LA46**
Description: **APL Sodium Sulfate Pickling**

Operating Parameters

Description	Value	Units	Notes
Annual Hours of Operation	8,760	hr/yr	-
Exhaust Flow Rate [1]	4,200	dcfm	-
Exhaust Filterable PM Concentration [2]	0.0022	gr/dscf	3
Exhaust Total PM_{10} Concentration [2]	100%	%	4
Exhaust Total $PM_{2.5}$ Concentration [2]	100%	%	4

1. Exhaust flow rate provided by manufacturer.
2. Exhaust PM Concentration (grain loading) determined by BACT.

Emissions Summary

Pollutant	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
PM	0.08	0.35
PM_{10}	0.08	0.35
$PM_{2.5}$	0.08	0.35

0.0099792

Emissions

Pollutant	Exhaust Flow Rate (ft^3/min)	Exhaust PM Concentration (gr/dscf)	Mass Fraction of PM %	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tons/yr)
PM	4,200	0.0022	100%	0.08	0.35
PM_{10}	4,200	0.0022	100%	0.08	0.35
$PM_{2.5}$	4,200	0.0022	100%	0.08	0.35

Emission Source Calculations

Emission Point Identifier: **LA47**
Description: **APL HNO3/HF Pickling**

Operating Parameters

Description	Value	Units
Annual Hours of Operation	8,760	hr/yr
Exhaust Flow Rate [1]	8,000	dcfm
NOx Emission Factor [2]	100	ppm
HF Emission Factor [1]	10	ppm
Exhaust PM Concentration [2]	0.0022	gr/dscf
PM_{10} Mass Fraction [2]	100%	%
$PM_{2.5}$ Mass Fraction [2]	100%	%

1. Project specification.

2. Established by BACT.

Pollutant	Hourly Emission Rate	Annual Emission Rate
	(lb/hr)	(tons/yr)
PM	0.15	0.66
PM_{10}	0.15	0.66
$PM_{2.5}$	0.15	0.66
NO_X	5.74	25.12

Emissions

Pollutant	Exhaust Flow Rate	Exhaust PM Concentration	Mass Fraction of PM	Hourly Emission Rate	Annual Emission Rate
	(ft^3/min)	(gr/dscf)	%	(lb/hr)	(tons/yr)
PM	8,000	0.0022	100%	0.15	0.66
PM_{10}	8,000	0.0022	100%	0.15	0.66
$PM_{2.5}$	8,000	0.0022	100%	0.15	0.66

Pollutant	Exhaust Flow Rate	Emission Factor	Volume of Gas	Molecular Weight	Hourly Emission Rate	Annual Emission Rate
	dscfm	ppm	scf/lb-mole	lb/lb-mole	(lb/hr)	(tons/yr)
NOx	8,000	100	385	46.00	5.74	25.12
HF	8,000	10	385	20.01	0.25	1.00

APPENDIX C

BACT RBLC TABLES

Prevention of Significant Deterioration Application

Outokumpu Stainless USA, LLC
1 Steel Drive
Calvert, Mobile County, Alabama

September 2023

Table C-1: RBLC Data for Reheat Furnaces, PM Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (lb/MMscf)
OH-0341	NUCOR STEEL MARION, INC.	12/23/2010	Reheat furnace for steel billet	184	MMBtu/H		7.6
PA-0274	ALLEGHENY LUDLUM CORPORATION - BRACKENRIDGE FACILITY	2/16/2010	THREE (3) WALKING BEAM REHEAT FURNACES (S-201, S-202, AND S-203)	465	MMBTU/H EACH	THE PERMITTEE SHALL EMPLOY EFFECTIVE COMBUSTION AND OPERATIONAL CONTROL PRACTICES TO MINIMIZE EMISSIONS OF PM	7.6
PA-0274	ALLEGHENY LUDLUM CORPORATION - BRACKENRIDGE FACILITY	2/16/2010	THREE (3) WALKING BEAM REHEAT FURNACES (S-201, S-202, AND S-203)	465	MMBTU/H EACH	THE PERMITTEE SHALL EMPLOY EFFECTIVE COMBUSTION AND OPERATIONAL CONTROL PRACTICES TO MINIMIZE EMISSIONS OF PM	7.6
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED REHEAT FURNACE (LA21) (MULTIPLE EMISSION POINTS)	169	MMBTU/H		7.6
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED REHEAT FURNACE (LA21) (MULTIPLE EMISSION POINTS)	169	MMBTU/H		7.6
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED REHEAT FURNACE (LA21) (MULTIPLE EMISSION POINTS)	169	MMBTU/H		7.6
GA-0142	OSCEOLA STEEL CO.	12/29/2010	Reheat Furnace	75	MMBTU/H	Fabric Filter (Baghouse) and Fuel Selection (firing natural gas exclusively)	7.6
LA-0309	BENTELER STEEL TUBE FACILITY	6/4/2015	Shell Reheat Furnace - S04	79.7	mm btu/hr	good combustion techniques	7.6
LA-0309	BENTELER STEEL TUBE FACILITY	6/4/2015	Shell Reheat Furnace - S04	79.7	mm btu/hr	good combustion techniques	7.6
OH-0246	THE TIMKEN COMPANY/FAIRCREST PLANT	2/20/2003	REHEAT FURNACE, NATURAL GAS	110	MMBTU/H		7.6
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Galvanizing Line #2 Preheat Furnace (EP 21-08A)	94	MMBtu/hr	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	7.6
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Galvanizing Line #2 Preheat Furnace (EP 21-08A)	94	MMBtu/hr	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	7.6
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 03-01 - Walking Beam Reheat Furnace (Including Cold Starts)	400	MMBtu/hr	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	13.3
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 03-01 - Walking Beam Reheat Furnace (Including Cold Starts)	400	MMBtu/hr	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	13.3
IN-0109	BETA STEEL CORP.	5/30/2003	SLAB REHEAT FURNACE	264.6	MMBTU/H		16.3

Table C-2: RBLC Data for Reheat Furnaces, NO_X Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (Lb/MMBtu)
NE-0026	NUCOR STEEL DIVISION	6/22/2004	NNII REHEAT FURNACE	143	MMBTU/H	ULTRA-LOW NOX BURNERS	0.064
IL-0126	NUCOR STEEL KANKAKEE, INC.	11/1/2018	Natural Gas-Fired Reheat Furnace	125.5	MMBTU/H	Good combustion practices and low-NOx burners	0.070
MI-0417	GERDAU MACSTEEL, INC.	10/27/2014	EUBILLET-REHEAT (Walking Beam Billet Reheat Furnace)	260.7	MMBTU/H	Ultra-Low NOx burners and good combustion practices.	0.070
PA-0274	ALLEGHENY LUDLUM CORPORATION - BRACKENRIDGE FACILITY	2/16/2010	THREE (3) WALKING BEAM REHEAT FURNACES (S-201, S-202, AND S-203)	465	MMBTU/H	ULTRA LOW NOX BURNERS ON EACH FURNACE.	0.070
OH-0316	V & M STAR	9/23/2008	BILLET PREHEAT FURNACE	0.18	MMSCF/H	ULTRA-LOW NOX BURNERS	0.07
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 03-01 - Walking Beam Reheat Furnace (Including Cold Starts)	400	MMBTU/H	Low-Nox Burner (Designed to maintain 0.07 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan.	0.070
TX-0705	STEEL MINIMILL FACILITY	7/24/2014	Rolling Mill Billet Reheat Furnace	1,300,000	tons/year	Ultra-low NOX burners.	0.073
GA-0142	OSCEOLA STEEL CO.	12/29/2010	Reheat Furnace	75	MMBTU/H	Low NOx burners with FGR technology and good combustion/operating practices.	0.075
KY-0094	NORTH AMERICAN STAINLESS	12/1/2003	REHEAT FURNACE	75	MMBTU/H	LOW NOX BURNERS	0.075
LA-0309	BENTELER STEEL TUBE FACILITY	6/4/2015	Shell Reheat Furnace - S04	79.7	MMBTU/H	ULNB	0.075
SC-0128	NUCOR STEEL CORPORATION (DARLINGTON PLANT)	12/29/2006	REHEAT FURNACE NO.2	180	MMBTU/H	LOW NOX BURNERS	0.075
FL-0283	JACKSONVILLE STEEL MILL	5/5/2006	NEW BILLET REHEAT FURNACE	160	T/YR	FIRING OF NATURAL GAS.	0.080
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED REHEAT FURNACE (LA21) (MULTIPLE EMISSION POINTS)	169	MMBTU/H	ULTRA LOW NOX AND LOW NOX BURNERS	0.085
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED REHEAT FURNACE (LA21) (MULTIPLE EMISSION POINTS)	169	MMBTU/H		0.085
TX-0417	NUCOR CORP.	1/15/2003	BILLET REHEAT FURNACES (2)			LOW NOX BURNERS, CLEAN FUEL, GOOD COMBUSTION PRACTICES.	0.090
WI-0094	CHARTER STEEL DIVISION	2/26/1997	BILLET REHEAT FURNACE, P10, S10	115	MMBTU/H	THE USE OF LOW-NOX BURNERS WITH EMISSIONS LESS THAN 0.09 POUND PER MILLION BTU HEAT INPUT	0.090
AR-0055	NUCOR YAMATO STEEL (ARMOREL)	10/10/2001	REHEAT FURNACE	225	MMBTU/H	ULTRA LOW NOX BURNERS WITH EGR	0.094
NE-0025	NUCOR STEEL DIVISION	6/22/2004	NNI PREHEAT FURNACE	133	MMBTU/H	LOW NOX BURNERS	0.096
NE-0026	NUCOR STEEL DIVISION	6/22/2004	NNI REHEAT FURNACE	133	MMBTU/H	ULTRA-LOW NOX BURNERS	0.096
SC-0075	NUCOR STEEL- DARLINGTON COUNTY	1/8/1998	REHEAT FURNACE #1	140	MMBTU/H	RESTRICTIONS.	0.098
NJ-0087	GERDAU SAYREVILLE	3/26/2018	Billet Reheat Furnace	1178	MMSCF/YR	Low NOx Burners	0.100
OH-0316	V & M STAR	9/23/2008	BILLET REHEAT FURNACE	290	MMBTU/H	ULTRA-LOW NOX BURNERS	0.100
IA-0087	GERDAU AMERISTEEL WILTON	5/29/2007	BILLET REHEAT FURNACE	145.5	MMBTU/H	24 ULTRA LOW NOX BURNERS	0.108
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED REHEAT FURNACE (LA21) (MULTIPLE EMISSION POINTS)	169	MMBTU/H	UNLB WITH EGR	0.110
OH-0245	REPUBLIC TECHNOLOGIES INTERNATIONAL	1/27/1999	BLOOM REHEAT FURNACE	196.2	MMBTU/H	FEASIBLE.	0.112
SC-0075	NUCOR STEEL- DARLINGTON COUNTY	1/8/1998	REHEAT FURNACE #2	125	MMBTU/H	RECIRCULATION, FUEL RESTRICTIONS.	0.125
NC-0064	NUCOR STEEL	4/20/1999	STEEL PLANT, REHEAT FURNACE	309	MMBTU/H	LOW-NOX BURNERS	0.128
OH-0246	THE TIMKEN COMPANY/FAIRCREST PLANT	2/20/2003	REHEAT FURNACE, NATURAL GAS	110	MMBTU/H	LOW NOX BURNERS	0.140
OH-0331	AK STEEL CORPORATION MANSFIELD WORKS	1/11/2010	Slab Reheat Furnace	1,138,800	MMBtu/YR		0.140
IN-0073	QUALITECH STEEL CORP.	10/31/1996	REHEAT FURNACE	175	MMBTU/H	LOW NOX BURNERS	0.150
AL-0196	IPSCO STEEL INC.	2/13/2001	REHEAT FURNACE	450	MMBTU/H	NATURAL GAS ONLY	0.172
AL-0210	IPSCO STEEL INC.	2/7/2005	REHEAT FURNACE	450	MMBTU/H	LOW NOX BURNERS, 12 MONTH NATURAL GAS LIMIT -- 3.69 E+9 CUFT	0.172
FL-0192	AMERISTEEL CORPORATION	9/28/1999	LADLE AND REHEAT FURNACES	720,000	T/YR	COMBUSTION PRACTICES	0.190
IA-0031	SSAB IOWA INC	3/14/1996	REHEAT FURNACE	387.6	MMBTU/H	LOW NOX BURNERS	0.200
IA-0055	IPSCO STEEL, INC	1/3/1995	REHEAT FURNACE, WALKING BLAM			LOW NOX BURNERS	0.230
NE-0025	NUCOR STEEL DIVISION	6/22/2004	NNII REHEAT FURNACE	143	MMBTU/H	ULTRA-LOW NOX BURNERS AND FGR	0.640

Table C-3: RBLC Data for Reheat Furnaces, CO Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (lb/MMBtu)
GA-0142	OSCEOLA STEEL CO.	12/29/2010	Reheat Furnace	75	MMBTU/H	Good Combustion/Operating Practices	0.004
PA-0274	ALLEGHENY LUDLUM CORPORATION - BRACKENRIDGE FACILITY	2/16/2010	THREE (3) WALKING BEAM REHEAT FURNACES (S-201, S-202, AND S-203)	465	MMBTU/H EACH	THE PERMITTEE SHALL EMPLOY EFFECTIVE COMBUSTION AND OPERATIONAL CONTROL PRACTICES TO MINIMIZE EMISSIONS OF CO.	0.020
IA-0031	SSAB IOWA INC	3/14/1996	REHEAT FURNACE	387.6	MMBTU/H		0.021
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED REHEAT FURNACE (LA21) (MULTIPLE EMISSION POINTS)	169	MMBTU/H		0.035
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED REHEAT FURNACE (LA21) (MULTIPLE EMISSION POINTS)	169	MMBTU/H		0.035
FL-0283	JACKSONVILLE STEEL MILL	5/5/2006	NEW BILLET REHEAT FURNACE	160	T/YR	GOOD COMBUSTION	0.035
NE-0025	NUCOR STEEL DIVISION	6/22/2004	NNI PREHEAT FURNACE	133	MMBTU/H		0.035
NE-0026	NUCOR STEEL DIVISION	6/22/2004	NNI REHEAT FURNACE	133	MMBTU/H		0.035
NE-0025	NUCOR STEEL DIVISION	6/22/2004	NNII REHEAT FURNACE	143	MMBTU/H		0.066
NE-0026	NUCOR STEEL DIVISION	6/22/2004	NNII REHEAT FURNACE	143	MMBTU/H		0.066
AL-0196	IPSCO STEEL INC.	2/13/2001	REHEAT FURNACE	450	MMBTU/H	NATURAL GAS ONLY	0.077
AR-0055	NUCOR YAMATO STEEL (ARMOREL)	10/10/2001	REHEAT FURNACE	225	MMBTU/H	CLEAN FUELS	0.082
KY-0094	NORTH AMERICAN STAINLESS	12/1/2003	REHEAT FURNACE	75	MMBTU/H		0.082
OH-0316	V & M STAR	9/23/2008	BILLET REHEAT FURNACE	290	MMBTU/H	GOOD COMBUSTION PRACTICES	0.082
NY-0094	NUCOR AUBURN STEEL	6/22/2004	REHEAT FURNACE	179	MMBTU/H	COMBUSTION CONTROLS	0.084
OH-0246	THE TIMKEN COMPANY/FAIRCREST PLANT	2/20/2003	REHEAT FURNACE, NATURAL GAS	110	MMBTU/H		0.084
OH-0331	AK STEEL CORPORATION MANSFIELD WORKS	1/11/2010	Slab Reheat Furnace	1,138,800	MMBTU/H		0.084
SC-0128	NUCOR STEEL CORPORATION (DARLINGTON PLANT)	12/29/2006	REHEAT FURNACE NO.2	180	MMBTU/H	FUEL SPECIFICATION AND GOOD COMBUSTION PRACTICES	0.084
IA-0087	GERDAU AMERISTEEL WILTON	5/29/2007	BILLET REHEAT FURNACE	145.5	MMBTU/H	GOOD COMBUSTION PRACTICES	0.084
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 03-01 - Walking Beam Reheat Furnace (Including Cold Starts)	400	MMBTU/H	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0.084
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Galvanizing Line #2 Preheat Furnace (EP 21-08A)	94	MMBTU/H	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan.	0.084
MI-0417	GERDAU MACSTEEL, INC.	10/27/2014	EUBILLET-REHEAT (Walking Beam Billet Reheat Furnace)	260.7	MMBTU/H		0.084
OH-0341	NUCOR STEEL MARION, INC.	12/23/2010	Reheat furnace for steel billet	184	MMBTU/H		0.084
NC-0064	NUCOR STEEL	4/20/1999	STEEL PLANT, REHEAT FURNACE	309	MMBTU/H		0.084
NC-0112	NUCOR STEEL	11/23/2004	NATURAL GAS DIRECT FIRED REHEAT FURNACE	309	MMBTU/H		0.154
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED REHEAT FURNACE (LA21) (MULTIPLE EMISSION POINTS)	169	MMBTU/H		0.090
IN-0040	BETA STEEL	2/24/1992	REHEAT FURNACE, SLAB (2)	264.6	MMBTU/H	BAGHOUSE	0.151
IN-0109	BETA STEEL CORP.	5/30/2003	SLAB REHEAT FURNACE	264.6	MMBTU/H		0.151
OH-0245	REPUBLIC TECHNOLOGIES INTERNATIONAL	1/27/1999	BLOOM REHEAT FURNACE	196.2	MMBTU/H		0.175
SC-0075	NUCOR STEEL- DARLINGTON COUNTY	1/8/1998	REHEAT FURNACE #1	140	MMBTU/H		0.197
SC-0075	NUCOR STEEL- DARLINGTON COUNTY	1/8/1998	REHEAT FURNACE #2	125	MMBTU/H	NONE INDICATED	0.210
TX-0445	SMI TEXAS	1/28/2004	REHEAT FURNACE STACK				0.240
FL-0192	AMERISTEEL CORPORATION	9/28/1999	LADLE AND REHEAT FURNACES	720,000	T/YR	T/YR	0.350

Table C-4: RBLC Data for Annealing Furnaces, NO_X Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (Lb/MMBtu)
IN-0100	ROCKPORT WORKS	2/13/1997	ANNEALING FURNACE, SECTION NO. 1	72.3	MMBTU/H	LOW NOX BURNER	0.04
IN-0100	ROCKPORT WORKS	2/13/1997	ANNEALING FURNACE, SECTION NO. 2	55.2	MMBTU/H	LOW NOX BURNER	0.04
IN-0100	ROCKPORT WORKS	2/13/1997	ANNEALING FURNACE, SECTION NO. 3	65.7	MMBTU/H	LOW NOX BURNER	0.04
IN-0359	NUCOR STEEL	3/30/2023	Annealing Furnace for Galvanizing Line	53.1	MMBtu/hr	low NOx burners and good combustion practices	0.05
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS -FIRED ANNEALING FURNACE (LA43)	196.4	MMBTU/H	UNLB WITH EGR	0.06
AL-0290	MOUNT VERNON MILL	3/25/2010	Annealing Furnace (S22)	120	MMBTU/H	Use of ultra-low NOx burner for the indirect fired portion of the furnace and selective catalytic reduction for direct fired portion.	0.06
LA-0309	BENTELER STEEL TUBE FACILITY	6/4/2015	Annealing Furnace - S10	13.5	mm btu/hr	ULNB + FGR	0.06
WI-0181	CHARTER STEEL	8/2/2000	ANNEALING FURNACES, (4), S20-S23	2.4	MMBTU/H	AND THE USE OF ULTRA LOW NOX BURNER.	0.06
OH-0258	PRO TEC COATING COMPANY	2/15/2001	ANNEALING FURNACE, STEEL	76.8	MMBTU/H	SELECTIVE CATALYTIC REDUCTION (SCR) AND STAGED AIR.	0.06
PA-0274	ALLEGHENY LUDLUM CORPORATION - BRACKENRIDGE FACILITY	2/16/2010	FOUR (4) ANNEALING FURNACES (S-208, S-209, S-210, AND S-211)	21	MMBTU/H EACH	ULTRA-LOW NOX BURNERS	0.075
KY-0094	NORTH AMERICAN STAINLESS	12/1/2003	ANNEALING FURNACES, EMISSION POINTS, 70 AND 71	40	mmbtu/h	LOW NOX BURNERS	0.075
AL-0307	ALLOYS PLANT	10/9/2015	ANNEALING FURNACE	8.3	MMBTU/H	LOW NOX BURNER	0.08
KY-0094	NORTH AMERICAN STAINLESS	12/1/2003	ANNEALING FURNACE, EMISSION POINT 61	114	mmbtu/h	LOW NOX BURNERS	0.08
AR-0172	NUCOR STEEL ARKANSAS	9/1/2021	SN-209 Annealing Furnaces	0		Low NOx burners	0.0915
AR-0095	NUCOR STEEL, ARKANSAS	12/12/2007	ANNEALING FURNACES, SN-89	4.8	MMBTU/H	LOW NOX BURNERS	0.1
AR-0168	BIG RIVER STEEL LLC	3/17/2021	Annealing Furnaces	117.9	MMBtu/hr	Combustion of clean fuel	0.1
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Batch Annealing Furnaces			Combustion of clean fuel	0.1
IN-0090	NUCOR STEEL	1/19/2001	BATCH ANNEALING FURNACE, 18	4.8	MMBTU/H EACH	LOW NOX BURNERS	0.1
IN-0220	AK STEEL CORPORATION ROCKPORT WORKS	2/24/2015	HYDROGEN BATCH ANNEALING FURNACES NOS. 16, 17, AND 18	6.75	MMBTU/H EACH	LOW NOX BURNERS	0.1
TX-0882	SDSW STEEL MILL	1/17/2020	Annealing Furnace AND Tunnel Furnaces			GOOD COMBUSTION PRACTICES, CLEAN FUEL	0.1
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED BATCH ANNEALING FURNACES (LA63, LA64)	33.4	MMBTU each	UNLB WITH EGR	0.11
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED PASSIVE ANNEALING FURNACE (LO41)	27.2	MMBTU/H	ULTRA LOW NOX BURNERS (ULNB) WITH EXHAUST GAS RECIRCULATION	0.11
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED BATCH ANNEALING FURNACE (535)	99	MMBTU/H	ULTRA LOW NOX BURNERS	0.11
LA-0350	BENTELER STEEL TUBE FACILITY	3/28/2018	Continuous Annealing Furnace - EQT0010	13.5	mm btu/hr	LNB+FGR	0.11
OH-0246	THE TIMKEN COMPANY/FAIRCREST PLANT	2/20/2003	ANNEALING FURNACE, NATURAL GAS FIRED, (2)	26.5	MMBTU/H	LOW NOX BURNERS	0.14
OH-0246	THE TIMKEN COMPANY/FAIRCREST PLANT	2/20/2003	ANNEALING FURNACE, NATURAL GAS	22	MMBTU/H	LOW NOX BURNERS	0.14
TN-0157	HOEGANAES CORP.	12/31/2003	ANNEALING FURNACES	80	MMBtu/h	LOW-NOX BURNERS.	0.1425
WI-0206	SAUKVILLE PLANT	12/19/2003	BOX ANNEALING FURNACES, P39, S39; P40, S40 -	10.4	MMBTU/H	USE OF EXISTING LOW NOX BURNERS	0.168
WI-0094	CHARTER STEEL DIVISION	2/26/1997	ANNEALING FURNACE, P39, S39	10	MMBTU/H	THE USE OF LOW-NOX BURNERS	0.175
WI-0094	CHARTER STEEL DIVISION	2/26/1997	ANNEALING FURNACE, P40, S40	10	MMBTU/H	THE USE OF LOW-NOX BURNERS WITH EMISSIONS LESS THAN 1.75 POUNDS PER HOUR.	0.175
AR-0090	NUCOR STEEL, ARKANSAS	4/3/2006	ANNEALING FURNACES SN-61	4.8	LB/MMBTU	LOW NOX BURNERS	0.3
TX-0503	ALUMAX SECONDARY ALUMINUM SMELTER	5/15/2006	ANNEALING FURNACES (8)				0.5
IN-0100	ROCKPORT WORKS	2/13/1997	HYDROGEN BATCH ANNEALING FURNACES (16)	6.75	MMBTU/H	LOW NOX BURNERS	1.4

Table C-5: RBLC Data for Annealing Furnaces, CO Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (lb/MMBtu)
WI-0094	CHARTER STEEL DIVISION	2/26/1997	ANNEALING FURNACE, P39, S39	10	MMBTU/H	THE USE OF GOOD COMBUSTION CONTROL DURING THE OPERATION OF THE ANNEALING FURNACE.	0.032
WI-0094	CHARTER STEEL DIVISION	2/26/1997	ANNEALING FURNACE, P40, S40	10	MMBTU/H	THE USE OF GOOD COMBUSTION CONTROL DURING THE OPERATION OF THE ANNEALING FURNACE.	0.032
OH-0246	THE TIMKEN COMPANY/FAIRCREST PLANT	2/20/2003	ANNEALING FURNACE, NATURAL GAS	22	MMBTU/H		0.04
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS -FIRED ANNEALING FURNACE	196.4	MMBTU/H		0.06
AL-0290	MOUNT VERNON MILL	3/25/2010	Annealing Furnace (S22)	120	MMBTU/H		0.06
PA-0274	ALLEGHENY LUDLUM CORPORATION - BRACKENRIDGE FACILITY	2/16/2010	FOUR (4) ANNEALING FURNACES (S-208, S-209, S-210, AND S-211)	21	MMBTU/H EACH	THE PERMITTEE SHALL EMPLOY EFFECTIVE COMBUSTION AND OPERATIONAL CONTROL PRACTICES TO MINIMIZE EMISSIONS OF CO.	0.07
IN-0359	NUCOR STEEL	3/30/2023	Annealing Furnace for Galvanizing Line	53.1	MMBtu/hr	using good combustion practices and use of natural gas fuel	0.082
TX-0882	SDSW STEEL MILL	1/17/2020	Annealing Furnace AND Tunnel Furnaces			GOOD COMBUSTION PRACTICES, CLEAN FUEL	0.082
KY-0094	NORTH AMERICAN STAINLESS	12/1/2003	ANNEALING FURNACES, EMISSION POINTS, 70 AND 71	40	mmbtu/h		0.082
KY-0094	NORTH AMERICAN STAINLESS	12/1/2003	ANNEALING FURNACE, EMISSION POINT 61	114	mmbtu/h		0.082
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Box Annealing Furnaces	5	mmbtu/hr	Good Combustion Practices	0.082
AR-0168	BIG RIVER STEEL LLC	3/17/2021	Annealing Furnaces	117.9	MMBtu/hr	Combustion of Natural gas and Good Combustion Practice	0.0824
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Batch Annealing Furnaces	0		Combustion of Natural gas and Good Combustion Practice	0.0824
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Galvanizing Line #2 Annealing Furnaces (15) (EP 21-15)	4.8	MMBtu/hr, each	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0.0824
TN-0157	HOEGANAES CORP.	12/31/2003	ANNEALING FURNACES	80	MMBtu/h	GOOD COMBUSTION PRACTICE.	0.08375
AR-0095	NUCOR STEEL, ARKANSAS	12/12/2007	ANNEALING FURNACES, SN-89	4.8	MMBTU/H	GOOD COMBUXTION PRACTICE	0.084
AR-0172	NUCOR STEEL ARKANSAS	9/1/2021	SN-209 Annealing Furnaces	0		Good Combustion Practice	0.084
IN-0090	NUCOR STEEL	1/19/2001	BATCH ANNEALING FURNACE, 18	4.8	MMBTU/H EACH	USE OF NATURAL GAS	0.084
IN-0220	AK STEEL CORPORATION ROCKPORT WORKS	2/24/2015	HYDROGEN BATCH ANNEALING FURNACES NOS. 16, 17, AND 18	6.75	MMBTU/H EACH	GOOD COMBUSTION PRACTICES	0.084
OH-0246	THE TIMKEN COMPANY/FAIRCREST PLANT	2/20/2003	ANNEALING FURNACE, NATURAL GAS FIRED, (2)	26.5	MMBTU/H		0.084
AR-0090	NUCOR STEEL, ARKANSAS	4/3/2006	ANNEALING FURNACES SN-61	4.8	LB/MMBTU	GOOD COMBUSTION PRACTICE	0.084
AR-0139	NUCOR CORPORATION - NUCOR STEEL, ARKANSAS	2/11/2013	ANNEALING FURNACE SN-61	4.8	MMBTU/H	GOOD COMBUSTION PRACTICE	0.084
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED BATCH ANNEALING FURNACES (LA63, LA64)	33.4	MMBTU each		0.09
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED PASSIVE ANNEALING FURNACE (LO41)	27.2	MMBTU/H		0.09
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	NATURAL GAS-FIRED BATCH ANNEALING FURNACE (535)	99	MMBTU/H		0.09
WI-0206	SAUKVILLE PLANT	12/19/2003	BOX ANNEALING FURNACES, P39, S39; P40, S40 -	10.4	MMBTU/H	GOOD COMBUSTION CONTROL, USE OF INTERNAL FLARE	0.13

Table C-6: RBLC Data for Miscellaneous Natural Gas Combustion Sources, NO_X Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (Lb/MMBtu)
OH-0258	PRO TEC COATING COMPANY	2/15/2001	BOILERS (4)	20.9	MMBTU/H	LOW NOX BURNERS.	0.033
AL-0142	HONDA MANUFACTURING OF ALABAMA, LLC	2/29/2000	BOILERS, NATURAL GAS FIRED	10	MMBTU/H	NATURAL GAS FUEL ONLY, LOW NOX BURNERS	0.035
AL-0292	MOUNT VERNON MILL	3/25/2010	Water Heater (S41)	15	MMBTU/H		0.035
AR-0140	BIG RIVER STEEL LLC	9/18/2013	BOILERS SN-26 AND 27, GALVANIZING LINE	24.5	MMBTU/H	LOW NOX BURNERSCOMBUSTION OF CLEAN FUELGOOD COMBUSTION PRACTICES	0.035
IN-0034	NUCOR STEEL	11/30/1993	BOILER, PICKLE LINE PACKAGE, 3 EA	7.3	MMBTU/H		0.049
IN-0359	NUCOR STEEL	3/30/2023	Hot Water Circuit Burner for Sheet Metal Coating Line	5.12	MMBtu/hr	low NOx burners, good combustion practices and only pipeline quality natural gas shall be combusted	0.049
IN-0359	NUCOR STEEL	3/30/2023	Hot Water Circuit Burner for Galvanizing Line	9	MMBtu/hr	low NOx burners, good combustion practices, use of pipeline quality natural gas	0.049
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Air Separation Unit Water Bath Vaporizer (2 indirect burners) (EP 23-01)	14.5	MMBtu/hr, each	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. Equipped with low-NOx burners.	0.049
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Pickle Line #2 â€“ Boiler #1 & #2 (EP 21-04 & EP 21-05)	18	MMBtu/hr, each	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. Equipped with low-NOx burners.	0.049
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 13-01 - Water Bath Vaporizer	22	MMBtu/hr, combined	Low-Nox Burners (Designed to maintain 0.05 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan.	0.049
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Galvanizing Line #2 Alkali Cleaning Section Heater (EP 21-07B)	23	MMBtu/hr	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. This unit is also required to be equipped with low-NO	0.049
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Box Annealing Furnaces	5	mmbtu/hr	LNBGood Combustion Practices	0.050
MN-0061	ERIE NUGGET	6/26/2005	COAL PULVERIZER #2	9	MMBTU/H	LOW NOX BURNERS	0.050
AL-0287	MOUNT VERNON MILL	3/25/2010	Line 1 Post-Dryer (S31)	7.7	MMBTU/H		0.060
AL-0288	MOUNT VERNON MILL	3/25/2010	Line 2 Post - Dryer (S32)	7.7	MMBTU/H		0.060
AL-0289	MOUNT VERNON MILL	3/25/2010	Line 3 Post - Dryer (S33)	7.7	MMBTU/H		0.060
AL-0291	MOUNT VERNON MILL	3/25/2010	Line 4 Post - Dryer (S34)	7.7	MMBTU/H		0.060
AR-0095	NUCOR STEEL, ARKANSAS	12/12/2007	PICKLE LINE BOILER	12.6	MMBTU/H	LOW NOX BURNERS	0.075
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 03-05 - Steckel Mill Coiling Furnaces #1 & #2	17.5	MMBtu/hr, each	Low-Nox Burner (Designed to maintain 0.08 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan.	0.080
AR-0077	BLUEWATER PROJECT	7/22/2004	BOILERS	22	MMBTU/H	LOW NOX BURNERS	0.080
*AR-0180	HYBAR LLC	4/28/2023	Ladle Preheaters	12.1	MMBTU/HR	Low NOX burners, Combustion of clean fuel, and good combustion practices	0.095
MN-0061	ERIE NUGGET	6/26/2005	FLUX PULVERIZER #1 AND #2	7.3	MMBTU/H		0.097
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Tundish Dryer	6	mmbtu/hr	Low-NOx BurnersGood Combustion Practices	0.098
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Tundish Preheater	9	mmbtu/hr	Low-NOx BurnersGood Combustion Practices	0.098
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Water Bath Vaporizer	11	mmbtu/hr	LNBGood Combustion Practices	0.098
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Horizontal/Vertical Ladle Preheaters	15	mmbtu/hr	Low-NOx BurnersGood Combustion Practices	0.098
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Ladle Dryer	15	mmbtu/hr	Low NOx Burner, Good Combustion Practices	0.098
IN-0108	NUCOR STEEL	11/21/2003	ACID REGENERATION	7.3	MMBTU/H		0.098
IN-0196	NUCOR STEEL	9/17/2013	TUNDISH NOZZLE PREHEATERS	6.4	MMBTU/H		0.098
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	9/27/2019	Tundish Preheaters #3 and #4 (P028 and P029)	9.5	mmbtu/hr	Use of natural gas, good combustion practices and design	0.100
IN-0100	ROCKPORT WORKS	2/13/1997	HYDROGEN BATCH ANNEALING FURNACES (16)	6.75	MMBTU/H	LOW NOX BURNERS	0.100
IN-0220	AK STEEL CORPORATION ROCKPORT WORKS	2/24/2015	HYDROGEN BATCH ANNEALING FURNACES NOS. 16, 17, AND 18	6.75	MMBTU/H EACH	LOW NOX BURNERS	0.100
*AR-0180	HYBAR LLC	4/28/2023	Air Separation Plant Water Vaporizer	9	MMBtu/hr	Low NOX burners, combustion of clean fuel, and good combustion practices	0.100
AR-0077	BLUEWATER PROJECT	7/22/2004	FURNACES, HEATERS, & DRYERS	11	MMBTU/H	LOW NOX BURNERS	0.100
AR-0168	BIG RIVER STEEL LLC	3/17/2021	Hydrogen Plant #2 Reformer Furnace	12.5	MMBtu/hr	Low NOx burnersCombustion of clean fuelGood Combustion Practices	0.100
AR-0168	BIG RIVER STEEL LLC	3/17/2021	Annealing and Coating Line Furnace Section	13	MMBtu/hr	Low NOx burnersSCRCombustion of clean fuelGood Combustion Practices	0.100
AR-0171	NUCOR STEEL ARKANSAS	2/14/2019	SN-233 Galvanizing Line Boilers	15	MMBTU/hr each	Low Nox Burners	0.100
IN-0090	NUCOR STEEL	1/19/2001	LADLE PREHEATERS	15	MMBTU/HR EACH	LOW NOX BURNERS	0.100
OH-0315	NEW STEEL INTERNATIONAL, INC., HAVERHILL	5/6/2008	VACUUM OXYGENT DEGASSER (4)	16	MMBTU/H		0.100
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	9/27/2019	Ladle Preheaters and Dryers (P021-023, P025-026)	16	MMBTU/H	Use of natural gas, good combustion practices and design	0.100
AR-0140	BIG RIVER STEEL LLC	9/18/2013	FURNACES SN-40 AND SN-42, DECARBURIZING LINE	22	MMBTU/H	LOW NOX BURNERSSCRCOMBUSTION OF CLEAN FUELGOOD COMBUSTION PRACTICES	0.100
IL-0126	NUCOR STEEL KANKAKEE, INC.	11/1/2018	Gas-Fired Space Heaters	25	mmBtu/hr	Good combustion practices	0.100
TN-0157	HOEGANAES CORP.	12/31/2003	ROTARY KILN	16	MMBtu/h	PROPER COMBUSTION CONTROL. OPERATING HOURS ARE LIMITED TO 8,000 HOURS/12 CONSECUTIVE MONTHS.	0.143
AR-0077	BLUEWATER PROJECT	7/22/2004	GALVANIZING LINE	9	MMBTU/H	LOW NOX BURNERS	0.150
WI-0094	CHARTER STEEL DIVISION	2/26/1997	ANNEALING FURNACE, P39, S39	10	MMBTU/H	THE USE OF LOW-NOX BURNERS	0.175
WI-0094	CHARTER STEEL DIVISION	2/26/1997	ANNEALING FURNACE, P40, S40	10	MMBTU/H	THE USE OF LOW-NOX BURNERS WITH EMISSIONS LESS THAN 1.75 POUNDS PER HOUR.	0.175
IN-0070	NUCOR STEEL	6/20/1996	SNUB FURNACE ON NO.1 TUNNEL FURNACE	6	MMBTU/H	LOW NOX BURNERS	0.190
AR-0090	NUCOR STEEL, ARKANSAS	4/3/2006	PICKLE LINE BOILERS, SN-52	12.6	MMBTU EACH	LOW NOX BURNERS	0.230
AR-0168	BIG RIVER STEEL LLC	3/17/2021	Coil Coating Line - Finish Oven	12.2	MMBtu/hr	Good combustion practicesEnergy efficient burnersCombustion of natural gas	0.250
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Coil Coating Line RTO	12.2	MMBtu/hr	Good combustion practicesEnergy efficient burnersCombustion of natural gas	0.250
AR-0168	BIG RIVER STEEL LLC	3/17/2021	Annealing and Coating Line Drying Furnace	15	MMBtu/hr	Low NOx burnersCombustion of clean fuelGood Combustion Practices	0.250

Table C-7: RBLC Data for Miscellaneous Natural Gas Combustion Sources, CO Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (lb/MMBtu)
OH-0258	PRO TEC COATING COMPANY	2/15/2001	BOILERS (4)	20.9	MMBTU/H		0.011
IN-0034	NUCOR STEEL	11/30/1993	BOILER, PICKLE LINE PACKAGE, 3 EA	7.3	MMBTU/H		0.019
IN-0108	NUCOR STEEL	11/21/2003	ACID REGENERATION	7.3	MMBTU/H		0.019
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	9/27/2019	Ladle Preheaters and Dryers (P021-023, P025-026)	16	MMBTU/H	Use of natural gas, good combustion practices and design	0.020
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	9/27/2019	Tundish Preheaters #3 and #4 (P028 and P029)	9.5	mmbtu/hr	Use of natural gas, good combustion practices and design	0.020
OH-0381	NORTHSTAR BLUESCOPE STEEL, LLC	9/27/2019	Tundish Dryer #2 (P030)	1.2	MMBTU/H	Use of natural gas, good combustion practices and design	0.020
WI-0094	CHARTER STEEL DIVISION	2/26/1997	ANNEALING FURNACE, P39, S39	10	MMBTU/H	THE USE OF GOOD COMBUSTION CONTROL DURING THE OPERATION OF THE ANNEALING FURNACE.	0.032
WI-0094	CHARTER STEEL DIVISION	2/26/1997	ANNEALING FURNACE, P40, S40	10	MMBTU/H	THE USE OF GOOD COMBUSTION CONTROL DURING THE OPERATION OF THE ANNEALING FURNACE.	0.032
AL-0292	MOUNT VERNON MILL	3/25/2010	Water Heater (S41)	15	MMBTU/H		0.040
AL-0287	MOUNT VERNON MILL	3/25/2010	Line 1 Post-Dryer (S31)	7.7	MMBTU/H		0.060
AL-0288	MOUNT VERNON MILL	3/25/2010	Line 2 Post - Dryer (S32)	7.7	MMBTU/H		0.060
AL-0289	MOUNT VERNON MILL	3/25/2010	Line 3 Post - Dryer (S33)	7.7	MMBTU/H		0.060
AL-0291	MOUNT VERNON MILL	3/25/2010	Line 4 Post - Dryer (S34)	7.7	MMBTU/H		0.060
MN-0061	ERIE NUGGET	6/26/2005	COAL PULVERIZER #2	9	MMBTU/H		0.082
MN-0061	ERIE NUGGET	6/26/2005	FLUX PULVERIZER #1 AND #2	7.3	MMBTU/H		0.082
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Horizontal/Vertical Ladle Preheaters	15	mmbtu/hr	Good Combustion Practices	0.082
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Ladle Dryer	15	mmbtu/hr	Good Combustion Practices	0.082
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Water Bath Vaporizer	11	mmbtu/hr	Good Combustion Practices	0.082
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Tundish Preheater	9	mmbtu/hr	Good Combustion Practices	0.082
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Tundish Dryer	6	mmbtu/hr	Good Combustion Practices	0.082
*WV-0034	WEST VIRGINIA STEEL MILL	5/5/2022	Box Annealing Furnaces	5	mmbtu/hr	Good Combustion Practices	0.082
AR-0140	BIG RIVER STEEL LLC	9/18/2013	BOILERS SN-26 AND 27, GALVANIZING LINE	24.5	MMBTU/H	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.082
AR-0140	BIG RIVER STEEL LLC	9/18/2013	FURNACES SN-40 AND SN-42, DECARBURIZING LINE	22	MMBTU/H	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.082
AR-0168	BIG RIVER STEEL LLC	3/17/2021	Annealing and Coating Line Furnace Section	13	MMBtu/hr	Combustion of Natural gas and Good Combustion Practice	0.082
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Coil Coating Line RTO	12.2	MMBtu/hr	Energy efficient burners	0.082
*AR-0180	HYBAR LLC	4/28/2023	Ladle Preheaters	12.1	MMBTU/HR	Combustion of natural gas and good operating practices	0.082
*AR-0180	HYBAR LLC	4/28/2023	Air Separation Plant Water Vaporizer	9	MMBtu/hr	Combustion of natural gas and good combustion practices	0.082
*AR-0180	HYBAR LLC	4/28/2023	Casting Process Heating Source	2.2	MMBtu/hr	Combustion of natural gas and good combustion sources	0.082
IN-0316	NUCOR STEEL	5/2/2018	acid regeneration roaster	6	MMbtu/hr		0.082
IN-0196	NUCOR STEEL	9/17/2013	TUNDISH NOZZLE PREHEATERS	6.4	MMBTU/H		0.082
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Galvanizing Line #2 Alkali Cleaning Section Heater (EP 21-07B)	23	MMBtu/hr	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0.082
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 13-01 - Water Bath Vaporizer	22	MMBtu/hr, combined	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0.082
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Pickle Line #2 â€“ Boiler #1 & #2 (EP 21-04 & EP 21-05)	18	MMBtu/hr, each	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0.082
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 03-05 - Steckel Mill Coiling Furnaces #1 & #2	17.5	MMBtu/hr, each	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0.082
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Air Separation Unit Water Bath Vaporizer (2 indirect burners) (EP 23-01)	14.5	MMBtu/hr, each	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0.082
IN-0359	NUCOR STEEL	3/30/2023	Hot Water Circuit Burner for Galvanizing Line	9	MMBtu/hr	good combustion practices	0.082
IN-0359	NUCOR STEEL	3/30/2023	Hot Water Circuit Burner for Sheet Metal Coating Line	5.12	MMBtu/hr	good combustion practices	0.082
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Galvanizing Line #2 Annealing Furnaces (15) (EP 21-15)	4.8	MMBtu/hr, each	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0.082
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Galvanizing Line #2 Zinc Pot Preheater (EP 21-09)	3	MMBtu/hr	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0.082
TN-0157	HOEGANAES CORP.	12/31/2003	ROTARY KILN	16	MMBtu/h	GOOD COMBUSTION PRACTICES. OPERATING HOURS LIMITED TO 8,000 HOURS/12 CONSECUTIVE MONTHS.	0.106
AR-0090	NUCOR STEEL, ARKANSAS	4/3/2006	PICKLE LINE BOILERS, SN-52	12.6	MMBTU EACH	GOOD COMBUSTION PRACTICE	0.084
AR-0139	NUCOR CORPORATION - NUCOR STEEL, ARKANSAS	2/11/2013	ANNEALING FURNACE SN-61	4.8	MMBTU/H	GOOD COMBUSTION PRACTICE	0.084
AR-0171	NUCOR STEEL ARKANSAS	2/14/2019	SN-233 Galvanizing Line Boilers	15	MMBTU/hr each	Good combustion practices	0.084
AR-0095	NUCOR STEEL, ARKANSAS	12/12/2007	PICKLE LINE BOILER	12.6	MMBTU/H	GOOD COMBUSTION PRACTICE	0.084
IN-0220	AK STEEL CORPORATION ROCKPORT WORKS	2/24/2015	HYDROGEN BATCH ANNEALING FURNACES NOS. 16, 17, AND 18	6.75	MMBTU/H EACH	GOOD COMBUSTION PRACTICES	0.084
AR-0095	NUCOR STEEL, ARKANSAS	12/12/2007	ANNEALING FURNACES, SN-89	4.8	MMBTU/H	GOOD COMBUXTION PRACTICE	0.084
IN-0090	NUCOR STEEL	1/19/2001	BATCH ANNEALING FURNACE, 18	4.8	MMBTU/H EACH	USE OF NATURAL GAS	0.084
AR-0171	NUCOR STEEL ARKANSAS	2/14/2019	SN-228 and SN-229 Zinc Dryer and Zinc Pot Preheat	3	MMBTU/hr each	Good Combustion Practices	0.084
AL-0297	THYSSENKRUPP STAINLESS USA, LLC	3/25/2010	Mixed Acid Regeneration (L072/LA72)	21.5	MMBTU/H		0.090
OH-0315	NEW STEEL INTERNATIONAL, INC., HAVERHILL	5/6/2008	VACUUM OXYGENT DEGASSER (4)	16	MMBTU/H	FLARE	0.125
AR-0168	BIG RIVER STEEL LLC	3/17/2021	Annealing and Coating Line Drying Furnace	15	MMBtu/hr	Combustion of Natural gas and Good Combustion Practice	0.450
AR-0077	BLUEWATER PROJECT	7/22/2004	BOILERS	22	MMBTU/H	GOOD COMBUSTION PRACTICE	0.840
AR-0077	BLUEWATER PROJECT	7/22/2004	FURNACES, HEATERS, & DRYERS	11	MMBTU/H	GOOD COMBUSTION PRACTICE	0.840
AR-0077	BLUEWATER PROJECT	7/22/2004	GALVANIZING LINE	9	MMBTU/H	GOOD COMBUSTION PRACTICE	0.840

Table C-8: RBLC Data for Roughing Mill/Finishing Stand, Filterable PM Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	6-Stand Finishing Mill (EP 02-05)	3,500,000	tons steel/yr	The permittee must develop a Good Work Practices (GWP) Plan to minimize emissions.	0.0002
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	2-Stand Roughing Mill (EP 02-04)	3,500,000	tons steel/yr	The permittee must develop a Good Work Practices (GWP) Plan to minimize emissions.	0.0002
AL-0276	MOUNT VERNON MILL	3/25/2010	Carbon Steel Hot Strip Finishing Stands (S5) (S5A)			WESP	0.0044
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 03-04 - Steckel Mill Finishing Stand (stack; uncaptured emissions)	1,750,000	tons steel/yr	This EP is required to have a Good Work Practices (GWP) Plan and install, operate, and maintain a high efficiency venturi scrubber de	0.005

Table C-9: RBLC Data for Roughing Mill/Finishing Stand,Total PM_{10} Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	6-Stand Finishing Mill (EP 02-05)	3,500,000	tons steel/yr	The permittee must develop a Good Work Practices (GWP) Plan to minimize emissions.	0.0002
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	2-Stand Roughing Mill (EP 02-04)	3,500,000	tons steel/yr	The permittee must develop a Good Work Practices (GWP) Plan to minimize emissions.	0.0003
AL-0276	MOUNT VERNON MILL	3/25/2010	Carbon Steel Hot Strip Finishing Stands (S5) (S5A)			WESP	0.0044
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 03-04 - Steckel Mill Finishing Stand (stack; uncaptured emissions)	1,750,000	tons steel/yr	This EP is required to have a Good Work Practices (GWP) Plan and install, operate, and maintain a high efficiency venturi scrubber de	0.005

Table C-10: RBLC Data for Roughing Mill/Finishing Stand, Total $PM_{2.5}$ Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	6-Stand Finishing Mill (EP 02-05)	3,500,000	tons steel/yr	The permittee must develop a Good Work Practices (GWP) Plan to minimize emissions.	0.0001
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	2-Stand Roughing Mill (EP 02-04)	3,500,000	tons steel/yr	The permittee must develop a Good Work Practices (GWP) Plan to minimize emissions.	0.0001
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 03-04 - Steckel Mill Finishing Stand (stack; uncaptured emissions)	1,750,000	tons steel/yr	This EP is required to have a Good Work Practices (GWP) Plan and install, operate, and maintain a high efficiency venturi scrubber designed t	0.0025

Table C-11: RBLC Data for Pickling/Degreasing, Filterable PM Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Pickling Line #2 (including storage tanks) (EP 21-02)	1,314,000	tons/yr	The permittee must develop a Good Work Practices (GWP) Plan to minimize emissions. This unit is equipped with a scrubber and mi	0.0015
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Push Pull Pickle Line			Scrubber	0.0022
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Pickle Galvanizing Line Scale Dust and Pickling Section			Scrubber	0.0022
AR-0140	BIG RIVER STEEL LLC	9/18/2013	SCALE EXHAUST, PICKLE LINE			FABRIC FILTER	0.003
TX-0882	SDSW STEEL MILL	1/17/2020	PICKLING OPERATIONS			Mist Eliminator Scrubber	0.01
IN-0220	AK STEEL CORPORATION ROCKPORT WORKS	2/24/2015	APL: MIXED ACID PICKLE AND RINSE TANK	130	T/H	WET SCRUBBER SYSTEM (WET SCRUBBER AND MIST ELIMINATOR) & MIXED ACID PICKLE AND RINSE TANKS SHALL BE ENCLOSED AN	0.0125
IN-0220	AK STEEL CORPORATION ROCKPORT WORKS	2/24/2015	APL: ELECTROLYTIC PICKLING	130	T/H	WET SCRUBBER	0.036

Table C-12: RBLC Data for Pickling/Degreasing, Total PM_{10} Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Pickling Line #2 (including storage tanks) (EP 21-02)	1,314,000	tons/yr	The permittee must develop a Good Work Practices (GWP) Plan to minimize emissions. This unit is equipped with a scrubber and mi	0.0013
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Push Pull Pickle Line			Scrubber	0.0022
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Pickle Galvanizing Line Scale Dust and Pickling Section			Scrubber	0.0022
AR-0140	BIG RIVER STEEL LLC	9/18/2013	SCALE EXHAUST, PICKLE LINE			FABRIC FILTER	0.003
TX-0882	SDSW STEEL MILL	1/17/2020	PICKLING OPERATIONS			Mist Eliminator Scrubber	0.01
IN-0220	AK STEEL CORPORATION ROCKPORT WORKS	2/24/2015	APL: MIXED ACID PICKLE AND RINSE TANK	130	T/H	WET SCRUBBER SYSTEM (WET SCRUBBER AND MIST ELIMINATOR) & MIXED ACID PICKLE AND RINSE TANKS SHALL BE ENCLOSED AN	0.0125
IN-0220	AK STEEL CORPORATION ROCKPORT WORKS	2/24/2015	APL: ELECTROLYTIC PICKLING	130	T/H	WET SCRUBBER	0.036

Table C-13: RBLC Data for Pickling/Degreasing, Total $PM_{2.5}$ Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Pickling Line #2 (including storage tanks) (EP 21-02)	1314000	tons/yr	eliminator.	0.0012
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Push Pull Pickle Line			Scrubber	0.0022
AR-0173	BIG RIVER STEEL LLC	1/31/2022	Pickle Galvanizing Line Scale Dust and Pickling Section			Scrubber	0.0022
AR-0140	BIG RIVER STEEL LLC	9/18/2013	SCALE EXHAUST, PICKLE LINE			FABRIC FILTER	0.003
TX-0882	SDSW STEEL MILL	1/17/2020	PICKLING OPERATIONS			Mist Eliminator Scrubber	0.01

Table C-14: RBLC Data for Mixed Acid Pickling and Acid Regeneration, NO_X Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (PPM)
AL-0295	THYSSENKRUPP STAINLESS USA, LLC	3/25/2010	Pickling (L047)			De-NOx selective catalytic reduction.	100
AL-0298	THYSSENKRUPP STAINLESS USA, LLC	3/25/2010	Pickling (L057)			De-NOx selective catalytic reduction	100
KY-0094	NORTH AMERICAN STAINLESS	12/1/2003	PLATE PICKLING SECTION	40	t/h	SCRUBBER	100
KY-0094	NORTH AMERICAN STAINLESS	12/1/2003	PICKLING LINE, EMISSION POINT 78	17.5	t/h	SCRUBBER	100
KY-0094	NORTH AMERICAN STAINLESS	12/1/2003	PICKLING LINES, 1 & 2	35	t/h	HYDROFLUORIC ACID.	100
WI-0181	CHARTER STEEL	8/2/2000	PICKLING PROCESS, SPECIALITY STEEL	5191	SCFM	BACT FOR NOX IS AN ACID GAS PACKED TOWER WET SCRUBBER.	100

Table C-15: RBLC Data for Cold Rolling Mill, Filterable PM Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
AR-0140	BIG RIVER STEEL LLC	9/18/2013	COLD MILL REVERSING COLD MILL AND SKIN PASS MILL SN-25, 38, 44, 45, AND 46			MIST ELIMINATOR	0.0025
AL-0230	THYSSENKRUPP STEEL AND STAINLESS USA, LLC	8/17/2007	COLD ROLLING MILLS			MIST ELIMINATOR	0.0025
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Cold Reduction Mill (EP 21-16)	1,000,000	tons/yr	This unit is equipped with a mist eliminator.	0.0025
SC-0183	NUCOR STEEL - BERKELEY	5/4/2018	Cold Reversing Mills/Cold Mill (cold reversing mill no. 1)			Fan with Mist Eliminator No.1 (existing) and Fan with Mist Eliminator No. 2 (new). Proper Operation and Maintenance.	0.01
TX-0882	SDSW STEEL MILL	1/17/2020	TANDUM COLD MILL			Mist Eliminator Scrubber	0.01

Table C-16: RBLC Data for Cold Rolling Mill, Total PM_{10} Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Cold Reduction Mill (EP 21-16)	1,000,000	tons/yr	This unit is equipped with a mist eliminator.	0.0024
SC-0183	NUCOR STEEL - BERKELEY	5/4/2018	Cold Reversing Mills/Cold Mill (cold reversing mill no. 1)			Fan with Mist Eliminator No.1 (existing) and Fan with Mist Eliminator No. 2 (new). Proper Operation and Maintenance.	0.0063
AR-0140	BIG RIVER STEEL LLC	9/18/2013	COLD MILL REVERSING COLD MILL AND SKIN PASS MILL SN-25, 38, 44, 45, AND 46			MIST ELIMINATOR	0.0066
TX-0882	SDSW STEEL MILL	1/17/2020	TANDUM COLD MILL			Mist Eliminator Scrubber	0.0066

Table C-17: RBLC Data for Cold Rolling Mill, Total $PM_{2.5}$ Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
KY-0115	NUCOR STEEL GALLATIN, LLC	4/19/2021	Cold Reduction Mill (EP 21-16)	1,000,000	tons/yr	This unit is equipped with a mist eliminator.	0.0013
AR-0140	BIG RIVER STEEL LLC	9/18/2013	COLD MILL REVERSING COLD MILL AND SKIN PASS MILL SN-25, 38, 44, 45, AND 46			MIST ELIMINATOR	0.0066
TX-0882	SDSW STEEL MILL	1/17/2020	TANDUM COLD MILL			Mist Eliminator Scrubber	0.0066

Table C-18: RBLC Data for Shot Blasting, Filterable PM Emissions

RBLCID	Facility Name	Permit Date	Process Name	Throughput	Throughput Unit	Control Method	Emission Limit (gr/dscf)
AR-0140	BIG RIVER STEEL LLC	9/18/2013	ANNEALING PICKLING LINE SCALE DUST AND SHOTBLAST			FABRIC FILTER	0.003
KY-0110	NUCOR STEEL BRANDENBURG	7/23/2020	EP 04-01 - Shot Blaster	180,000	tons shot consumed/y	This EP is required to have a Good Work Practices (GWP) Plan and a baghouse designed to control particulate grain loading to 0.003	0.003
AL-0295	THYSSENKRUPP STAINLESS USA, LLC	3/25/2010	Shotblaster/scale breaker w/ baghouse (L045)			Baghouse	0.005
AL-0296	THYSSENKRUPP SAINLESS USA, LLC	3/25/2010	Shotblaster/scale breaker w/ baghouse common to HAPL-LO (LA45)			Baghouse	0.005
IN-0027	I/N TEK	10/15/1987	BLASTING CABINET, ROLL SHOT			FABRIC FILTER	0.013

Table C-19: CCS Economic Evaluation

	Post-Combustion CO2 Capture	
Capital [1]	$105/ton	$50,017,695
	Pipeline Cost Breakdown [2]	
L, Pipeline Length (miles)		25
D, Pipeline Diameter (inches)		12
	Pipeline Costs [3]	
Materials	\$64,632 + \$1.85 x L x (330.5 x D^2 + 686.7 x D + 26,960)	$3,893,781
Labor	\$341,627 + \$1.85 x L x (343.2 x D^2 + 2074 x D + 170,013)	$11,364,515
Miscellaneous	$150,166 + $1.58 x L x (8,417 x D + 7,234)	$4,424,145
Right of Way	$48,037 + $1.2 x L x (577 x D + 29,788)	$1,149,397
	Other Capital [4]	
CO_2 Surge Tank	Fixed	$1,244,744
Pipeline Control System	Fixed	$111,907
	O&M [3]	
Fixed O&M ($/year)	$8,632 x L	$215,800

	Geologic Storage Costs [2]	
Number of Injection Wells Well		1
Depth (m)		2,134
CO2 Captured (tons)		1,473,483
	Capital	
Site Screening and Evaluation	Fixed	$4,738,488
Injection Wells	\$240,714 x $e^{0.0008}$ x Well Depth	$1,327,177
Injection Equipment	\$94,029 x (7,839/(280 x Number of Injection Wells))$^{0.5}$	$497,523
Liability Bond	Fixed	$5,000,000
	Declining Capital Funds	
Pore Space Acquisition	$0.334/short ton CO2	$159,104
	O&M	
Normal Daily Expenses	$11,566/Injection Well	$11,566
Consumables	$2,995/yr/ton CO2/day	$3,908,754
Surface Maintenance	\$23,478 x (7,839/(280 x Number of Injection Wells))$^{0.5}$	$124,226
Subsurface Maintenance	$7.08/ft-depth/Injection Well	$15,109
	Annualized Cost Estimate	
Capital Costs		**$83,769,372**
O&M Costs (Annual)		$4,275,455

NOTES:

1. Adapted from CO2 abatement in the iron and steel industry, January 2012. Capital Costs were taken from Table 25 based on Physical absorption for TGR-BF due to characteristics of exhaust stream. Cost adjusted for inflation from 2011 dollars.
2. Pipeline and Geologic Storage cost estimates based on National Energy Technology Laboratory (US DOE) document, Estimating Carbon Dioxide Transport and Storage Costs, DOE/NETL-2010/1447 (March 2010). The distance given is to the nearest CO2 transportation pipeline, the Denbury Pipeline.
3. Pipeline costs have been adjusted for inflation from 2007 dollars.
4. Adapted from FE/NETL CO2 Transport Cost Model (2018): Model Overview, National Energy Technology Laboratory, May 8, 2018.

Table C-20 Cost Estimate Meltshop Hot Box SCR

Total Capital Investment (TCI)

TCI for Oil and Natural Gas Boilers

For Oil and Natural Gas-Fired Utility Boilers between 25MW and 500 MW:

$$TCI = 86,380 \times (200/B_{MW})^{0.35} \times B_{MW} \times ELEVF \times RF$$

For Oil and Natural Gas-Fired Utility Boilers >500 MW:

$$TCI = 62,680 \times B_{MW} \times ELEVF \times RF$$

For Oil-Fired Industrial Boilers between 275 and 5,500 MMBTU/hour :

$$TCI = 7,850 \times (2,200/Q_B)^{0.35} \times Q_B \times ELEVF \times RF$$

For Natural Gas-Fired Industrial Boilers between 205 and 4,100 MMBTU/hour :

$$TCI = 10,530 \times (1,640/Q_B)^{0.35} \times Q_B \times ELEVF \times RF$$

For Oil-Fired Industrial Boilers >5,500 MMBtu/hour:

$$TCI = 5,700 \times Q_B \times ELEVF \times RF$$

For Natural Gas-Fired Industrial Boilers >4,100 MMBtu/hour:

$$TCI = 7,640 \times Q_B \times ELEVF \times RF$$

Total Capital Investment (TCI) =	$464,728	in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	$5,847	in 2023 dollars
Indirect Annual Costs (IDAC) =	$42,530	in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	$48,376	in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Catalyst Cost)

Annual Maintenance Cost =	0.005 x TCI =	$2,324	in 2023 dollars
Annual Reagent Cost =	$m_{sol} \times Cost_{reag} \times t_{op}$ =	$1,134	in 2023 dollars
Annual Electricity Cost =	$P \times Cost_{elect} \times t_{op}$ =	$1,827	in 2023 dollars
Annual Catalyst Replacement Cost =		$562	in 2023 dollars
	$n_{scr} \times Vol_{cat} \times (CC_{replace}/R_{layer}) \times FWF$		
Direct Annual Cost =		$5,847	in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x (Operator Cost + 0.4 x Annual Maintenance Cost) =	$2,656	in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	$39,874	in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	$42,530	in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	$48,376	per year in 2023 dollars
NOx Removed =	2.37	tons/year
Cost Effectiveness =	$20,453	per ton of NOx removed in 2023 dollars

Table C-21 Cost Estimate Ladle Treatment Stand Furnace SCR

Total Capital Investment (TCI)

TCI for Oil and Natural Gas Boilers

For Oil and Natural Gas-Fired Utility Boilers between 25MW and 500 MW:

$$TCI = 86{,}380 \times (200/B_{MW})^{0.35} \times B_{MW} \times ELEVF \times RF$$

For Oil and Natural Gas-Fired Utility Boilers >500 MW:

$$TCI = 62{,}680 \times B_{MW} \times ELEVF \times RF$$

For Oil-Fired Industrial Boilers between 275 and 5,500 MMBTU/hour :

$$TCI = 7{,}850 \times (2{,}200/Q_B)^{0.35} \times Q_B \times ELEVF \times RF$$

For Natural Gas-Fired Industrial Boilers between 205 and 4,100 MMBTU/hour :

$$TCI = 10{,}530 \times (1{,}640/Q_B)^{0.35} \times Q_B \times ELEVF \times RF$$

For Oil-Fired Industrial Boilers >5,500 MMBtu/hour:

$$TCI = 5{,}700 \times Q_B \times ELEVF \times RF$$

For Natural Gas-Fired Industrial Boilers >4,100 MMBtu/hour:

$$TCI = 7{,}640 \times Q_B \times ELEVF \times RF$$

Total Capital Investment (TCI) =	$647,740	in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	$9,110	in 2023 dollars
Indirect Annual Costs (IDAC) =	$58,243	in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	$67,353	in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Catalyst Cost)

Annual Maintenance Cost =	0.005 x TCI =	$3,239	in 2023 dollars
Annual Reagent Cost =	$m_{sol} \times Cost_{reag} \times t_{op}$ =	$1,890	in 2023 dollars
Annual Electricity Cost =	$P \times Cost_{elect} \times t_{op}$ =	$3,045	in 2023 dollars
Annual Catalyst Replacement Cost =	$n_{scr} \times Vol_{cat} \times (CC_{replace}/R_{layer}) \times FWF$	$937	in 2023 dollars
Direct Annual Cost =		$9,110	in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x (Operator Cost + 0.4 x Annual Maintenance Cost) =	$2,667	in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	$55,576	in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	$58,243	in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	$67,353	per year in 2023 dollars
NOx Removed =	3.94	tons/year
Cost Effectiveness =	$17,086	per ton of NOx removed in 2023 dollars

Table C-22 Cost Estimate Small Holding Furnaces SCR

Total Capital Investment (TCI)

TCI for Oil and Natural Gas Boilers

For Oil and Natural Gas-Fired Utility Boilers between 25MW and 500 MW:

$$TCI = 86,380 \times (200/B_{MW})^{0.35} \times B_{MW} \times ELEVF \times RF$$

For Oil and Natural Gas-Fired Utility Boilers >500 MW:

$$TCI = 62,680 \times B_{MW} \times ELEVF \times RF$$

For Oil-Fired Industrial Boilers between 275 and 5,500 MMBTU/hour :

$$TCI = 7,850 \times (2,200/Q_B)^{0.35} \times Q_B \times ELEVF \times RF$$

For Natural Gas-Fired Industrial Boilers between 205 and 4,100 MMBTU/hour :

$$TCI = 10,530 \times (1,640/Q_B)^{0.35} \times Q_B \times ELEVF \times RF$$

For Oil-Fired Industrial Boilers >5,500 MMBtu/hour:

$$TCI = 5,700 \times Q_B \times ELEVF \times RF$$

For Natural Gas-Fired Industrial Boilers >4,100 MMBtu/hour:

$$TCI = 7,640 \times Q_B \times ELEVF \times RF$$

Total Capital Investment (TCI) =	$1,144,296	in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	$19,813	in 2023 dollars
Indirect Annual Costs (IDAC) =	$100,877	in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	$120,691	in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Catalyst Cost)

Annual Maintenance Cost =	0.005 x TCI =	$5,721	in 2023 dollars
Annual Reagent Cost =	$m_{sol} \times Cost_{reag} \times t_{op}$ =	$4,536	in 2023 dollars
Annual Electricity Cost =	$P \times Cost_{elect} \times t_{op}$ =	$7,308	in 2023 dollars
Annual Catalyst Replacement Cost =	$n_{scr} \times Vol_{cat} \times (CC_{replace}/R_{layer}) \times FWF$	$2,248	in 2023 dollars
Direct Annual Cost =		$19,813	in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x (Operator Cost + 0.4 x Annual Maintenance Cost) =	$2,697	in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	$98,181	in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	$100,877	in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	$120,691	per year in 2023 dollars
NOx Removed =	9.46	tons/year
Cost Effectiveness =	$12,757	per ton of NOx removed in 2023 dollars

Table C-23 Cost Estimate Steckel Mill Furnaces SCR

Total Capital Investment (TCI)

TCI for Oil and Natural Gas Boilers

For Oil and Natural Gas-Fired Utility Boilers between 25MW and 500 MW:

$$TCI = 86{,}380 \times (200/B_{MW})^{0.35} \times B_{MW} \times ELEVF \times RF$$

For Oil and Natural Gas-Fired Utility Boilers >500 MW:

$$TCI = 62{,}680 \times B_{MW} \times ELEVF \times RF$$

For Oil-Fired Industrial Boilers between 275 and 5,500 MMBTU/hour :

$$TCI = 7{,}850 \times (2{,}200/Q_B)^{0.35} \times Q_B \times ELEVF \times RF$$

For Natural Gas-Fired Industrial Boilers between 205 and 4,100 MMBTU/hour :

$$TCI = 10{,}530 \times (1{,}640/Q_B)^{0.35} \times Q_B \times ELEVF \times RF$$

For Oil-Fired Industrial Boilers >5,500 MMBtu/hour:

$$TCI = 5{,}700 \times Q_B \times ELEVF \times RF$$

For Natural Gas-Fired Industrial Boilers >4,100 MMBtu/hour:

$$TCI = 7{,}640 \times Q_B \times ELEVF \times RF$$

Total Capital Investment (TCI) =	$1,042,659	in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	$17,426	in 2023 dollars
Indirect Annual Costs (IDAC) =	$92,151	in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	$109,577	in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Catalyst Cost)

Annual Maintenance Cost =	0.005 x TCI =	$5,213	in 2023 dollars
Annual Reagent Cost =	$m_{sol} \times Cost_{reag} \times t_{op}$ =	$3,931	in 2023 dollars
Annual Electricity Cost =	$P \times Cost_{elect} \times t_{op}$ =	$6,333	in 2023 dollars
Annual Catalyst Replacement Cost =	$n_{scr} \times Vol_{cat} \times (CC_{replace}/R_{layer}) \times FWF$	$1,948	in 2023 dollars
Direct Annual Cost =		$17,426	in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x (Operator Cost + 0.4 x Annual Maintenance Cost) =	$2,691	in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	$89,460	in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	$92,151	in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	$109,577	per year in 2023 dollars
NOx Removed =	8.20	tons/year
Cost Effectiveness =	$13,364	per ton of NOx removed in 2023 dollars

Table C-24 Cost Estimate Slab Holding Furnace SCR

Total Capital Investment (TCI)

TCI for Oil and Natural Gas Boilers

For Oil and Natural Gas-Fired Utility Boilers between 25MW and 500 MW:

$$TCI = 86{,}380 \text{ x } (200/B_{MW})^{0.35} \text{ x } B_{MW} \text{ x ELEVF x RF}$$

For Oil and Natural Gas-Fired Utility Boilers >500 MW:

$$TCI = 62{,}680 \text{ x } B_{MW} \text{ x ELEVF x RF}$$

For Oil-Fired Industrial Boilers between 275 and 5,500 MMBTU/hour :

$$TCI = 7{,}850 \text{ x } (2{,}200/Q_B)^{0.35} \text{ x } Q_B \text{ x ELEVF x RF}$$

For Natural Gas-Fired Industrial Boilers between 205 and 4,100 MMBTU/hour :

$$TCI = 10{,}530 \text{ x } (1{,}640/Q_B)^{0.35} \text{ x } Q_B \text{ x ELEVF x RF}$$

For Oil-Fired Industrial Boilers >5,500 MMBtu/hour:

$$TCI = 5{,}700 \text{ x } Q_B \text{ x ELEVF x RF}$$

For Natural Gas-Fired Industrial Boilers >4,100 MMBtu/hour:

$$TCI = 7{,}640 \text{ x } Q_B \text{ x ELEVF x RF}$$

Total Capital Investment (TCI) =	$1,175,065	in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	$20,554 in 2023 dollars
Indirect Annual Costs (IDAC) =	$103,519 in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	$124,073 in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Catalyst Cost)

Annual Maintenance Cost =	0.005 x TCI =	$5,875 in 2023 dollars
Annual Reagent Cost =	m_{sol} x $Cost_{reag}$ x t_{op} =	$4,725 in 2023 dollars
Annual Electricity Cost =	P x $Cost_{elect}$ x t_{op} =	$7,612 in 2023 dollars
Annual Catalyst Replacement Cost =		$2,342 in 2023 dollars
	n_{scr} x Vol_{cat} x $(CC_{replace}/R_{layer})$ x FWF	
Direct Annual Cost =		$20,554 in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x (Operator Cost + 0.4 x Annual Maintenance Cost) =	$2,699 in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	$100,821 in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	$103,519 in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	$124,073 per year in 2023 dollars
NOx Removed =	9.86 tons/year
Cost Effectiveness =	$12,590 per ton of NOx removed in 2023 dollars

Table C-25 Cost Estimate Meltshop Hot Box SNCR

Total Capital Investment (TCI)

For Coal-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + APH_{cost} + BOP_{cost})$$

For Fuel Oil and Natural Gas-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + BOP_{cost})$$

Capital costs for the SNCR ($SNCR_{cost}$) =	\$128,560 in 2023 dollars
Balance of Plant Costs (BOP_{cost}) =	\$189,218 in 2023 dollars
Total Capital Investment (TCI) =	\$413,112 in 2023 dollars

SNCR Capital Costs ($SNCR_{cost}$)

For Coal-Fired Utility Boilers:

$$SNCR_{cost} = 220{,}000 \times (B_{MW} \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$SNCR_{cost} = 147{,}000 \times (B_{MW} \times HRF)^{0.42} \times ELEVF \times RF$$

For Coal-Fired Industrial Boilers:

$$SNCR_{cost} = 220{,}000 \times (0.1 \times Q_B \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$SNCR_{cost} = 147{,}000 \times ((Q_B/NPHR) \times HRF)^{0.42} \times ELEVF \times RF$$

SNCR Capital Costs ($SNCR_{cost}$) =	\$128,560 in 2023 dollars

Balance of Plant Costs (BOP_{cost})

For Coal-Fired Utility Boilers:

$$BOP_{cost} = 320{,}000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$BOP_{cost} = 213{,}000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

For Coal-Fired Industrial Boilers:

$$BOP_{cost} = 320{,}000 \times (0.1 \times Q_B)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$BOP_{cost} = 213{,}000 \times (Q_B/NPHR)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

Balance of Plant Costs (BOP_{cost}) =	\$189,218 in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	\$6,892 in 2023 dollars
Indirect Annual Costs (IDAC) =	\$39,184 in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	\$46,076 in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Water Cost) + (Annual Fuel Cost) + (Annual Ash Cost)

Annual Maintenance Cost =	0.015 x TCI =	\$6,197 in 2023 dollars
Annual Reagent Cost =	$q_{sol} \times Cost_{reag} \times t_{op}$ =	\$630 in 2023 dollars
Annual Electricity Cost =	$P \times Cost_{elect} \times t_{op}$ =	\$21 in 2023 dollars
Annual Water Cost =	$q_{water} \times Cost_{water} \times t_{op}$ =	\$7 in 2023 dollars
Additional Fuel Cost =	$\Delta Fuel \times Cost_{fuel} \times t_{op}$ =	\$37 in 2023 dollars
Additional Ash Cost =	$\Delta Ash \times Cost_{ash} \times t_{op} \times (1/2000)$ =	\$0 in 2023 dollars
Direct Annual Cost =		\$6,892 in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x Annual Maintenance Cost =	\$186 in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	\$38,998 in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	\$39,184 in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	\$46,076 per year in 2023 dollars
NOx Removed =	1.31 tons/year
Cost Effectiveness =	\$34,089 per ton of NOx removed in 2023 dollars

Table C-26 Cost Estimate Ladle Treatment Stand Furnace SNCR

Total Capital Investment (TCI)

For Coal-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + APH_{cost} + BOP_{cost})$$

For Fuel Oil and Natural Gas-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + BOP_{cost})$$

Capital costs for the SNCR ($SNCR_{cost}$) =	$159,325 in 2023 dollars
Balance of Plant Costs (BOP_{cost}) =	$226,811 in 2023 dollars
Total Capital Investment (TCI) =	$501,977 in 2023 dollars

SNCR Capital Costs ($SNCR_{cost}$)

For Coal-Fired Utility Boilers:

$$SNCR_{cost} = 220,000 \times (B_{MW} \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$SNCR_{cost} = 147,000 \times (B_{MW} \times HRF)^{0.42} \times ELEVF \times RF$$

For Coal-Fired Industrial Boilers:

$$SNCR_{cost} = 220,000 \times (0.1 \times Q_B \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$SNCR_{cost} = 147,000 \times ((Q_B/NPHR) \times HRF)^{0.42} \times ELEVF \times RF$$

SNCR Capital Costs ($SNCR_{cost}$) =	$159,325 in 2023 dollars

Balance of Plant Costs (BOP_{cost})

For Coal-Fired Utility Boilers:

$$BOP_{cost} = 320,000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$BOP_{cost} = 213,000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

For Coal-Fired Industrial Boilers:

$$BOP_{cost} = 320,000 \times (0.1 \times Q_B)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$BOP_{cost} = 213,000 \times (Q_B/NPHR)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

Balance of Plant Costs (BOP_{cost}) =	$226,811 in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	$8,689 in 2023 dollars
Indirect Annual Costs (IDAC) =	$47,612 in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	$56,302 in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Water Cost) + (Annual Fuel Cost) + (Annual Ash Cost)

Annual Maintenance Cost =	0.015 x TCI =	$7,530 in 2023 dollars
Annual Reagent Cost =	$q_{sol} \times Cost_{reag} \times t_{op}$ =	$1,050 in 2023 dollars
Annual Electricity Cost =	$P \times Cost_{elect} \times t_{op}$ =	$36 in 2023 dollars
Annual Water Cost =	$q_{water} \times Cost_{water} \times t_{op}$ =	$12 in 2023 dollars
Additional Fuel Cost =	$\Delta Fuel \times Cost_{fuel} \times t_{op}$ =	$62 in 2023 dollars
Additional Ash Cost =	$\Delta Ash \times Cost_{ash} \times t_{op} \times (1/2000)$ =	$0 in 2023 dollars
Direct Annual Cost =		$8,689 in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x Annual Maintenance Cost =	$226 in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	$47,387 in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	$47,612 in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	$56,302 per year in 2023 dollars
NOx Removed =	2.19 tons/year
Cost Effectiveness =	$25,709 per ton of NOx removed in 2023 dollars

Table C-27 Cost Estimate Small Holding Furnaces SNCR

Total Capital Investment (TCI)

For Coal-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + APH_{cost} + BOP_{cost})$$

For Fuel Oil and Natural Gas-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + BOP_{cost})$$

Capital costs for the SNCR ($SNCR_{cost}$) =	$230,130 in 2023 dollars
Balance of Plant Costs (BOP_{cost}) =	$336,325 in 2023 dollars
Total Capital Investment (TCI) =	$736,391 in 2023 dollars

SNCR Capital Costs ($SNCR_{cost}$)

For Coal-Fired Utility Boilers:

$$SNCR_{cost} = 220{,}000 \times (B_{MW} \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$SNCR_{cost} = 147{,}000 \times (B_{MW} \times HRF)^{0.42} \times ELEVF \times RF$$

For Coal-Fired Industrial Boilers:

$$SNCR_{cost} = 220{,}000 \times (0.1 \times Q_B \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$SNCR_{cost} = 147{,}000 \times ((Q_B/NPHR)x\ HRF)^{0.42} \times ELEVF \times RF$$

SNCR Capital Costs ($SNCR_{cost}$) =	$230,130 in 2023 dollars

Balance of Plant Costs (BOP_{cost})

For Coal-Fired Utility Boilers:

$$BOP_{cost} = 320{,}000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$BOP_{cost} = 213{,}000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

For Coal-Fired Industrial Boilers:

$$BOP_{cost} = 320{,}000 \times (0.1 \times Q_B)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$BOP_{cost} = 213{,}000 \times (Q_B/NPHR)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

Balance of Plant Costs (BOP_{cost}) =	$336,325 in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	$13,829 in 2023 dollars
Indirect Annual Costs (IDAC) =	$69,847 in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	$83,676 in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Water Cost) + (Annual Fuel Cost) + (Annual Ash Cost)

Annual Maintenance Cost =	0.015 x TCI =	$11,046 in 2023 dollars
Annual Reagent Cost =	$q_{sol} \times Cost_{reag} \times t_{op}$ =	$2,520 in 2023 dollars
Annual Electricity Cost =	$P \times Cost_{elect} \times t_{op}$ =	$86 in 2023 dollars
Annual Water Cost =	$q_{water} \times Cost_{water} \times t_{op}$ =	$29 in 2023 dollars
Additional Fuel Cost =	$\Delta Fuel \times Cost_{fuel} \times t_{op}$ =	$149 in 2023 dollars
Additional Ash Cost =	$\Delta Ash \times Cost_{ash} \times t_{op} \times (1/2000)$ =	$0 in 2023 dollars
Direct Annual Cost =		$13,829 in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x Annual Maintenance Cost =	$331 in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	$69,515 in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	$69,847 in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	$83,676 per year in 2023 dollars
NOx Removed =	5.26 tons/year
Cost Effectiveness =	$15,920 per ton of NOx removed in 2023 dollars

Table C-28 Cost Estimate Steckel Mill Furnaces SNCR

Total Capital Investment (TCI)

For Coal-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + APH_{cost} + BOP_{cost})$$

For Fuel Oil and Natural Gas-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + BOP_{cost})$$

Capital costs for the SNCR ($SNCR_{cost}$) =	$216,706	in 2023 dollars
Balance of Plant Costs (BOP_{cost}) =	$315,350	in 2023 dollars
Total Capital Investment (TCI) =	$691,672	in 2023 dollars

SNCR Capital Costs ($SNCR_{cost}$)

For Coal-Fired Utility Boilers:

$$SNCR_{cost} = 220{,}000 \times (B_{MW} \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$SNCR_{cost} = 147{,}000 \times (B_{MW} \times HRF)^{0.42} \times ELEVF \times RF$$

For Coal-Fired Industrial Boilers:

$$SNCR_{cost} = 220{,}000 \times (0.1 \times Q_B \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$SNCR_{cost} = 147{,}000 \times ((Q_B/NPHR) \times HRF)^{0.42} \times ELEVF \times RF$$

SNCR Capital Costs ($SNCR_{cost}$) =	$216,706	in 2023 dollars

Balance of Plant Costs (BOP_{cost})

For Coal-Fired Utility Boilers:

$$BOP_{cost} = 320{,}000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$BOP_{cost} = 213{,}000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

For Coal-Fired Industrial Boilers:

$$BOP_{cost} = 320{,}000 \times (0.1 \times Q_B)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$BOP_{cost} = 213{,}000 \times (Q_B/NPHR)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

Balance of Plant Costs (BOP_{cost}) =	$315,350	in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	$12,787	in 2023 dollars
Indirect Annual Costs (IDAC) =	$65,605	in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	$78,392	in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Water Cost) + (Annual Fuel Cost) + (Annual Ash Cost)

Annual Maintenance Cost =	0.015 x TCI =	$10,375	in 2023 dollars
Annual Reagent Cost =	$q_{sol} \times Cost_{reag} \times t_{op}$ =	$2,184	in 2023 dollars
Annual Electricity Cost =	$P \times Cost_{elect} \times t_{op}$ =	$74	in 2023 dollars
Annual Water Cost =	$q_{water} \times Cost_{water} \times t_{op}$ =	$25	in 2023 dollars
Additional Fuel Cost =	$\Delta Fuel \times Cost_{fuel} \times t_{op}$ =	$129	in 2023 dollars
Additional Ash Cost =	$\Delta Ash \times Cost_{ash} \times t_{op} \times (1/2000)$ =	$0	in 2023 dollars
Direct Annual Cost =		$12,787	in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x Annual Maintenance Cost =	$311	in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	$65,294	in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	$65,605	in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	$78,392	per year in 2023 dollars
NOx Removed =	4.56	tons/year
Cost Effectiveness =	$17,209	per ton of NOx removed in 2023 dollars

Table C-29 Cost Estimate Slab Holding Furnace SNCR

Total Capital Investment (TCI)

For Coal-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + APH_{cost} + BOP_{cost})$$

For Fuel Oil and Natural Gas-Fired Boilers:

$$TCI = 1.3 \times (SNCR_{cost} + BOP_{cost})$$

Capital costs for the SNCR ($SNCR_{cost}$) =	\$234,109 in 2023 dollars
Balance of Plant Costs (BOP_{cost}) =	\$342,560 in 2023 dollars
Total Capital Investment (TCI) =	\$749,670 in 2023 dollars

SNCR Capital Costs ($SNCR_{cost}$)

For Coal-Fired Utility Boilers:

$$SNCR_{cost} = 220{,}000 \times (B_{MW} \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$SNCR_{cost} = 147{,}000 \times (B_{MW} \times HRF)^{0.42} \times ELEVF \times RF$$

For Coal-Fired Industrial Boilers:

$$SNCR_{cost} = 220{,}000 \times (0.1 \times Q_B \times HRF)^{0.42} \times CoalF \times BTF \times ELEVF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$SNCR_{cost} = 147{,}000 \times ((Q_B/NPHR) \times HRF)^{0.42} \times ELEVF \times RF$$

SNCR Capital Costs ($SNCR_{cost}$) =	\$234,109 in 2023 dollars

Balance of Plant Costs (BOP_{cost})

For Coal-Fired Utility Boilers:

$$BOP_{cost} = 320{,}000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Utility Boilers:

$$BOP_{cost} = 213{,}000 \times (B_{MW})^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

For Coal-Fired Industrial Boilers:

$$BOP_{cost} = 320{,}000 \times (0.1 \times Q_B)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times BTF \times RF$$

For Fuel Oil and Natural Gas-Fired Industrial Boilers:

$$BOP_{cost} = 213{,}000 \times (Q_B/NPHR)^{0.33} \times (NO_xRemoved/hr)^{0.12} \times RF$$

Balance of Plant Costs (BOP_{cost}) =	\$342,560 in 2023 dollars

Annual Costs

Total Annual Cost (TAC)

TAC = Direct Annual Costs + Indirect Annual Costs

Direct Annual Costs (DAC) =	\$14,144 in 2023 dollars
Indirect Annual Costs (IDAC) =	\$71,106 in 2023 dollars
Total annual costs (TAC) = DAC + IDAC	\$85,250 in 2023 dollars

Direct Annual Costs (DAC)

DAC = (Annual Maintenance Cost) + (Annual Reagent Cost) + (Annual Electricity Cost) + (Annual Water Cost) + (Annual Fuel Cost) + (Annual Ash Cost)

Annual Maintenance Cost =	0.015 x TCI =	\$11,245 in 2023 dollars
Annual Reagent Cost =	$q_{sol} \times Cost_{reag} \times t_{op}$ =	\$2,625 in 2023 dollars
Annual Electricity Cost =	$P \times Cost_{elect} \times t_{op}$ =	\$89 in 2023 dollars
Annual Water Cost =	$q_{water} \times Cost_{water} \times t_{op}$ =	\$30 in 2023 dollars
Additional Fuel Cost =	$\Delta Fuel \times Cost_{fuel} \times t_{op}$ =	\$155 in 2023 dollars
Additional Ash Cost =	$\Delta Ash \times Cost_{ash} \times t_{op} \times (1/2000)$ =	\$0 in 2023 dollars
Direct Annual Cost =		\$14,144 in 2023 dollars

Indirect Annual Cost (IDAC)

IDAC = Administrative Charges + Capital Recovery Costs

Administrative Charges (AC) =	0.03 x Annual Maintenance Cost =	\$337 in 2023 dollars
Capital Recovery Costs (CR)=	CRF x TCI =	\$70,769 in 2023 dollars
Indirect Annual Cost (IDAC) =	AC + CR =	\$71,106 in 2023 dollars

Cost Effectiveness

Cost Effectiveness = Total Annual Cost/ NOx Removed/year

Total Annual Cost (TAC) =	\$85,250 per year in 2023 dollars
NOx Removed =	5.48 tons/year
Cost Effectiveness =	\$15,571 per ton of NOx removed in 2023 dollars

APPENDIX D

ADEM APPLICATION FORMS

Prevention of Significant Deterioration Application

Outokumpu Stainless USA, LLC
1 Steel Drive
Calvert, Mobile County, Alabama

September 2023

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (AIR DIVISION)

Do not Write in This Space

Facility Number ☐☐☐ - ☐☐☐☐

CONSTRUCTION/OPERATING PERMIT APPLICATION FACILITY IDENTIFICATION FORM

1. Name of Facility, Firm, or Institution: Outokumpu Stainless USA, LLC

Facility Physical Location Address

Street & Number: 1 Steel Drive

City: Calvert County: Mobile Zip: 36513

Facility Mailing Address (If different from above)

Address or PO Box: 1 Steel Drive, PO Box 13000

City: Calvert County: Mobile Zip: 36513

Owner's Business Mailing Address

2. Owner: Outokumpu Stainless USA, LLC – address same as facility mailing

Street & Number: City:

State: Zip: Telephone:

Responsible Official's Business Mailing Address

3. Responsible Official: Joachim Stolz Title: VP Operations

Street & Number: address same as facility mailing

City: State: Zip:

Telephone Number: E-mail Address: Joachim.stolz@outokumpu.com

Plant Contact Information

4. Plant Contact: Wayne Denton Title: Director, EHS

Telephone Number: (251) 829-3671 E-mail Address: wayne.denton@outokumpu.com

5. Location Coordinates:

UTM 405,462 E-W 3,446,821 N-S

Latitude/Longitude ______ LAT ______ LONG

6. Permit application is made for:

☐Existing source (initial application)

☐Existing source (permit renewal)

☒Modification

☐New source (to be constructed)

☐Change of ownership

☐Change of location

☐Other (specify) ______

If application is being made to construct or modify, please provide the name and address of installer or contractor

______

______

______ Telephone ______

Date construction/modification to begin October 2023 to be completed TBD

7. Permit application is being made to obtain the following type permit:

☒Air permit

☒Major source operating permit

☐Synthetic minor source operating permit

☐General permit

8. Indicate the number of each of the following forms attached and made a part of this application: (if a form does not apply to your operation indicate "N/A" in the space opposite the form). Multiple forms may be usd as required.

	ADEM 104 - INDIRECT HEATING EQUIPMENT
16	ADEM 105 - MANUFACTURING OR PROCESSING OPERATION
	ADEM 106 - REFUSE HANDLING, DISPOSAL, AND INCINERATION
	ADEM 107 - STATIONARY INTERNAL COMBUSTION ENGINES
	ADEM 108 - LOADING, STORAGE & DISPENSING LIQUID & GASEOUS ORGANIC COMPOUNDS
	ADEM 109 - VOLATILE ORGANIC COMPOUND SURFACE COATING EMISSION SOURCES
13	ADEM 110 - AIR POLLUTION CONTROL DEVICE
	ADEM 112 - SOLVENT METAL CLEANING
	ADEM 438 - CONTINUOUS EMISSION MONITORS
	ADEM 437 - COMPLIANCE SCHEDULE

9. General nature of business: (describe and list appropriate standard industrial classification (SIC) and North American Industry Classification System (NAICS) (www.naics.com) code(s)):

SIC = 3312 Steel Works, Blast Furnaces and Rolling Mills

SIC = 3316 Cold Rolled Steel Sheet, Strip, Bars

NAICS = 33120802 Stainless Steel

10. **<u>For those making application for a synthetic minor or major source operating permit</u>, please summarize each pollutant emitted and the potential facility-wide annual emission rate for the pollutant. Indicate those pollutants for which the facility is major.**

Regulated pollutant	Potential Emissions* (tons/year)	Major source? yes/no
See appendix C		

***Potential emissions are either the maximum allowed by the regulations or by permit, or, if there is no regulatory limit, it is the emissions that occur from continuous operation at maximum capacity.**

11. For those applying for a major source operating permit, indicate the compliance status by program for each emission unit or source and the method used to determine compliance. Also cite the specific applicable requirement.

Emission unit or source: ______________________________

(description)

Emission Point No.	Pollutant[4]	Standard	Program[1]	Method used to determine compliance	Compliance Status	
					IN[2]	OUT[3]

[1] PSD, non-attainment NSR, NSPS, NESHAP (40 CFR Part 61), NESHAP (40 CFR Part 63), accidental release (112(r)),SIP regulation, Title IV, Enhanced Monitoring, Title VI, Other (specify)

[2] Attach compliance plan

[3] Attach compliance schedule (ADEM Form-437)

[4] Fugitive emissions must be included as separate entries

12. **List all insignificant activities and the basis for listing them as such (i.e., less than the insignificant activity thresholds or on the list of insignificant activities). Attach any documentation needed, such as calculations. No unit subject to an NSPS, NESHAP or MACT standard can be listed as insignificant.**

Insignificant Activity	Basis

13. **List and explain any exemptions from applicable requirements the facility is claiming:**

a.
b.
c.
d.
e.
f.
g.
h.
i.

14. **List below other attachments that are a part of this application(all supporting engineering calculations must be appended):**

a.
b.
c.
d.
e.
f.
g.
h.
i.

I CERTIFY UNDER PENALTY OF LAW THAT, BASED ON INFORMATION AND BELIEF FORMED AFTER REASONABLE INQUIRY, THE STATEMENTS AND INFORMATION CONTAINED IN THIS APPLICATION ARE TRUE, ACCURATE AND COMPLETE.

I ALSO CERTIFY THAT THE SOURCE WILL CONTINUE TO COMPLY WITH APPLICABLE REQUIREMENTS FOR WHICH IT IS IN COMPLIANCE, AND THAT THE SOURCE WILL, IN A TIMELY MANNER, MEET ALL APPLICABLE REQUIREMENTS THAT WILL BECOME EFFECTIVE DURING THE PERMIT TERM AND SUBMIT A DETAILED SCHEDULE, IF NEEDED FOR MEETING THE REQUIREMENTS.

	SVP Operations	06/19/2023
SIGNATURE OF RESPONSIBLE OFFICIAL	**TITLE**	**DATE**

PERMIT APPLICATION FOR
MANUFACTURING OR PROCESSING OPERATION

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

   Operating scenario number ____

   The facility will add a recirculating heating system to the existing small hotbox in the meltshop. The facility will add an additional ladle treatment stand (LTS) to the AOD section of the meltshop.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): New Meltshop Hot Box (LO2A)

   Make: TBD
   Model: TBD
   Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A
   Manufactured date: TBD
   Proposed installation date: 12/2023
   Original installation date (if existing): N/A
   Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

   Hours per day: 24
   Days per week: 7
   Weeks per year: 52
   Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Raw Materials	100 tph	126 tph	1,100,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104): 6 MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Stainless Slabs	1,100,000	Tons per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):
Scrap Management Plan (SMP)

A SMP helps prevent the introduction of scrap steel containing plastic, paint, oil/grease, etc. from entering the EAF. This minimizes the emissions of pollutants from the melt shop.

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form-110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LO2A/B	406674.10	3447405.85			164		48.89	16.01		50.4		92.9

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions must be included and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LO2A	PM	0.0447	0.196	AP-42		
	PM_{10}	0.0447	0.196	AP-42		
	$PM_{2.5}$	0.0447	0.196	AP-42		
	Sulfur dioxide	0.00353	0.0155	AP-42		
	Nitrogen oxides	0.588	2.58	AP-42		
	Carbon monoxide	0.494	2.16	AP-42		
	VOCs	0.0324	0.142	AP-42		
	Lead	2.94E-06	0.0000129	AP-42		
	GHG	706	3,090	40 CFR 98		

12. Using a flow diagram:
   (1) Illustrate input of raw materials,
   (2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,
   (3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒ Yes ☐ No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☒ Yes ☐ No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

PERMIT APPLICATION FOR MANUFACTURING OR PROCESSING OPERATION

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
Do not write in this space

16. Name of facility or organization: Outokumpu Stainless USA, LLC

17. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

Operating scenario number ____

The facility will add a recirculating heating system to the existing small hotbox in the meltshop. The facility will add an additional ladle treatment stand (LTS) to the AOD section of the meltshop.

18. Type of unit or process (e.g., calcining kiln, cupola furnace): New Ladle Treatment Stand (LO2B)

Make: TBD

Model: TBD

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

Manufactured date: TBD

Proposed installation date: 12/2023

Original installation date (if existing): N/A

Reconstruction or Modification date (if applicable): N/A

19. Normal operating schedule:

Hours per day: 24

Days per week: 7

Weeks per year: 52

Peak production season (if any):

20. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Raw Materials	150 tph	182 tph	1,600,000

21. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104): 10 MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

22. Products of process or unit:

Products	Quantity/year	Units of production
Stainless Slabs	1,100,000	Tons per year

23. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):
Scrap Management Plan (SMP)

A SMP helps prevent the introduction of scrap steel containing plastic, paint, oil/grease, etc. from entering the EAF. This minimizes the emissions of pollutants from the melt shop.

24. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form-110 must be completed and attached).

25. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LO2A/B	406674.10	3447405.85			164		48.89	16.01		50.4		92.9

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

26. **Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions must be included and calculations must be appended.**

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LO2B	PM	0.0745	0.326	AP-42		
	PM_{10}	0.0745	0.326	AP-42		
	$PM_{2.5}$	0.0745	0.326	AP-42		
	Sulfur dioxide	0.00588	0.0258	AP-42		
	Nitrogen oxides	0.98	4.29	AP-42		
	Carbon monoxide	0.824	3.61	AP-42		
	VOCs	0.0539	0.236	AP-42		
	Lead	0.0000049	0.0000215	AP-42		
	GHG	1180	5150	40 CFR 98		

27. **Using a flow diagram:**

(1) **Illustrate input of raw materials,**

(2) **Label production processes, process fuel combustion, process equipment and air pollution control equipment,**

(3) **Illustrate locations of air contaminant release so that emission points under item 10 can be identified.**

☐Check box if extra pages are attached)
Process flow diagram

28. **Is this unit or process in compliance with all applicable air pollution rules and regulations?**

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

29. **Does the input material or product from this process or unit contain finely divided materials which could become airborne?**

☒ Yes ☐ No

30. **If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?**

☒ Yes ☐ No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

   Operating scenario number ____

   The Steckel mill produces either stainless steel strip or stainless steel plate. Stainless steel coils are produced from stainless steel slabs. Stainless steel coils produced in the finishing mill or the roughing mill can be further processed into stainless steel plate or remain as coils.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): Small Holding Furnace Phase 1 (LA21) and Phase 2 (LA22

   Make: TBD

   Model: TBD

   Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

   Manufactured date: TBD

   Proposed installation date: 12/2023

   Original installation date (if existing): N/A

   Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

   Hours per day: 24

   Days per week: 7

   Weeks per year: 52

   Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Stainless steel coils	192,000	365,000	1,600,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104): 24 MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Stainless Steel Coils/Plate	1,600,000	Ton per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA21	406209.9	3447193			98.4		48.89	3.61		11.94		392
LA22	406233.3	3447216			98.4		48.89	3.61		11.94		392

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA21	PM	0.179	0.783	AP-42		
	PM_{10}	0.179	0.783	AP-42		
	$PM_{2.5}$	0.179	0.783	AP-42		
	SO_2	0.0141	0.0618	BACT		
	NO_X	2.4	10.5	AP-42		
	CO	1.98	8.66	BACT		
	VOC	0.129	0.567	AP-42		
	Lead	0.0000118	0.0000515	AP-42		
	GHG	2820	12,400	40 CFR 98		
LA22	PM	0.179	0.783	AP-42		
	PM_{10}	0.179	0.783	AP-42		
	$PM_{2.5}$	0.179	0.783	AP-42		
	SO_2	0.0141	0.0618	BACT		
	NO_X	2.4	10.5	AP-42		
	CO	1.98	8.66	BACT		
	VOC	0.129	0.567	AP-42		
	Lead	0.0000118	0.0000515	AP-42		
	GHG	2820	12,400	40 CFR 98		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒Yes ☐No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐Yes ☒No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature: Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

   Operating scenario number ____

   The Steckel mill produces either stainless steel strip or stainless steel plate. Stainless steel coils are produced from stainless steel slabs. Stainless steel coils produced in the finishing mill or the roughing mill can be further processed into stainless steel plate or remain as coils.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): Walking Beam Furnace Phase 1 (LA23) and Phase 2 (LA24)

   Make: TBD Model: TBD

   Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

   Manufactured date: TBD Proposed installation date: 12/2023

   Original installation date (if existing): N/A

   Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

   Hours per day: 24 Days per week: 7 Weeks per year: 52

   Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Stainless steel coils	150 tph	182 tph	1,600,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):__________MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Stainless Steel Coils/Plate	1,600,000	Ton per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA23	406143.3	3447208			262	213	48.89	12.14		19.52		376
LA24	406160.6	3447224			262	213	48.89	12.14		19.52		376

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA23	PM	2.27	9.95	AP-42		
	PM_{10}	2.27	9.95	AP-42		
	$PM_{2.5}$	2.27	9.95	AP-42		
	SO_2	0.179	0.786	BACT		
	NO_X	21.4	93.5	AP-42		
	CO	10.7	46.8	BACT		
	VOC	1.64	7.2	AP-42		
	Lead	0.00015	0.000655	AP-42		
	GHG	35,900	157,000	40 CFR 98		
LA24	PM	2.27	9.95	AP-42		
	PM_{10}	2.27	9.95	AP-42		
	$PM_{2.5}$	2.27	9.95	AP-42		
	SO_2	0.179	0.786	BACT		
	NO_X	21.4	93.5	AP-42		
	CO	10.7	46.8	BACT		
	VOC	1.64	7.2	AP-42		
	Lead	0.00015	0.000655	AP-42		
	GHG	35,900	157,000	40 CFR 98		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒ Yes ☐ No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐ Yes ☒ No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

Type text here

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
Do not write in this space

1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

   Operating scenario number ____

   The Steckel mill produces either stainless steel strip or stainless steel plate. Stainless steel coils are produced from stainless steel slabs. Stainless steel coils produced in the finishing mill or the roughing mill can be further processed into stainless steel plate or remain as coils.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): Roughing Mill/Finishing Stands (LA25)

   Make: TBD
   Model: TBD

   Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

   Manufactured date: TBD
   Proposed installation date: 12/2023

   Original installation date (if existing): N/A

   Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

   Hours per day: 24
   Days per week: 7
   Weeks per year: 52

   Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Stainless steel coils	150 tph	182 tph	1,600,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):__________MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Stainless Steel Coils/Plate	1,600,000	Ton per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA25	406090.0	3446977			98.4		48.89	7.28		60.04		151

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions must be included and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA25	PM	3.21	14	BACT		
	PM_{10}	3.21	14	BACT/AP-42		
	$PM_{2.5}$	1.82	7.98	BACT/AP-42		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒ Yes ☐ No

15. If "yes”, is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐ Yes ☒ No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature: Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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16. Name of facility or organization: Outokumpu Stainless USA, LLC

17. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

Operating scenario number ____

The Steckel mill produces either stainless steel strip or stainless steel plate. Stainless steel coils are produced from stainless steel slabs. Stainless steel coils produced in the finishing mill or the roughing mill can be further processed into stainless steel plate or remain as coils.

18. Type of unit or process (e.g., calcining kiln, cupola furnace): Steckel Mill Furnace Phase 1 (LA26) and Phase 2 (LA27).

Make: TBD Model: TBD

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

Manufactured date: TBD Proposed installation date: 12/2023

Original installation date (if existing): N/A

Reconstruction or Modification date (if applicable): N/A

19. Normal operating schedule:

Hours per day: 24 Days per week: 7 Weeks per year: 52

Peak production season (if any):

20. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Stainless steel coils	150 tph	182 tph	1,600,000

21. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104): 20.8 MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

22. Products of process or unit:

Products	Quantity/year	Units of production
Stainless Steel Coils/Plate	1,600,000	Ton per year

23. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

24. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

25. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA26	406054.4	3446985			262	213	48.89	21.33		1.05		350
LA27	406067.4	3446997			262	213	48.89	21.33		1.05		392

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

26. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA26	PM	0.155	0.678	AP-42		
	PM_{10}	0.155	0.678	AP-42		
	$PM_{2.5}$	0.155	0.678	AP-42		
	SO_2	0.0122	0.0535	BACT		
	NO_X	2.08	9.1	AP-42		
	CO	1.71	7.49	BACT		
	VOC	0.112	0.491	AP-42		
	Lead	0.0000102	0.0000446	AP-42		
	GHG	2,440	10,700	40 CFR 98		
LA27	PM	0.155	0.678	AP-42		
	PM_{10}	0.155	0.678	AP-42		
	$PM_{2.5}$	0.155	0.678	AP-42		
	SO_2	0.0122	0.0535	BACT		
	NO_X	2.08	9.1	AP-42		
	CO	1.71	7.49	BACT		
	VOC	0.112	0.491	AP-42		
	Lead	0.0000102	0.0000446	AP-42		
	GHG	2,440	10,700	40 CFR 98		

27. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

28. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

29. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒Yes ☐No

30. If "yes”, is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐Yes ☒No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

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PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

   Operating scenario number ____

   The slab holding furnace is utilized for the ferritic grade of stainless steel as this material must be maintained at a certain temperature while waiting to be processed in the hot rolling mill. .

3. Type of unit or process (e.g., calcining kiln, cupola furnace): Slab Holding Furnace (LO42B)

   Make: TBD

   Model: TBD

   Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

   Manufactured date: TBD

   Proposed installation date: 12/2023

   Original installation date (if existing): N/A

   Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

   Hours per day: 24

   Days per week: 7

   Weeks per year: 52

   Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Stainless steel slabs	100 tph	126 tph	1,100,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104): 25 MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Stainless Steel Coils	600,000	Tons per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, Form ADEM-110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LO42B	406398.07	3447456.04			131		48.89	4.60		38.8		86.0

* Std temperature is 68ºF – Std pressure is 29.92” in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions must be included and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LO42B	PM	0.186	0.816	AP-42		
	PM_{10}	0.186	0.816	AP-42		
	$PM_{2.5}$	0.186	0.816	AP-42		
	SO_2	0.0147	0.0644	BACT		
	NO_X	2.13	9.31	AP-42		
	CO	2.06	9.02	BACT		
	VOC	0.135	0.59	AP-42		
	Lead	0.0000123	0.0000537	AP-42		
	GHG	2,940	12,900	40 CFR 98		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒ Yes ☐ No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐ Yes ☒ No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

Operating scenario number ____

The MAPL will operate as a combination of the existing HAPL and CAPL. The major operational differences in the HAPL and CAPL are the shot blasting operation in the HAPL and the degreasing section in CAPL. The MAPL will include both operations, as well as the annealing furnace and pickling operations.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): MAPL Degreasing (LA43)

Make: TBD Model: TBD

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

Manufactured date: TBD Proposed installation date: 12/2023

Original installation date (if existing): N/A

Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

Hours per day: 24 Days per week: 7 Weeks per year: 52

Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Coils	60 tph	75 tph -	660,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):__________MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Annealed Coils	522,500	Tons per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA43	405788.57	3447618.12			82.0		48.89	2.62		15.6		140

* Std temperature is 68ºF – Std pressure is 29.92” in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA43	PM	0.111	0.486	BACT		
	PM_{10}	0.111	0.486	BACT		
	$PM_{2.5}$	0.111	0.486	BACT		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒Yes ☐No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒Yes ☐No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐Yes ☒No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature: Date: 9/8/2023

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PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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Do not write in this space

1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

   Operating scenario number ____

   The MAPL will operate as a combination of the existing HAPL and CAPL. The major operational differences in the HAPL and CAPL are the shot blasting operation in the HAPL and the degreasing section in CAPL. The MAPL will include both operations, as well as the annealing furnace and pickling operations.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): MAPL Annealing Furnace (LA44)

   Make: TBD

   Model: TBD

   Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

   Manufactured date: TBD

   Proposed installation date: 12/2023

   Original installation date (if existing): N/A

   Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

   Hours per day: 24

   Days per week: 7

   Weeks per year: 52

   Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Coils	60 tph	75 tph -	660,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104): 143 MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Annealed Coils	522,500	Tons per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA44	405716.61	3447550.81			82.0		48.89	11.5		61.7		482

* Std temperature is 68ºF – Std pressure is 29.92” in Hg.

11. **Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.**

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA44	PM	1.07	4.67	AP-42		
	PM$_{10}$	1.07	4.67	BACT		
	PM$_{2.5}$	1.07	4.67	AP-42		
	SO$_2$	0.0841	0.368	AP-42		
	NO$_X$	8.58	37.6	BACT		
	CO	8.58	37.6	BACT		
	VOC	0.787	3.44	AP-42		
	Lead	0.0000701	0.000307	AP-42		
	GHG	16,800	73,700	40 CFR 98		

12. **Using a flow diagram:**

- (1) **Illustrate input of raw materials,**
- (2) **Label production processes, process fuel combustion, process equipment and air pollution control equipment,**
- (3) **Illustrate locations of air contaminant release so that emission points under item 10 can be identified.**

(☐ Check box if extra pages are attached)
Process flow diagram

13. **Is this unit or process in compliance with all applicable air pollution rules and regulations?**

☒Yes ☐No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. **Does the input material or product from this process or unit contain finely divided materials which could become airborne?**

☒Yes ☐No

15. **If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?**

☐Yes ☒No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature: Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

Operating scenario number ____

The MAPL will operate as a combination of the existing HAPL and CAPL. The major operational differences in the HAPL and CAPL are the shot blasting operation in the HAPL and the degreasing section in CAPL. The MAPL will include both operations, as well as the annealing furnace and pickling operations.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): MAPL Shot Blaster (LA45)

Make: TBD

Model: TBD

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

Manufactured date: TBD

Proposed installation date: 12/2023

Original installation date (if existing): N/A

Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

Hours per day: 24

Days per week: 7

Weeks per year: 52

Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Coils	60 tph	75 tph -	660,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):__________MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Annealed Coils	522,500	Tons per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA45	405639.3	3447475.94			82.0		48.89	2.95		44.0		113

* Std temperature is 68ºF – Std pressure is 29.92" in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA45	PM	0.95	4.16	BACT		
	PM_{10}	0.136	0.595	BACT		
	$PM_{2.5}$	0.136	0.595	BACT		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒Yes ☐No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒Yes ☐No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐Yes ☒No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

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PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

Operating scenario number ____

The MAPL will operate as a combination of the existing HAPL and CAPL. The major operational differences in the HAPL and CAPL are the shot blasting operation in the HAPL and the degreasing section in CAPL. The MAPL will include both operations, as well as the annealing furnace and pickling operations.

3. Type of unit or process (e.g., calcining kiln, cupola furnace MAPL H2SO4 Pickling (LA46)

Make: TBD

Model: TBD

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

Manufactured date: TBD

Proposed installation date: 12/2023

Original installation date (if existing): N/A

Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

Hours per day: 24

Days per week: 7

Weeks per year: 52

Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Coils	60 tph	75 tph -	660,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):__________MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Annealed Coils	522,500	Tons per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA46	405623.77	3447462.61			82.0		48.89	2.62		34.8		85.7

* Std temperature is 68ºF – Std pressure is 29.92” in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA46	PM	0.0792	0.347	BACT		
	PM_{10}	0.0792	0.347	BACT		
	$PM_{2.5}$	0.0792	0.347	BACT		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒Yes ☐No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒Yes ☐No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐Yes ☒No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

   Operating scenario number ____

   The MAPL will operate as a combination of the existing HAPL and CAPL. The major operational differences in the HAPL and CAPL are the shot blasting operation in the HAPL and the degreasing section in CAPL. The MAPL will include both operations, as well as the annealing furnace and pickling operations.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): MAPL HNO3/HF Pickling (LA47)

   Make: TBD Model: TBD

   Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

   Manufactured date: TBD

   Proposed installation date: 12/2023

   Original installation date (if existing): N/A

   Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

   Hours per day: 24 Days per week: 7 Weeks per year: 52

   Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Coils	60 tph	75 tph -	660,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):__________MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Annealed Coils	522,500	Tons per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA43	405788.57	3447618.12			82.0		48.89	2.62		15.6		140
LA44	405716.61	3447550.81			82.0		48.89	11.5		61.7		482
LA45	405639.3	3447475.94			82.0		48.89	2.95		44.0		113
LA46	405623.77	3447462.61			82.0		48.89	2.62		34.8		85.7
LA47	405542.52	3447384.92			82.0		48.89	3.28		57.0		482

* Std temperature is 68ºF – Std pressure is 29.92” in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions must be included and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA43	PM	0.111	0.486	BACT		
	PM_{10}	0.111	0.486	BACT		
	$PM_{2.5}$	0.111	0.486	BACT		
LA44	PM	1.07	4.67	AP-42		
	PM_{10}	1.07	4.67	BACT		
	$PM_{2.5}$	1.07	4.67	AP-42		
	SO_2	0.0841	0.368	AP-42		
	NO_X	8.58	37.6	BACT		
	CO	8.58	37.6	BACT		
	VOC	0.787	3.44	AP-42		
	Lead	0.0000701	0.000307	AP-42		
	GHG	16,800	73,700	40 CFR 98		
LA45	PM	0.95	4.16	BACT		
	PM_{10}	0.136	0.595	BACT		
	$PM_{2.5}$	0.136	0.595	BACT		
LA46	PM	0.0792	0.347	BACT		
	PM_{10}	0.0792	0.347	BACT		
	$PM_{2.5}$	0.0792	0.347	BACT		
LA47	PM	0.151	0.661	BACT		
	PM_{10}	0.151	0.661	BACT		
	$PM_{2.5}$	0.151	0.661	BACT		
	NO_x	5.74	25.1	BACT		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒Yes ☐No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒Yes ☐No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐Yes ☒No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

Operating scenario number ____

Hot rolled annealed and pickled coils are loaded in one of the cold rolling mills and uncoiled. The strip is subject to a thickness reduction operation by several reversible passes through the mill stand where force is applied to the strip by rollers and applying high strip tension.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): Cold Rolling Mills – LO51

Make: TBD
Model: TBD

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

Manufactured date: TBD
Proposed installation date: 12/2023

Original installation date (if existing): N/A

Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

Hours per day: 24
Days per week: 7
Weeks per year: 52

Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Coils	60 tph	75 tph -	660,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):__________MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Rolled Coils	660,000	Tons per year

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LO51	406139.78	3447405.7			213		48.89	6.23		64.0		68

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LO51	PM	1.460	6.410	BACT		
	PM_{10}	1.410	6.150	BACT		
	$PM_{2.5}$	0.761	3.330	BACT		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒Yes ☐No

Type text here

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒Yes ☐No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐Yes ☒No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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1. Name of facility or organization: Outokumpu Stainless USA, LLC

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

   Operating scenario number ____

   Waste pickle liquor from the mixed acid pickling process is pumped into a preconcentrator. Moisture and mixed acids are evaporated and enter an absorption column where the acid is recovered and reused in the mixed acid pickling process. The exhaust gas is passed through a scrubber and de-NOx. SCR. The concentrated liquid from the preconcentrator enter a reactor where the remaining moisture is evaporated and solid iron oxidizes is conveyed to an oxide silo for reuse offsite.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): ARP Oxide Transportation (LA71)

   Make: Pyromars or similar

   Model: TBD

   Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

   Manufactured date: TBD

   Proposed installation date: 12/2023

   Original installation date (if existing): N/A

   Reconstruction or Modification date (if applicable): N/A

4. Normal operating schedule:

   Hours per day: 24

   Days per week: 7

   Weeks per year: 52

   Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Spent Mixed Acid Pickling Liquor	1.5 tph	2.5 tph	20,600

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):__________MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA71	405843.17	3447192.82			197		48.89	2.95		20.05		131

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions must be included and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA71	PM	6.21E-02	0.272	BACT		
	PM_{10}	6.21E-02	0.272	BACT		
	$PM_{2.5}$	6.21E-02	0.272	BACT		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☒ Yes ☐ No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐ Yes ☒ No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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16. Name of facility or organization: Outokumpu Stainless USA, LLC

17. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

Operating scenario number ____

Waste pickle liquor from the mixed acid pickling process is pumped into a preconcentrator. Moisture and mixed acids are evaporated and enter an absorption column where the acid is recovered and reused in the mixed acid pickling process. The exhaust gas is passed through a scrubber and de-NOx. SCR. The concentrated liquid from the preconcentrator enter a reactor where the remaining moisture is evaporated and solid iron oxidizes is conveyed to an oxide silo for reuse offsite.

18. Type of unit or process (e.g., calcining kiln, cupola furnace): ARP DeNox (LA72)

Make: Pyromars or similar

Model: TBD

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

Manufactured date: TBD

Proposed installation date: 12/2023

Original installation date (if existing): N/A

Reconstruction or Modification date (if applicable): N/A

19. Normal operating schedule:

Hours per day: 24

Days per week: 7

Weeks per year: 52

Peak production season (if any):

20. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Spent Mixed Acid Pickling Liquor	1.5 tph	2.5 tph	20,600

21. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104): 10.75 MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

22. Products of process or unit:

Products	Quantity/year	Units of production

23. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

24. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

25. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA72	405828.69	3447178.61			197		48.89	3.08		18.37		601

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

26. **Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.**

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LA72	PM	8.26E-02	0.362	BACT		
	PM$_{10}$	8.26E-02	0.362	BACT		
	PM$_{2.5}$	8.26E-02	0.362	BACT		
	SO$_2$	6.32E-03	2.77E-02	AP-42		
	NO$_X$	1.610	7.030	BACT		
	CO	0.885	3.880	BACT		
	VOC	5.80E-02	0.254	AP-42		
	Lead	5.27E-06	2.31E-05	AP-42		
	GHG	1,260	5,540	40 CFR 98		

27. **Using a flow diagram:**

- (1) **Illustrate input of raw materials,**
- (2) **Label production processes, process fuel combustion, process equipment and air pollution control equipment,**
- (3) **Illustrate locations of air contaminant release so that emission points under item 10 can be identified.**

(☐ Check box if extra pages are attached)
Process flow diagram

28. **Is this unit or process in compliance with all applicable air pollution rules and regulations?**

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

29. **Does the input material or product from this process or unit contain finely divided materials which could become airborne?**

☒ Yes ☐ No

30. **If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?**

☐ Yes ☒ No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature:

Date: 9/8/2023

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

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1. **Name of facility or organization: Outokumpu Stainless USA, LLC**

2. **Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.**

   Operating scenario number ____

   Unstabilized ferritic hot-rolled coils will be annealed in the passive annealing furnace, which can anneal several coils simultaneously. The passive annealing process is also called self-annealing because it takes advantage of the remaining heat in the coils exiting the hot rolling mill. As the coils exit the hot rolling mill, they will be top-charged into a box-type annealing furnace, where they will be heated to a predetermined temperature and kept for several hours.

3. **Type of unit or process (e.g., calcining kiln, cupola furnace):** Passive Annealing Furnace (LO41B)

   Make: TBD **Model:** TBD

   Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: N/A

   Manufactured date: TBD **Proposed installation date:** 12/2023

   Original installation date (if existing): N/A

   Reconstruction or Modification date (if applicable): N/A

4. **Normal operating schedule:**

   Hours per day: 24 **Days per week:** 7 **Weeks per year:** 52

   Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Steel Coils	10 tph	60 tph	400,000

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104): 30 MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas	1,020	Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

7. Products of process or unit:

Products	Quantity/year	Units of production
Steel Coils	400,000	tons

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

9. Is there any emission control equipment on this emission source?

☒ Yes ☐ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack											
	UTM Coordinates		Geographic Coordinates		Height Above Grade (Feet)	GEP Stack Height (Feet)	Base Elevation (Feet)	Inside Diameter for Round Opening (Feet)	Inside Area if NOT Round Opening (sq. feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (ºF)
	E-W (km)	N-S (km)	LAT	LONG								
LA41B	406027.4	3446778.0			164		48.89	3.61		55.1	33,829	392

* Std temperature is 68ºF - Std pressure is 29.92" in Hg.

11. Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
LO41B	PM	0.224	0.979	AP-42		
	PM_{10}	0.224	0.979	AP-42		
	$PM_{2.5}$	0.224	0.979	AP-42		
	SO_2	0.0176	0.0773	AP-42		
	NO_X	2.48	10.8	BACT		
	CO	1.8	7.88	BACT		
	VOC	0.162	0.709	AP-42		
	Lead	1.47E-05	6.44E-05	AP-42		
	GHG	3,530	15,500	40 CFR 98		

12. Using a flow diagram:

(1) Illustrate input of raw materials,

(2) Label production processes, process fuel combustion, process equipment and air pollution control equipment,

(3) Illustrate locations of air contaminant release so that emission points under item 10 can be identified.

(☐ Check box if extra pages are attached)
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☒ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☐ Yes ☒ No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐Yes ☒No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: Brad Arnold

Signature: **Date:** 9/27/2023

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. **Name of facility or organization** Outokumpu Stainless USA, LLC

2. **Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)**

   ☐ Settling chamber
   ☐ Afterburner
   ☐ Cyclone
   ☐ Absorber
   ☐ Condenser
   ☐ Electrostatic precipitator
   ☐ Baghouse
   ☐ Multiclone
   ☐ Adsorber
   ☐ Wet Suppression

   ☒ **Wet scrubber (kind):** Water
   Stage 1 - Vapor balance (type):
   Other (describe):

3. **Control device manufacturer's information:**

   Name of manufacturer TBD **Model No.** TBD

4. **Emission source to which device is installed or is to be installed:**
   MAPL Degreasing (LA43)

5. **Emission parameters**

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	$PM/PM_{10}/PM_{2.5}$		
Mass emission rate (#/hr)			
Uncontrolled	2.2		
Designed	0.11		
Manufacturer's guaranteed	0.0022 gr/dscf		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	95		
Manufacturer's guaranteed	95		

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			5,059
Temperature (ºF)			140
Velocity (ft/sec)			15.6
Percent moisture			

Pressure drop across device: (inches H_20)

7. Stack dimensions:

UTM Coordinate (E-W)	405788.6	(km)	UTM Coordinate (N-S)	3447618.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	82.0	(feet)	Gas temperature at exit	140	(°F)
Inside diameter at exit (round)	2.62	(feet)	Gas Velocity	15.6	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other _______

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

Water recirculation rate to be determined.

12. By-pass (if any) is to be used when:
N/A

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	N/A		TBD	
Composition			TBD	
Is waste hazardous?			NO	
Method of disposal			WWT	
Final destination			Surface Discharge	

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature

Date 9/8/2023

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. Name of facility or organization Outokumpu Stainless USA, LLC

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser

☐ Electrostatic precipitator
☐ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

Wet scrubber (kind):
Stage 1 - Vapor balance (type):
☒ Other (describe): Low NO_x Burners

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
MAPL Annealing Furnace (LA44)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	NO_x		
Mass emission rate (#/hr)			
Uncontrolled	42.9		
Designed	8.58		
Manufacturer's guaranteed	0.060 lb/MMBtu		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	80		
Manufacturer's guaranteed	80		

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			383,257
Temperature (ºF)			482
Velocity (ft/sec)			61.7
Percent moisture			

Pressure drop across device: (inches H_20)

7. Stack dimensions:

UTM Coordinate (E-W)	405716.6	(km)	UTM Coordinate (N-S)	3447551.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	82.0	(feet)	Gas temperature at exit	482	(°F)
Inside diameter at exit (round)	11.48	(feet)	Gas Velocity	61.7	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other _______

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

12. By-pass (if any) is to be used when:

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	N/A		N/A	
Composition				
Is waste hazardous?				
Method of disposal				
Final destination				

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature

Date 9/8/2023

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. **Name of facility or organization** Outokumpu Stainless USA, LLC

2. **Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)**

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser
☐ Electrostatic precipitator
☒ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

Wet scrubber (kind): ______
Stage 1 - Vapor balance (type): ______
Other (describe): ______

3. **Control device manufacturer's information:**

Name of manufacturer TBD **Model No.** TBD

4. **Emission source to which device is installed or is to be installed:**
MAPL Shot Blaster (LA45)

5. **Emission parameters**

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	PM	PM_{10}	$PM_{2.5}$
Mass emission rate (#/hr)			
Uncontrolled	950	136	136
Designed	0.95	0.136	0.136
Manufacturer's guaranteed	0.0030 gr/dscf		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	99.9	99.9	99.9
Manufacturer's guaranteed	99.9	99.9	99.9

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			36,960
Temperature (ºF)			113
Velocity (ft/sec)			44.0
Percent moisture			

Pressure drop across device: (inches H_20)

7. Stack dimensions:

UTM Coordinate (E-W)	405639.3	(km)	UTM Coordinate (N-S)	3447476.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	82.0	(feet)	Gas temperature at exit	113	(°F)
Inside diameter at exit (round)	2.95	(feet)	Gas Velocity	44.0	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other ________

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

Filter media and pressure drop to be specified

12. By-pass (if any) is to be used when:
N/A

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	TBD		N/A	
Composition	Metal Dust			
Is waste hazardous?	TBD			
Method of disposal	Off Site			
Final destination	Land fill			

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature **Date** 9/8/2023

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION

FOR

AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. Name of facility or organization Outokumpu Stainless USA, LLC

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser
☐ Electrostatic precipitator
☐ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

☒ Wet scrubber (kind): Caustic
Stage 1 - Vapor balance (type):
Other (describe):

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
MAPL H_2SO_4 Pickling (LA46)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	$PM/PM_{10}/PM_{2.5}$		
Mass emission rate (#/hr)			
Uncontrolled	1.58		
Designed	0.0792		
Manufacturer's guaranteed	0.0022 gr/dcsf		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	95		
Manufacturer's guaranteed	95		

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			11,300
Temperature (ºF)			86
Velocity (ft/sec)			34.8
Percent moisture			

Pressure drop across device: (inches H_20)

7. Stack dimensions:

UTM Coordinate (E-W)	405623.8	(km)	UTM Coordinate (N-S)	3447463.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	82.0	(feet)	Gas temperature at exit	85.7	(°F)
Inside diameter at exit (round)	2.62	(feet)	Gas Velocity	34.8	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints
☐ Manufacturer's literature
☐ Emissions test of existing installation
☐ Other _______

☐ Particle size distribution report
☐ Size efficiency curves
☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

Recirculation rate to be determined.

12. By-pass (if any) is to be used when:
N/A

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	N/A		TBD	
Composition			TBD	
Is waste hazardous?			NO	
Method of disposal			WWT	
Final destination			Surface Discharge	

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature

Date 9/8/2023

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. Name of facility or organization Outokumpu Stainless USA, LLC

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser

☐ Electrostatic precipitator
☐ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

☒ Wet scrubber (kind): Water Pre Scrubber
Stage 1 - Vapor balance (type):
Other (describe):

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
MAPL HNO_3/HF Pickling (LA47)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	$PM/PM_{10}/PM_{2.5}$	HF	
Mass emission rate (#/hr)			
Uncontrolled	4.0	5.0	
Designed	0.08	0.25	
Manufacturer's guaranteed	0.0043 gr/dscf	10 ppm	
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	98	95	
Manufacturer's guaranteed	98	95	

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			28,907
Temperature (ºF)			482
Velocity (ft/sec)			57.0
Percent moisture			

Pressure drop across device: (inches $H_2$0)

7. Stack dimensions:

UTM Coordinate (E-W)	405542.5	(km)	UTM Coordinate (N-S)	3447385.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	82.0	(feet)	Gas temperature at exit	482	(°F)
Inside diameter at exit (round)	3.28	(feet)	Gas Velocity	57.0	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other _______

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

Water recirculation rate to be determined based on vendor and equipment selected.

12. By-pass (if any) is to be used when:
N/A

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	N/A		TBD	
Composition			TBD	
Is waste hazardous?			NO	
Method of disposal			WWT	
Final destination			Surface Discharge	

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature

Date 9/8/2023

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. **Name of facility or organization** Outokumpu Stainless USA, LLC

2. **Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)**

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser
☐ Electrostatic precipitator
☐ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

Wet scrubber (kind):
Stage 1 - Vapor balance (type):
☒ **Other (describe):** Selective Catalytic Reduction (SCR) – Ammonia

3. **Control device manufacturer's information:**

Name of manufacturer TBD **Model No.** TBD

4. **Emission source to which device is installed or is to be installed:**
MAPL HNO_3/HF Pickling (LA47)

5. **Emission parameters**

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	NO_X		
Mass emission rate (#/hr)			
Uncontrolled	8.00		
Designed	0.40		
Manufacturer's guaranteed	0.06 lb/MMBtu		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	95		
Manufacturer's guaranteed	95		

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			28,907
Temperature (ºF)			482
Velocity (ft/sec)			57.0
Percent moisture			

Pressure drop across device: (inches $H_2$0)

7. Stack dimensions:

UTM Coordinate (E-W)	405542.5	(km)	UTM Coordinate (N-S)	3447385.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	82.0	(feet)	Gas temperature at exit	482	(°F)
Inside diameter at exit (round)	3.28	(feet)	Gas Velocity	57.0	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other ________

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

SCR operating parameters (ammonia injection rate) to be determined based on vendor specifications.

12. By-pass (if any) is to be used when:
SCR inoperative

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	N/A		N/A	
Composition				
Is waste hazardous?				
Method of disposal				
Final destination				

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature

Date 9/8/2023

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION

FOR

AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐

(ADEM Use Only)

1. Name of facility or organization Outokumpu Stainless USA, LLC

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber	☐ Electrostatic precipitator
☐ Afterburner	☐ Baghouse
☐ Cyclone	☐ Multiclone
☐ Absorber	☐ Adsorber
☐ Condenser	☐ Wet Suppression

Wet scrubber (kind): ________

Stage 1 - Vapor balance (type): ________

☒ Other (describe): Mist Eliminator

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
Cold Rolling Mill (LO51)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	PM	PM_{10}	$PM_{2.5}$
Mass emission rate (#/hr)			
Uncontrolled	1,460	1,410	760
Designed	1.46	1.41	0.76
Manufacturer's guaranteed	0.0025 gr/dscf	0.0024 gr/dscf	0.0013gr/dscf
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	99.9	99.9	99.9
Manufacturer's guaranteed	99.9	99.9	99.9

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			117,149
Temperature (ºF)			68
Velocity (ft/sec)			64.0
Percent moisture			

Pressure drop across device: (inches $H_2$0)

7. Stack dimensions:

UTM Coordinate (E-W)	406139.8	(km)	UTM Coordinate (N-S)	3447406.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	213.3	(feet)	Gas temperature at exit	68	(°F)
Inside diameter at exit (round)	6.23	(feet)	Gas Velocity	64.0	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other ________

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

Filter detail to be specified

12. By-pass (if any) is to be used when:
N/A

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	TBD		N/A	
Composition	Metal Oxide/Dust			
Is waste hazardous?	TBD			
Method of disposal	Off-Site			
Final destination	Landfill			

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature Date 9/8/2023

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. Name of facility or organization Outokumpu Stainless USA, LLC

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser

☐ Electrostatic precipitator
☒ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

Wet scrubber (kind):
Stage 1 - Vapor balance (type):
Other (describe):

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
ARP Oxide Transportation (LA71)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	$PM/PM_{10}/PM_{2.5}$		
Mass emission rate (#/hr)			
Uncontrolled	62		
Designed	0.062		
Manufacturer's guaranteed	0.0020 gr/dscf		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	99.9		
Manufacturer's guaranteed	99.9		

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			8,236
Temperature (ºF)			131
Velocity (ft/sec)			20.0
Percent moisture			

Pressure drop across device: (inches H_20)

7. Stack dimensions:

UTM Coordinate (E-W)	405843.2	(km)	UTM Coordinate (N-S)	3447193.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	196.9	(feet)	Gas temperature at exit	131	(°F)
Inside diameter at exit (round)	2.95	(feet)	Gas Velocity	20.0	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other _______

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

Baghouse specification to be determined by supplier to meet removal guarantee.

12. By-pass (if any) is to be used when:
N/A

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	TBD		N/A	
Composition	Iron Oxide Dust			
Is waste hazardous?	No			
Method of disposal	Off Site			
Final destination	Landfill			

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature Date 9/8/2023

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION

FOR

AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. Name of facility or organization Outokumpu Stainless USA, LLC

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser
☐ Electrostatic precipitator
☐ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

☒ Wet scrubber (kind): Water Pre Scrubber
Stage 1 - Vapor balance (type):
Other (describe):

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
ARP de-NO$_x$ (LA72)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	PM/PM$_{10}$/PM$_{2.5}$	HF	
Mass emission rate (#/hr)			
Uncontrolled	4.15	1.40	
Designed	0.083	0.07	
Manufacturer's guaranteed	0.0043 gr/dscf	10 ppm	
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	98	95	
Manufacturer's guaranteed	98	95	

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			8,235
Temperature (ºF)			601
Velocity (ft/sec)			18.4
Percent moisture			

Pressure drop across device: (inches H_20)

7. Stack dimensions:

UTM Coordinate (E-W)	405828.7	(km)	UTM Coordinate (N-S)	3447179.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	196.9	(feet)	Gas temperature at exit	601	(°F)
Inside diameter at exit (round)	3.08	(feet)	Gas Velocity	18.4	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other ________

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

Recirculation rate to be determined based on vendor and equipment selected.

12. By-pass (if any) is to be used when:
N/A

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	N/A		TBD	
Composition			TBD	
Is waste hazardous?			No	
Method of disposal			WWT	
Final destination			Surface Discharge	

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature **Date** 9/8/2023

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. Name of facility or organization **Outokumpu Stainless USA, LLC**

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser

☐ Electrostatic precipitator
☐ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

Wet scrubber (kind): ____
Stage 1 - Vapor balance (type): ____
☒ Other (describe): Selective Catalytic Reduction (SCR) - Ammonia

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
ARP de-NOx (LA72)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	NO_x		
Mass emission rate (#/hr)			
Uncontrolled	32.2		
Designed	1.61		
Manufacturer's guaranteed	100 ppm		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	95		
Manufacturer's guaranteed	95		

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			8,235
Temperature (ºF)			601
Velocity (ft/sec)			18.4
Percent moisture			

Pressure drop across device: (inches H_20)

7. Stack dimensions:

UTM Coordinate (E-W)	405828.7	(km)	UTM Coordinate (N-S)	3447179.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	196.9	(feet)	Gas temperature at exit	601	(°F)
Inside diameter at exit (round)	3.08	(feet)	Gas Velocity	18.4	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints
☐ Manufacturer's literature
☐ Emissions test of existing installation
☐ Other ________
☐ Particle size distribution report
☐ Size efficiency curves
☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

SCR operating (ammonia injection rate) parameters to be determined based on vendor specifications.

12. By-pass (if any) is to be used when:
SCR inoperative

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	N/A		N/A	
Composition				
Is waste hazardous?				
Method of disposal				
Final destination				

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature Date 9/8/2023

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. Name of facility or organization Outokumpu Stainless USA, LLC

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser
☐ Electrostatic precipitator
☐ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

Wet scrubber (kind): ______
Stage 1 - Vapor balance (type): ______
☒ Other (describe): Ultra Low NO_x Burners

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
Walking Beam Furnace Phase I (LA23)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	NO_x		
Mass emission rate (#/hr)			
Uncontrolled	106.75		
Designed	21.35		
Manufacturer's guaranteed	0.070 lb/MMBtu		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	80		
Manufacturer's guaranteed	80		

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68°f, 29.92" hg)			
(ACFM, existing conditions)			135,555
Temperature (°F)			375
Velocity (ft/sec)			19.5
Percent moisture			

Pressure drop across device: (inches H_2O)

7. Stack dimensions:

UTM Coordinate (E-W)	406143.3	(km)	UTM Coordinate (N-S)	3447208.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	262.5	(feet)	Gas temperature at exit	375	(°F)
Inside diameter at exit (round)	12.14	(feet)	Gas Velocity	19.5	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other _______

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

12. By-pass (if any) is to be used when:

13. Disposal of collected air pollutants:

	Solid waste	**Solid waste**	**Liquid waste**	**Liquid waste**
Volume	N/A		N/A	
Composition				
Is waste hazardous?				
Method of disposal				
Final destination				

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature **Date** 9/8/2023

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. Name of facility or organization Outokumpu Stainless USA, LLC

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber	☐ Electrostatic precipitator
☐ Afterburner	☐ Baghouse
☐ Cyclone	☐ Multiclone
☐ Absorber	☐ Adsorber
☐ Condenser	☐ Wet Suppression

Wet scrubber (kind):
Stage 1 - Vapor balance (type):
☒ Other (describe): Ultra Low NO_x Burners

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
Walking Beam Furnace Phase 2 (LA24)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	NO_x		
Mass emission rate (#/hr)			
Uncontrolled	106.75		
Designed	21.35		
Manufacturer's guaranteed	0.070 lb/MMBtu		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	80		
Manufacturer's guaranteed	80		

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			135,555
Temperature (ºF)			375
Velocity (ft/sec)			19.5
Percent moisture			

Pressure drop across device: (inches $H_2$0)

7. Stack dimensions:

UTM Coordinate (E-W)	406160.6	(km)	UTM Coordinate (N-S)	3447224.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	262.5	(feet)	Gas temperature at exit	375	(°F)
Inside diameter at exit (round)	12.14	(feet)	Gas Velocity	19.5	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

9. Enclosed are:

☐ Blueprints

☐ Manufacturer’s literature

☐ Emissions test of existing installation

☐ Other _______

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

10. If the pollution control device is of unusual design, please provide a sketch of the device.

11. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

12. By-pass (if any) is to be used when:

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	N/A		N/A	
Composition				
Is waste hazardous?				
Method of disposal				
Final destination				

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature **Date** 9/8/2023

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

13. Name of facility or organization Outokumpu Stainless USA, LLC

14. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser
☒ Electrostatic precipitator
☐ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

Wet scrubber (kind):
Stage 1 - Vapor balance (type):
Other (describe):

15. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

16. Emission source to which device is installed or is to be installed:
Steckel Mill Roughing Mill and Finishing Stands (LA25)

17. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	PM	PM_{10}	$PM_{2.5}$
Mass emission rate (#/hr)			
Uncontrolled	3,210	3,210	1,820
Designed	3.21	3.21	1.82
Manufacturer's guaranteed	0.0044 gr/dscf	0.0044 gr/dscf	0.0025 gr/dscf
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	99.9	99.9	99.9
Manufacturer's guaranteed	99.9	99.9	99.9

18. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			150,091
Temperature (ºF)			151
Velocity (ft/sec)			60.0
Percent moisture			

Pressure drop across device: (inches H_20)

19. Stack dimensions:

UTM Coordinate (E-W)	406090.0	(km)	UTM Coordinate (N-S)	3446977.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	98.4	(feet)	Gas temperature at exit	151	(°F)
Inside diameter at exit (round)	7.28	(feet)	Gas Velocity	60.0	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged		(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

20. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

21. Enclosed are:

☐ Blueprints
☐ Manufacturer's literature
☐ Emissions test of existing installation
☐ Other ________
☐ Particle size distribution report
☐ Size efficiency curves
☐ Fan curves

22. If the pollution control device is of unusual design, please provide a sketch of the device.

23. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

TBD

24. By-pass (if any) is to be used when:
N/A

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	TBD		N/A	
Composition	Metal Dust			
Is waste hazardous?	TBD			
Method of disposal	Off Site			
Final destination	Land fill			

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature

Date 9/8/2023

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
PERMIT APPLICATION
FOR
AIR POLLUTION CONTROL DEVICE

☐☐☐ - ☐☐☐☐ - ☐☐☐☐
(ADEM Use Only)

1. Name of facility or organization Outokumpu Stainless USA, LLC

2. Type of pollution control device: (if more than one, check each; however, separate forms are to be submitted for each specific device.)

☐ Settling chamber
☐ Afterburner
☐ Cyclone
☐ Absorber
☐ Condenser

☐ Electrostatic precipitator
☐ Baghouse
☐ Multiclone
☐ Adsorber
☐ Wet Suppression

Wet scrubber (kind):
Stage 1 - Vapor balance (type):
☒ Other (describe): Ultra Low NO_x Burners w/ EGR

3. Control device manufacturer's information:

Name of manufacturer TBD Model No. TBD

4. Emission source to which device is installed or is to be installed:
Passive Annealing Furnace (LO41B)

5. Emission parameters

	Pollutants Removed		
	Pollutant #1	Pollutant #2	Pollutant #3
	NO_x		
Mass emission rate (#/hr)			
Uncontrolled	12.4		
Designed	2.48		
Manufacturer's guaranteed	0.0825 lb/MMBtu		
Mass emission rate (Expressed as units of standard)			
Required by regulation			
Manufacturer's guaranteed			
Removal efficiency (%)			
Designed	80		
Manufacturer's guaranteed	80		

6. Gas Conditions

	Inlet	Intermediate Locations	Outlet
Volume (SDCFM, 68ºf, 29.92" hg)			
(ACFM, existing conditions)			33,829
Temperature (ºF)			392
Velocity (ft/sec)			55.1
Percent moisture			

Pressure drop across device: (inches $H_2$0)

7. Stack dimensions:

UTM Coordinate (E-W)	406027.4	(km)	UTM Coordinate (N-S)	3446778.0	(km)
Latitude		(LAT)	Longitude		(LONG)
Height above grade	164	(feet)	Gas temperature at exit	392	(°F)
Inside diameter at exit (round)	3.61	(feet)	Gas Velocity	55.1	(Ft/Sec)
Inside area at exit (not round)		(sq. feet)	Volume of gas discharged	33,829	(ACFM)
Base Elevation	48.89	(feet)	GEP Stack Height		(feet)

8. Provide a flow diagram which includes gas exit from process, each control device, location of by-pass, fan or blower, each emission point, exits for collected pollutants, and location of sampling ports.

Enclosed are:

☐ Blueprints

☐ Manufacturer's literature

☐ Emissions test of existing installation

☐ Other _______

☐ Particle size distribution report

☐ Size efficiency curves

☐ Fan curves

9. If the pollution control device is of unusual design, please provide a sketch of the device.

10. List below the important operating parameters for the device. (For example: air/cloth ratio and fabric type, weight, and weave for baghouse; throat velocity and water use rate for a venturi scrubber; etc.)

11. By-pass (if any) is to be used when:

13. Disposal of collected air pollutants:

	Solid waste	Solid waste	Liquid waste	Liquid waste
Volume	N/A		N/A	
Composition				
Is waste hazardous?				
Method of disposal				
Final destination				

If collected air pollutants are recycled, describe:

Name of person preparing application Brad Arnold

Signature

Date 9/27/2023

APPENDIX E

PSD AIR DISPERSION MODELING REPORT

Prevention of Significant Deterioration Application

Outokumpu Stainless USA, LLC
1 Steel Drive
Calvert, Mobile County, Alabama

September 2023

Appendix E:

PSD Air Dispersion Modeling Report

CONTENTS

1. INTRODUCTION

Outokumpu Stainless USA, LLC (Outokumpu or OTK) owns and operates a stainless steel mill located in Calvert, Mobile County, Alabama. The area is currently classified as attainment or unclassifiable for all criteria pollutants. The plant currently operates under a Title V operating permit issued by the Alabama Department of Environmental Management (ADEM) on February 24, 2015 (Permit No. 503-0095). Outokumpu is proposing to make the following changes to the facility:

- Construction of a new Mixed Annealing and Pickling Line (MAPL):
    - Degreasing
    - Annealing Furnace
    - Shot Blaster
    - H_2SO_4 Steel Pickling
    - HNO_3/HF Steel Pickling
- Construction of a second Mixed Acid Regeneration Plant;
- Construction of a new Steckel Mill:
    - Small Holding Furnace (2)
    - Walking Beam Furnace (2)
    - Roughing Mill and Finishing Stands (2)
    - Steckel Mill Furnace (2)
- Additional Support Sources Throughout the Mill:
    - New Cold Rolling Mill
    - New Meltshop “Hot Box”
    - New Passive Annealing Furnace
    - New Slab Holding Furnace
    - Additional Ladle Treatment Stand

The facility location is shown in Figure 1 and Figure 2.

Based upon preliminary design information, a summary of estimated project emissions compared to the Prevention of Significant Deterioration (PSD) major modification thresholds is provided in Table 1.Table 1The following pollutants trigger PSD review and therefore a dispersion modeling analysis to demonstrate compliance with the applicable air quality standards: PM_{10}, $PM_{2.5}$, NOx, and CO. Since PSD review is triggered for NOx, the analysis will also evaluate secondary $PM_{2.5}$ due to NOx and SO_2 emissions and ozone from NOx and VOC emissions. The applicable air quality thresholds and standards for these pollutants are provided in Table 2.

Table 1 Comparison of Project Emissions to PSD Major Modification Thresholds

	TSP	PM_{10}	$PM_{2.5}$	NO_X	SO_2	CO	VOC	Lead
Total Project Emissions Increase	56.6	52.7	43.3	323	2.38	189	21.9	0.002
PSD Major Modification Threshold	25.0	15.0	10.0	40.0	40.0	100.0	40.0	0.6
PSD Major? (Y/N)	Yes	Yes	Yes	Yes	No	Yes	No	No

This modeling report follows the approach established in the project modeling protocol previously reviewed and accepted by ADEM. A copy of that protocol is provided in Attachment 2. The compliance demonstration was conducted in accordance with guidance provided by ADEM and the Environmental Protection Agency (EPA) as outlined in the following documents:

- Guideline on Air Quality Models [published as 40 CFR 58, Appendix W] (Appendix W);
- ADEM PSD Air Quality Analysis Modeling Guidelines (September 2022);
- Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program; and
- Correspondence between SOLA and ADEM.

Table 2 Applicable Air Quality Thresholds and Standards

Compounds	Averaging Period	Significant Impact Level[1] ($\mu g/m^3$)	Significant Monitoring Concentration[1] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Class II PSD Increment ($\mu g/m^3$)
Carbon Monoxide (CO)	1-Hour	2,000	--	40,000[2]	--
	8-Hour	500	575	10,000[b]	--
Nitrogen Dioxide (NO_2)	1-Hour	7.5[3]	--	188.7[4]	--
	Annual	1	14	100[a]	25[1]
Inhalable Particulate Matter (PM_{10})	24-Hour	5	10	150[5]	30[2]
	Annual	1	--	--	17
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	1.2	--	35[6]	9[2]
	Annual	0.3[7]	--	12[8]	4[1]
Ozone	8-Hour	1.0 ppb	--	70 ppb	--

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[11] The maximum high 1st-high predicted concentration modeled over five years of meteorological data.

[2] Not to be exceeded more than once per year.

[3] U.S. EPA interim SIL of 4 ppb, *U.S. EPA Memorandum, Guidance Concerning the Implementation of the 1-hour NO2 NAAQS for the Prevention of Significant Deterioration Program*, June 29, 2010.

[4] 1-hour NO_2 NAAQS of 100 ppb. 98th percentile of the maximum daily 1-hour concentration per year, averaged over five years.

[5] High sixth high over five years of concatenated meteorological data.

[6] Based on the 24-hour PM2.5 NAAQS for the 98th percentile (high-8th-high) of the 24-hour concentration averaged over five years.

[7] The 2016 *$PM_{2.5}$ and Ozone SIL Draft Guidance* provides that a state is authorized to use the annual $PM_{2.5}$ SIL of 0.3 $\mu g/m^3$ from 40 C.F.R. § 51.165(b).

[8] The maximum 5-year average 1st-high predicted concentration modeled.

2. DISPERSION MODELING PROCEDURES

2.1 MODEL SELECTION

The current version of the EPA-approved American Meteorological Society/EPA Regulatory Model (AERMOD) modeling system was used to meet the dispersion modeling requirements for this analysis. AERMOD is recommended for use in modeling multi-source emissions, and can account for plume downwash, stack tip downwash, and point, area, and volume sources.

Current version numbers of the AERMOD model and pre-processors that are used include:

- AERMAP version 18081,
- AERMET version 22112, and
- AERMOD version 22112.

Copies of all model input/output files and supporting data used in the modeling analysis are provided in Attachment 4 of this report.

2.2 SOURCE CLASSIFICATION

In order to appropriately determine the applicable atmospheric boundary layer characteristics that affect a model's calculation of ambient concentrations, a determination was made of whether the area around the facility is considered urban or rural. The first method discussed in Section 5.1 of the AERMOD Implementation Guide (also referring therein to Section 7.2.3c of Appendix W) is called the "land use" technique because it examines the various land use within 3 km of a source and quantifies the percentage of area in various land use categories. If greater than 50% of the land use in the prescribed area is considered urban, then the urban option should be used in AERMOD. The latest 2016 National Land Cover Data (NLCD) was processed by AERSURFACE (version 20060) to create a 3 km radius around the facility and review the land use classifications in the prescribed area. Table 3 below provides the results of this analysis. The area surrounding the Outokumpu facility is approximately 15.2% urban, which is well below the recommended threshold of 50% for urban consideration. Figure 3 provides the visual representation of the 3 km circle to show which land was included in the analysis.

Table 3 AUER Land-Use Analysis

Category ID	Category Description	Number of Cells	Percent	Land Use Classification
11	Open Water	919	5.2%	Rural
21	Developed, Open Space	127	0.7%	Rural
22	Developed, Low Intensity	487	2.8%	Rural
23	Developed, Medium Intensity	1880	10.7%	Urban
24	Developed, High Intensity	783	4.5%	Urban
31	Barren Land	1	0.0%	Rural
41	Deciduous Forest	2718	15.5%	Rural
42	Evergreen Forest	6924	39.5%	Rural
43	Mixed Forest	3323	19.0%	Rural
52	Shrub/Scrub	0	0.0%	Rural
71	Grassland/Herbaceous	0	0.0%	Rural
81	Pasture/Hay	146	0.8%	Rural
82	Cultivated Crops	218	1.2%	Rural
90	Woody Wetlands	0	0.0%	Rural
95	Emergent Herbaceous Wetlands	0	0.0%	Rural
Total		17,526		
Urban Total		2,663	15.2%	
Rural Total		14,863	84.8%	

2.3 DOWNWASH

The effects of plume downwash are considered for all point sources, based on building locations and heights relative to facility emission sources. Direction-specific downwash parameters are calculated using the current version of the EPA-approved Building Profile Input Program (BPIPPRM Version 04274). Building dimensions for the structures are obtained from information provided by Outokumpu. Table 4 provides the building dimensions and the southwest UTM coordinate for each structure included in the evaluation. A simplified plot plan of the facility, showing the location of all structures and point source locations used in the downwash calculations is provided in Figure 4.

In addition to the downwash for the facility's buildings, ADEM has provided the downwash for several nearby sources which are included in the cumulative modeling runs (as needed).

Table 4 Building Dimensions

Figure 4 ID	Building Name	No. of Tiers	Tier	No. of Corners	Southwest UTM Coordinate	
					East (m)	North (m)
A	LMS	6	1	6	406,353	3,447,416
			2	4	406,507	3,447,572
			3	8	406,459	3,447,561
			4	4	406,500	3,447,500
			5	4	406,376	3,447,486
			6	4	406,353	3,447,416
	LMS_Ext	1		4	406,331	3,447,438
B	AODEAF	1		4	406,637	3,447,421
C	CAPL1	1		4	405,626	3,447,412
D	CAPL2	1		4	405,578	3,447,364
E	LCB	1		4	405,932	3,446,823
F	CRM1	1		4	405,925	3,447,703
G	CRM2	1		4	405,861	3,447,598
H	CRM3	1		4	405,927	3,447,577
I	CRM4	1		4	405,984	3,447,516
J	CRM5	1		4	406,095	3,447,464
K	HAPL	1		6	405,747	3,447,012
L	LFB1	1		4	405,498	3,447,033
M	LFB4	1		6	405,544	3,447,331
N	MAPL	1		4	405,529	3,447,367
O	BLDG1	2	1	4	405,947	3,447,342
			2	10	405,947	3,447,342
P	BLDG2	1		4	405,986	3,447,300
Q	BLDG3	1		6	405,932	3,447,273
R	BLDG4	2	1	4	405,860	3,447,261
			2	10	405,816	3,447,181
S	BLDG5	1		4	405,897	3,447,220
T	BLDG6	1		6	405,845	3,447,198
U	STM	1		6	406,225	3,447,149
	AUX1	1		4	406,238	3,447,114
	AUX2	1		4	406,199	3,447,091
	AUX3	1		4	406,166	3,447,059
	AUX4	1		4	406,136	3,447,030
	AUX5	1		4	406,082	3,446,975
	AUX6	1		4	406,058	3,446,952
	AUX7	1		4	406,158	3,447,133
	AUX8	1		4	406,132	3,447,107

2.3.1 GEP STACK HEIGHT

Appendix W requires the evaluation of the potential for physical structures to affect the dispersion of emissions from stack sources. The exhaust from stacks that are located within specified distances of buildings may be subject to “aerodynamic building downwash” under certain meteorological conditions. This determination was made by comparing actual stack height to the Good Engineering Practice (GEP) stack height. The modeled emission units at the proposed facility are evaluated in terms of their proximity to nearby structures. In accordance with recent AERMOD updates, an emission point is assumed to be subject to the effects of downwash at all release heights even if the stack height is above the U.S. EPA formula height, which is defined by the following formula:

$$H_{GEP} = H + 1.5L$$

Where:

H_{GEP} = GEP stack height,
H = structure height, and
L = lesser dimension of the structure (height or maximum projected width).

In addition to calculating direction-specific building dimensions, the BPIPPRM program also calculates the Good Engineering Practice (GEP) stack height. BPIP-PRIME is designed to incorporate the concepts and procedures expressed in the GEP Technical Support document, the Building Downwash Guidance document, and other related documents and has been adapted to incorporate the PRIME downwash algorithms. Most modeled source stacks at the proposed facility are less than 65 meters tall and therefore meet the requirements of GEP and credit for the entire actual height of each stack is used in this modeling analysis. The GEP analysis for the four (4) stacks that are taller than 65m is included in Table 5.

Table 5 GEP Analysis

Stack ID	Stack Height (m)	Calculated H_{GEP} (m)	GEP Stack Height Value (m)
LA23	80	52.63	65
LA24	80	52.29	65
LA26	80	32.82	65
LA27	80	32.60	65

2.4 METEOROLOGICAL DATA

Preprocessed meteorological data was provided by ADEM for the years 2017 – 2021 including surface observations from Mobile, AL and upper air observations from Slidell, LA[9]. A windrose of the processed meteorological data is provided in Figure 5. The transmittal readme document includes the following processing notes:

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[9] Email from Jim Owen (ADEM) to Brad Arnold (SOLA) on July 1, 2022.

- Soil moisture content (Bowen ratio) processed by year
- Seasonality processed by month
- 1-minute ASOS wind data was used
- The data was processed with the adjust u* option.

2.5 EMISSIONS INVENTORY

2.5.1 NEW SOURCES

The project emissions sources are comprised of the Steckel Mill, Mixed Annealing and Pickling Line, Mixed Acid Regeneration Plant, and other sources. It should be noted that all sources are vertical point sources and there are no horizontal point, capped point, volume, or area sources in this analysis. A few of the new emissions sources will vent through existing stacks. The Meltshop Hotbox (LO2A) and Ladle Treatment Stand (LO2B) will vent through existing stack LO2. The Slab Holding Box (LO42B) will vent through existing stack LO11.

For those pollutants/averaging periods with project-only impacts above the SILs, cumulative modeling is required to demonstrate compliance with the applicable air quality standards. The cumulative modeling includes project sources, existing Outokumpu sources, and other nearby non-Outokumpu sources. ADEM has provided nearby non-Outokumpu sources for cumulative analysis. Table 6 provides a list of the project sources and their modeled parameters and the location of the project sources is provided in Figure 4.

2.5.2 EXISTING FACILITY AND NEARBY SOURCES

For those pollutants/averaging periods with project-only impacts above the SILs, cumulative modeling is required to demonstrate compliance with the applicable air quality standards. The cumulative modeling includes project sources, existing Outokumpu sources, and other nearby non-Outokumpu sources. ADEM has provided nearby non-Outokumpu sources for the cumulative analysis.[10] We have used the sources as provided by ADEM with no modifications.

The existing Outokumpu inventory is provided in Attachment 3 of this submittal. With this application, Outokumpu is proposing to raise the stack height of existing sources LO45, LO48, LO49, and LO50 to 55m.

2.5.3 PRE-CONSTRUCTION MONITORING

The SIL modeling was also used to assess if any pre-constructive modeling would be necessary by comparing the predicted screening impacts against the Significant Monitoring Concentration (SMC).

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[10] Email from Jackson Rogers (ADEM) to Brad Arnold on April 6, 2022.

Table 6 List of Project Sources and Parameters

Source	Unit ID	UTM East (m)	UTM North (m)	PM$_{2.5}$ Emissions (g/s)	PM$_{10}$ Emissions (g/s)	NOx Emissions (g/s)	CO Emissions (g/s)	Stack Height (m)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)
New Meltshop Hot Box	LO2A	406674.1	3447406	5.63E-03	5.63E-03	7.41E-02	6.23E-02	49.99	307	15.35	4.88
Ladle Treatment Stand	LO2B	406674.1	3447406	9.39E-03	9.39E-03	0.124	0.104	49.99	307	15.35	4.88
Small Holding Furnace Phase 1	LA21	406209.9	3447193	2.25E-02	2.25E-02	0.302	0.249	30.0	473	3.64	1.10
Small Holding Furnace Phase 2	LA22	406233.3	3447216	2.25E-02	2.25E-02	0.302	0.249	30.0	473	3.64	1.10
Walking Beam Furnace Phase 1	LA23	406143.3	3447208	0.286	0.286	2.69	1.35	80.0	464	5.95	3.70
Walking Beam Furnace Phase 2	LA24	406160.6	3447224	0.286	0.286	2.69	1.35	80.0	464	5.95	3.70
Roughing/Finishing	LA25	406090.0	3446977	0.229	0.404	--	--	30	339	18.30	2.22
Steckel Mill Furnace Phase 1	LA26	406054.4	3446985	1.95E-02	1.95E-02	0.262	0.216	80.0	450	0.32	6.5
Steckel Mill Furnace Phase 2	LA27	406067.4	3446997	1.95E-02	1.95E-02	0.262	0.216	80.0	450	0.32	6.5
Passive Annealing Furnace	LO41B	406027.4	3446778	2.82E-02	2.82E-02	0.416	0.227	50	473	16.80	1.1
Slab Holding Furnace	LO42B	406398.0	3447456	2.35E-02	2.35E-02	0.315	0.259	40	303	11.80	1.4
MAPL Degreasing	LA43	405788.6	3447618	1.40E-02	1.40E-02	--	--	25	333	4.75	0.8
MAPL Annealing Furnace	LA44	405716.6	3447551	0.134	0.134	1.08	1.08	25	523	18.80	3.5
MAPL Shot Blaster	LA45	405639.3	3447476	1.71E-02	1.71E-02	--	--	25	318	13.40	0.9
MAPL H_2SO_4 Pickling	LA46	405623.8	3447463	9.98E-03	9.98E-03	--	--	25	303	10.61	0.8
APL HNO_3/HF Pickling	LA47	405542.5	3447385	1.90E-02	1.90E-02	0.723	--	25	523	17.37	1
Cold Rolling Mill	LO51	406139.8	3447406	9.59E-02	0.177	--	--	65	293	19.50	1.90
ARP Oxide Transportation	LA71	405843.2	3447193	7.83E-03	7.83E-03	--	--	60	328	6.11	0.9
ARP DeNox	LA72	405828.7	3447179	1.04E-02	1.04E-02	0.202	0.112	60	589	5.60	0.94

2.6 BACKGROUND CONCENTRATIONS

Background ambient air quality concentrations are added to the model-predicted cumulative impacts to determine the total air quality concentrations for comparison to the NAAQS. Background concentrations are current levels of ambient air pollution, external to the facility's own impacts and those of nearby sources, which are the result of non-modeled point, area, and mobile sources of air pollution. Background concentrations for NO_2 and $PM_{2.5}$ were provided by ADEM[11].

The background values are summarized in Table 7.

Table 7 Background Air Quality

Compounds	Averaging Period	Background Value (μg/m^3)	Monitor
Nitrogen Dioxide (NO_2)	1-Hour	31	Yorkville, GA
	Annual	7.5	ADEM Guidance
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	16	Chickasaw
	Annual	8.0	Chickasaw

2.7 RECEPTOR GRID AND FACILITY FENCELINE

Cartesian receptor grids centered on the facility are defined using the Universal Transverse Mercator (UTM) Zone 16, NAD83 coordinate system. The grids are designed to accurately resolve the highest predicted pollutant impacts while at the same time allowing for reasonable execution time. Several receptor grids of varying resolution are defined for the required model analyses. The grids consist of a set of nested receptors placed at:

- 25-meter resolution along the ambient air boundary.
- 100-meter resolution extending to a distance of approximately 5 km from the ambient air boundary.
- 250-meter resolution extending to approximately 10 km from the ambient air boundary.
- 500-meter resolution extending to approximately 15 km from the ambient air boundary.
- 1,000-meter resolution extending to approximately 50 km from the ambient air boundary.

If the maximum predicted cumulative or increment impact occurs outside the 100-meter resolution grid, an additional refined (100-meter resolution) grid was developed around the maximum impact receptor. The additional refined grid extends to the nearest coarse grid receptor in each cardinal direction.

Receptor elevation and scale heights are obtained using the AERMAP terrain processor. The digital terrain dataset provided as input to AERMAP was the National Elevation Dataset (NED) digital terrain data at 1/3 arc-second resolution, which is equivalent to approximately 10 meters in the project area. The receptor grid is shown in Figure 6.

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[11] Email from Michael Leach (ADEM) to Brad Arnold (SOLA) on November 9, 2022.

For cumulative modeling, Outokumpu are using pollutant and averaging period specific receptor grids that included only receptors that were over the respective SIL. Additionally, for the particulate matter runs, the receptor grid was split such that receptors on and within AM/NS's fence line are segregated and run separately excluding AM/NS's emission impacts from within its own property. The modeling runs for the receptors outside of AM/NS's fence line are run normally including the project, Outokumpu's existing facility and all offsite inventory sources. Since all SIL exceedances (for both 24 hour and annual) occurred within AM/NS's fence line, the NAAQS and PSD Increment runs for $PM_{2.5}$ do not include AM/NS sources.

2.8 NO_X TO NO_2 CONVERSION

The emitted NO_x will photochemically react with other atmospheric constituents to form NO_2, which is the pollutant for which EPA has established the NAAQS. EPA has instituted a three-tiered approach that addresses the conversion of NOx to NO_2. The three tiers are:

- Tier 1: assume full conversion of NOx to NO_2.
- Tier 2: run AERMOD with the Ambient Ratio Method 2 (ARM2) option invoked, which is based on empirical data to estimate the amount of conversion of NOx to NO_2 based on the modeled NOx concentration.
- Tier 3: The appropriate applications for the Ozone Limiting Method (OLM) and Plume Volume Molar Ratio Method (PVMRM) NO_2 modeling schemes.

The Tier 3 approach, using PVMRM, is used to estimate 1-hour and annual average NO_2 impacts. The use of PVMRM requires ambient ozone data and the NOx to NO_2 in-stack ratio (ISR) for each modeled NO_X source. All sources will use the default ISR of 0.5 as dictated in the EPA memorandum titled "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2, National Ambient Air Quality Standard" (March 2011).

The ozone data from monitor 01-97-0003 was provided by ADEM for use in the analysis[12]. The Chickasaw monitor operates seasonally, collecting data only from March to October each year. To account for missing hours, the maximum hourly value for each month in the ozone data was calculated and stored. For months outside the monitoring season, the maximum hourly values from March were used as conservative substitutes for January and February and the maximum hourly values from October were used as conservative substitutes for November and December.

2.9 SECONDARY PARTICULATE AND OZONE FORMATION

The analysis of project emissions for the secondarily-formed pollutants, i.e., secondary $PM_{2.5}$ and ozone, is required by Appendix W for PSD sources. Secondary $PM_{2.5}$ and ozone are formed from the emissions of precursor pollutants, i.e., VOC, SO_2, and NO_X. Following ADEM guidance, the EPA's Modeled Emission Rates for Precursor Pollutants (MERPs) dataset are used to estimate secondary $PM_{2.5}$ and ozone formation due to project emissions. The estimated secondary $PM_{2.5}$ are added to the primary $PM_{2.5}$

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[12] Gina Curvin (ADEM) to Brad Arnold (SOLA) via email on November 10, 2022.

impacts modeled by AERMOD for a total $PM_{2.5}$ concentration for comparison to all applicable air quality thresholds and standards. The estimated ozone formation are compared to the ozone SIL, and if above the SIL, are added to ambient ozone values.

2.9.1 SITE SELECTION

The Autauga County hypothetical source in Alabama has been selected as the representative source for the ozone and $PM_{2.5}$ MERPs analysis in the EPA's photochemical modeling study. There are no hypothetical sources within a 200 km radius of the project location according to the EPA database documentation. The Autauga site is about 210 km northeast of the facility. Although there are two coastal hypothetical sources, one in Bay County, Florida (around 250 km southeast of the site), and another in Orleans, Louisiana (approximately 215 km southwest of the site), they may be influenced by coastal meteorology due to their proximity to the ocean. Both the Autauga site and the project site are situated in rural areas close to urban/industrialized regions. Therefore, the Autauga hypothetical source is chosen as the representative source for the analysis of ozone and secondary $PM_{2.5}$ MERPs.

2.9.2 SECONDARY $PM_{2.5}$ FORMATION

Since the facility mainly consists of tall stacks, and the majority of NOx and SO_2 emissions for the project will come from stacks that are much taller than 10 m, the 90 m stack source category was selected to determine the appropriate MERP values for the Autauga hypothetical source. The emissions MERP value category (e.g., 500 tpy, 1000 tpy) was chosen based on the closest value to the annual emission estimates for the project. Table 8 shows the selected MERPs values for the Autauga County hypothetical source, the calculated $PM_{2.5}$ MERPs, project emissions increases of NOx and SO_2, and estimated secondary $PM_{2.5}$ impact associated with the expansion project.

Table 8 $PM_{2.5}$ MERPs Analysis

Averaging Period	**Precursor**	**Air Quality Threshold** (µg/m³)	**$PM_{2.5}$ MERP** (tpy)	**Project Emissions** (tpy)	**% of Air Quality Threshold**	**Secondary $PM_{2.5}$ Impact** (µg/m³)
24-hr	NO_X	1.2	7,875	328	4.16%	**0.050**
Annual	NO_X	0.3	50,999		0.64%	**0.00193**
24-hr	SO_2	1.2	2,224	2.38	0.11%	**0.00128**
Annual	SO_2	0.3	14,816		0.02%	**4.58E-05**
					24-hr Total	**0.051**
					Annual Total	**0.00198**

2.9.3 OZONE AMBIENT IMPACT ANALYSIS

Table 9 shows the selected MERPs values for the Autauga County hypothetical source, the calculated ozone MERPs, project emissions increases of NO_X and VOC, and estimated ozone impact associated with the expansion project.

Table 9 Ozone MERPs Analysis

Averaging Period	**Precursor**	**Air Quality Threshold** (ppb)	**Ozone MERP** (tpy)	**Project Emissions** (tpy)	**% of Air Quality Threshold**	**Secondary Ozone Impact** ($\mu g/m^3$)
8-hour	NO_X	1.0	207	328	158%	**1.58**
8-hour	VOC	1.0	9,362	21.9	0.23%	**0.0023**
					Total	**1.58**

ADEM has provided a background concentration of 56 ppb for ozone. The cumulative ozone impact for his project (project impact plus background) is therefore 57.58 ppb, which is well below the NAAQS of 70 ppb.

3. IMPACT ANALYSES RESULTS

3.1 SIGNIFICANT IMPACT ANALYSIS

Table 10 below provides the maximum predicted project impacts due to the emission increases as compared to the PSD Class II SILs for NO_2, $PM_{2.5}$, PM_{10}, and CO. The impacts are also compared to the significant monitoring concentrations (SMCs) following ADEM guidance.

Table 10 Significant Impact Level (SIL) and Significant Monitoring Concentration (SMC) Analysis

Pollutant	Averaging Period	SIL (µg/m³)	Significant Monitoring Concentration (µg/m³)	Results	
				Max H1H (µg/m³)	SIA (km)
CO	1-hour	2000	--	34.0	--
	8-hour	500	575	23.0	--
NO_2	1-hour	7.5	--	45.7	15.7
	Annual	1	14	4.13	2.5
PM_{10}	24-hour	5	10	4.05	--
	Annual	1	--	0.575	--
$PM_{2.5}$	24-hour	1.2	4	3.68	2.5
	Annual	0.3	--	0.490	1.9

The maximum concentrations from the project were compared against the applicable monitoring de minimis concentration or SMC. All the criteria pollutants with SILs had predicted H1H impacts from the project less than their respective SMC.

If impacts for any pollutant and averaging period are less than or equal to the applicable SIL then the project is deemed to not cause or contribute to any exceedances of the NAAQS or Class II PSD increment, and no further analyses are required. If impacts exceed the SIL for any pollutant and averaging period, then a cumulative NAAQS and/or Class II PSD increment impact analysis are performed for that pollutant/averaging period, as applicable. The SIAs are shown in Figures 7 through 14.

3.2 NAAQS AND PSD CLASS II INCREMENT ANALYSIS

For those pollutants/averaging periods with project-only impacts above the SILs, cumulative modeling was required to demonstrate compliance with the applicable air quality standards. The cumulative modeling was performed only for those receptors where the significant impact level is exceeded on a pollutant and averaging period basis. Compliance with the NAAQS are based on the total estimated air quality concentration, which is the sum of the project impacts, existing Outokumpu source impacts, nearby source impacts, and background air quality data. Compliance with the Class II PSD increments are based on the total estimated air quality concentration, which is the sum of the project impacts, existing Outokumpu source impacts, and nearby source impacts.

3.2.1 NAAQS ASSESSMENT

Modeling was performed using pollutant and averaging period specific receptor grids that included only receptors that were over the respective SIL. To have a NAAQS exceedance, the total concentration at a specific time and location must exceed the NAAQS. A secondary significance test is then performed to assess if the project causes or contributes to the exceedance. The threshold for assessing a significant contribution of an exceedance to the NAAQS is whether the contributions are greater than the SIL. Table 11 shows the results of these NAAQS assessments. The NAAQS modeling results are shown in Figures 15 through 18.

Table 11 NAAQS Assessment Results

Pollutant	Averaging Period	NAAQS (µg/m³)	Background (µg/m³)	Secondary Impact (µg/m³)	Results	
					Predicted Concentration (µg/m³)	Design Value (µg/m³)
NO_2	1-hour	188.7	31	--	700	731
	Annual	100	7.5	--	9.86	17.36
$PM_{2.5}$	24-hour	35	16	0.051	16.14	32.19
	Annual	12	8.0	0.00198	3.68	11.682

For the NAAQS exceedance, the statistical standards (1-hour NO_2) complicate a straightforward culpability analysis since the design values for each receptor are calculated in a two-step process as follows:

- First, the daily values (daily maximum for the 1-hour standard) for each year and each receptor are sorted by rank.
- Second, for each receptor the five sets of yearly ranked values are averaged across the same rank over the five year modeling period.

To assist in the culpability analysis for these statistical standards, AERMOD contains an option to generate an output file of the maximum daily contributions from each source called a MAXDCONT file. These MAXDCONT files record all the daily maxima (for the 1-hour standard) for each receptor for each year. Furthermore, the MAXDCONT files record the specific modeled concentration contributions of the project, as well as the inventory sources for each of the daily values at each receptor for each year. To assure that the NAAQS are protected, the U.S. EPA recommends extracting the MAXDCONT culpability data up to a high enough rank at which no NAAQS exceedances are predicted.

Analysis of the MAXDCONT files revealed the following:

- From the 1-hour NO_2 MAXDCONT file the project was shown to not significantly contribute to any of the modeled NAAQS exceedances because none of the project contributions to modeled

NAAQS exceedances were above the relevant SIL. The project's peak contribution to any NAAQS exceedance was 3.726 µg/m^3 at the 8th rank. The culpability data was run up to a rank of 365. The maximum rank where no NAAQS exceedances occurred was 142nd.

The modeling for this application was performed such that any predicted peak impact would be captured within a fine receptor grid spacing of 100 meters. This approach resolves the predicted peak impacts at a spatial scale fine enough for better ensuring that modeling captures the magnitude of the peak impact to within a 100 meter scaling. Figure 19 shows that all predicted peak impacts occur within the 100 meter spaced grid for the NO_2 1-hr NAAQS modeling.

Therefore, for all pollutant and averaging periods requiring full cumulative modeling, the project was shown to be in compliance with the NAAQS.

3.2.2 PSD INCREMENT ASSESSMENT

A Class II PSD increment modeling analysis was performed for 24-hour and annual $PM_{2.5}$, and annual NO_2. For the PSD increment assessment, no ambient background is added as the threshold applies only to the change in ambient concentrations that have occurred since the baseline date was established. The major source baseline date for $PM_{2.5}$ is October 20, 2010 and the major source baseline date for NO_2 is February 8, 1988. All existing sources at Outokumpu are considered baseline sources for $PM_{2.5}$ based on the initial PSD permit for the prior combined entity of ThyssenKrupp Steel and Stainless USA issuance date of August 17, 2007, and the continuous construction of the facility starting in 2008 and continuing through the baseline date. For the NO_2 increment runs, all the facility sources were included as their major source baseline dates were prior to any construction at the facility. The nearby offsite inventory sources (provided by ADEM) have been categorized to account for whether a source was constructed after the baseline date (consuming sources). Sources that have been retired since the baseline date (expanding sources) were modeled with negative emissions in AERMOD to take credit for the reductions that have occurred after the baseline date. Table 12 summarizes the results of the PSD increment assessment. Based on these results it is shown that emissions from the project, when assessed with other increment consuming and expanding sources, are in compliance with the PSD increment. The PSD Increment modeling results are shown in Figures 20 through 22.

Table 12 PSD Increment Assessment Results

Pollutant	Averaging Period	Increment (µg/m^3)	Secondary Impact (µg/m^3)	Results	
				Predicted Concentration (µg/m^3)	Design Value (µg/m^3)
NO_2	Annual	25	--	9.90	9.90
$PM_{2.5}$	24-hour	9	0.051	3.65	3.70
	Annual	4	0.00198	0.506	0.508

Based on these results it is shown that emissions from the project, when assessed with other increment consuming and expanding sources, are in compliance with the PSD increment.

3.3 CLASS I AQRV CONSIDERATIONS

Class I areas are federally protected areas for which more stringent air quality standards apply to protect unique natural, cultural, recreational, and/or historic values. Breton Wilderness Area is 150 km from the facility and is the only Class I area within 300 km.

The Federal Land Managers (FLM) possess the authority to safeguard air quality related values (AQRVs) and, in collaboration with the permitting authority, assess whether a proposed major emitting facility will have any detrimental effects on these values. AQRVs commonly subject to PSD modeling encompass visibility and the deposition of sulfur and nitrogen.

To ascertain whether a comprehensive AQRV analysis is necessary, the emission-to-Class I distance ratio (Q/D) for this project in the neighboring Class I areas was considered. According to the FLM's AQRV Work Group (FLAG) 2010 guidance, a Q/D value of ten or less indicates that AQRV analyses are not obligatory. The initial assessment of the Q/D for Breton Wilderness revealed that the Q/D is below 10, demonstrating minimal effects. A notification has been duly submitted (via e-mail) to the relevant FLM, requesting agreement on whether an AQRV analysis is required for this project. We will use the CALPUFF Modeling System to consider deposition in the event the FLM does require an AQRV analysis.

3.4 ADDITIONAL IMPACT ANALYSIS

A qualitative assessment of the impacts on general growth, soil, and vegetation associated with the proposed modification was performed. The additional impact analysis has been conducted to evaluate the following:

- Growth analysis
- Ambient air quality impact analysis
- Soils and vegetation impact analysis
- Visibility analysis

3.4.1 GROWTH ANALYSIS

Since the project will not lead to any associated industrial, commercial, and residential growth, this analysis is satisfied and addressed by the air quality analysis described in herein.

3.4.2 SOIL AND VEGETATION IMPACT ANALYSIS

Estimated impact to soils and vegetation are based on a comparison of the air quality impacts due to project emissions to the secondary (or primary if no secondary standards are specified) NAAQS. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The screening levels represent the minimum concentrations in either plant tissue or soils at which adverse growth effects or tissue injury was reported in the literature. The NAAQS secondary standards were set to protect public welfare, including protection against damage to crops and vegetation. Comparing the modeled emissions to the air quality related values (AQRV) screening concentrations and the NAAQS secondary standards provides one indication as to whether potential impacts are likely to be significant for vegetation and soils. As discussed in Section 3.2 of this report, the project does not significantly contribute to any NAAQS exceedances, and they are caused by the modeled background sources. Therefore, the project will not have a significant impact on soils and vegetation.

3.5 VISIBILITY ANALYSIS

A visibility analysis was not required using the VISCREEN model as there are no regional airports or scenic vistas located within the significant impact area of the proposed modification. The closest identified Class II area is Meaher State Park, which is greater than 40 km away and well outside the SIAs for all pollutants.

ATTACHMENT 1 - FIGURES

Figure 1 Area Map

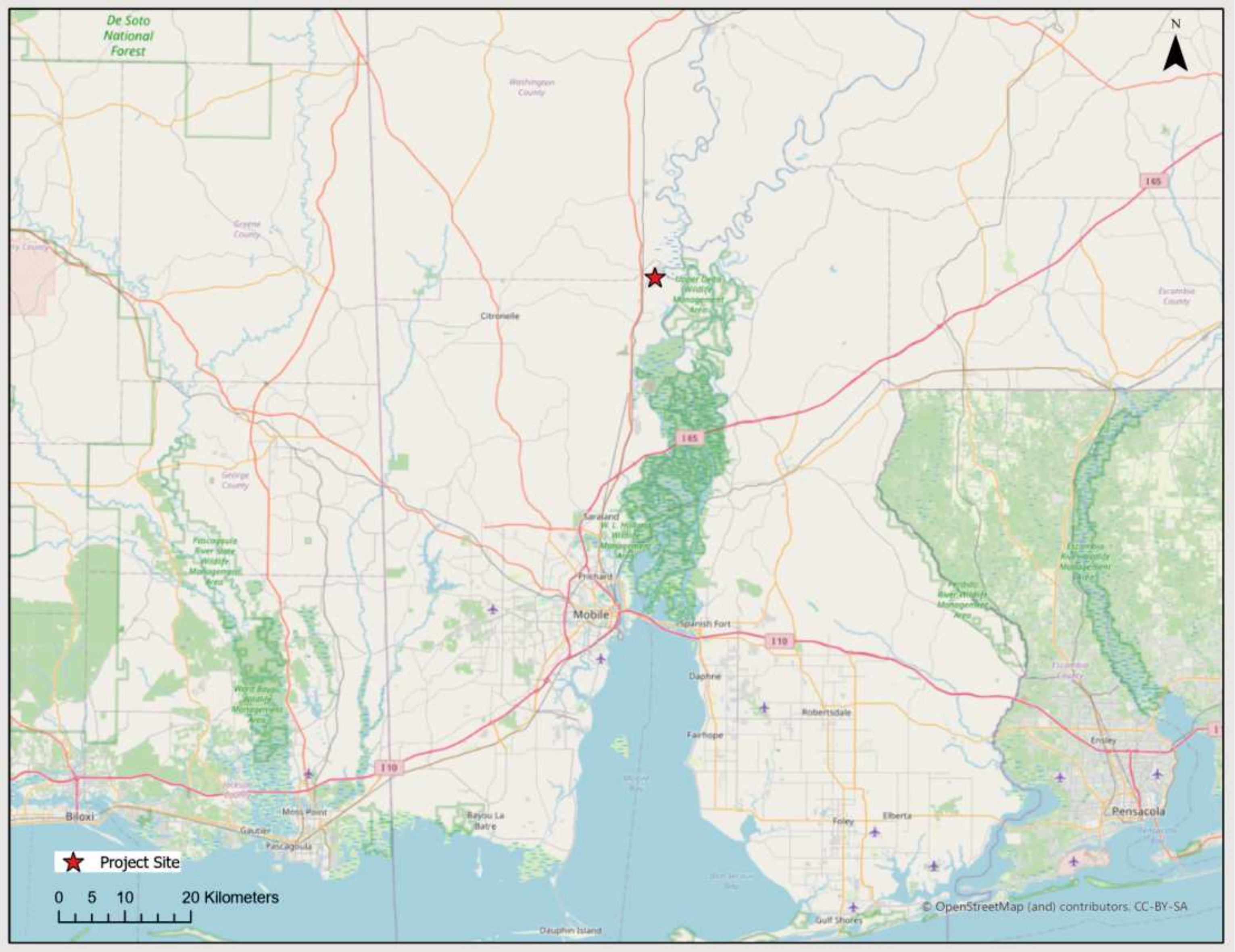

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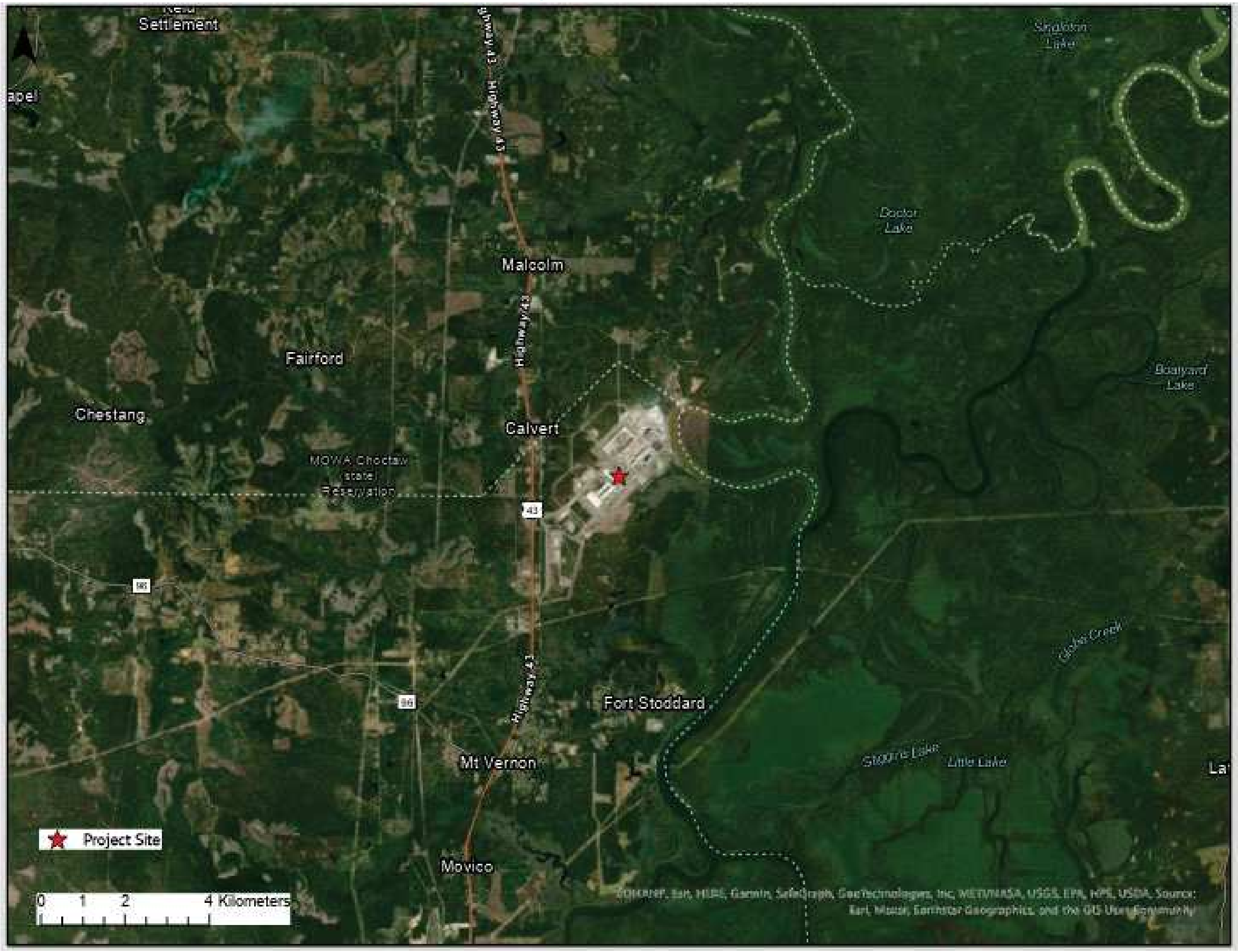
Figure 2 Local Map



Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 3 AUER 3-KM Analysis

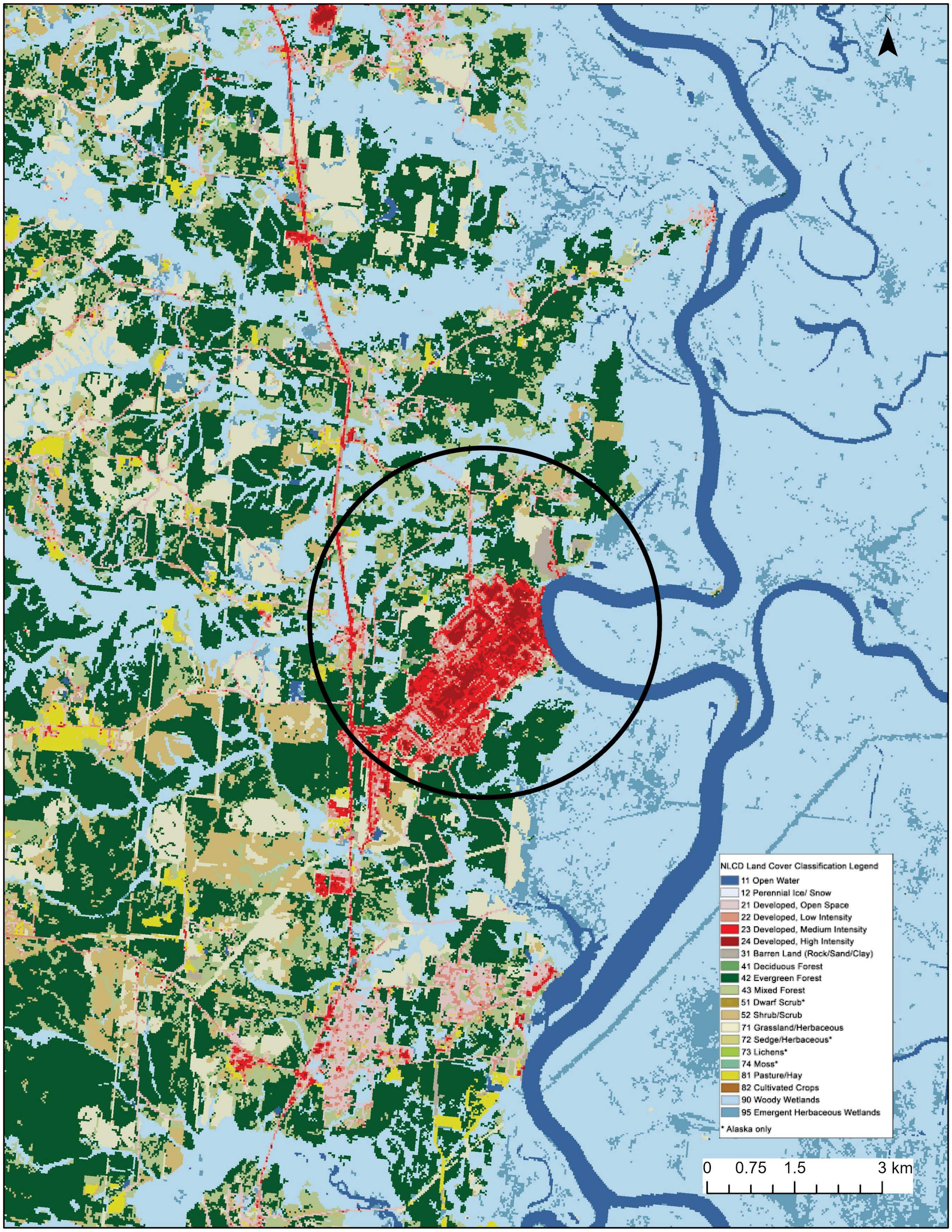
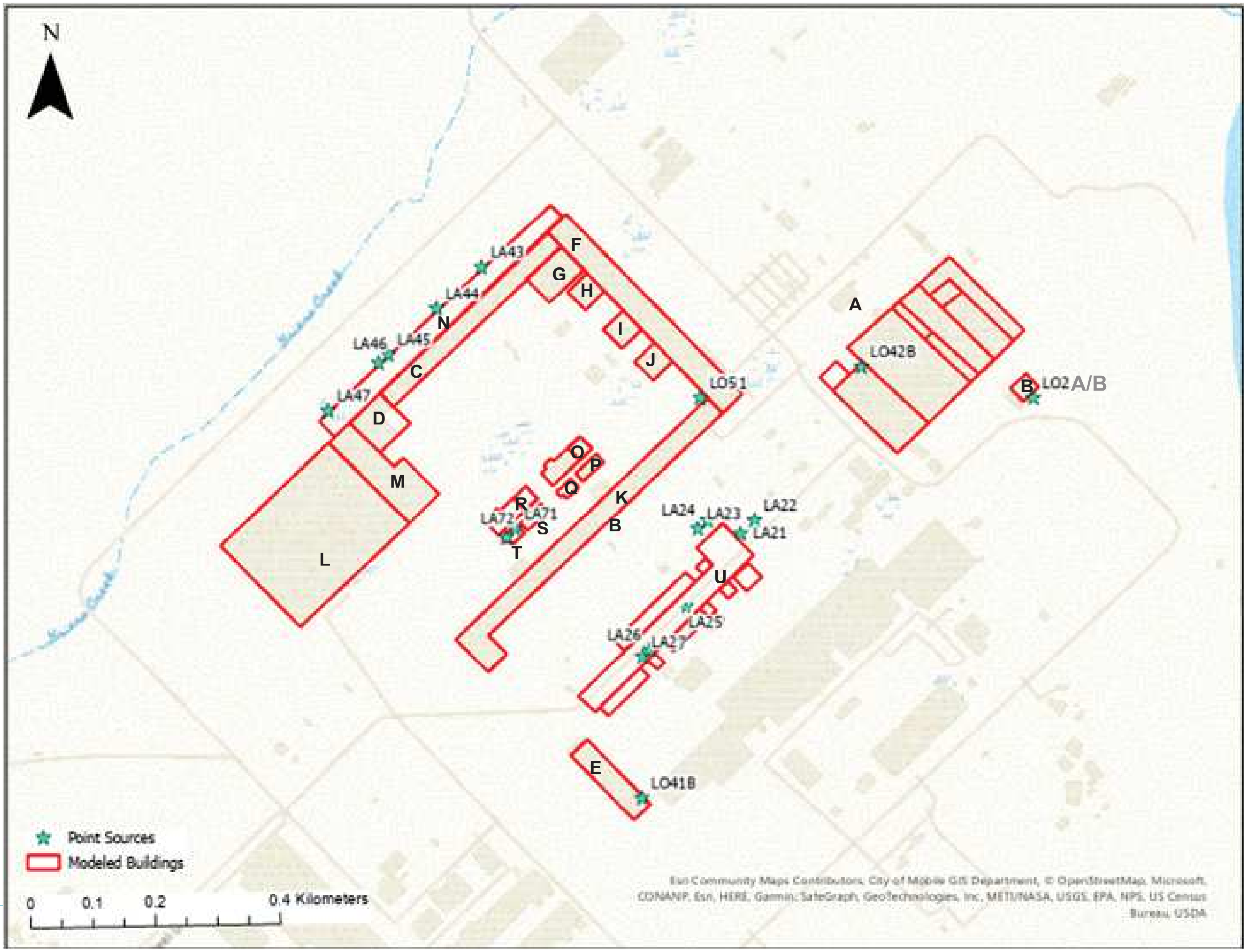


Figure 4 Digitized Facility Structures and Source Locations



Esri Community Maps Contributors, City of Mobile GIS Department, © OpenStreetMap, Microsoft, CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Figure 5 Mobile Wind Rose (2017-2021)

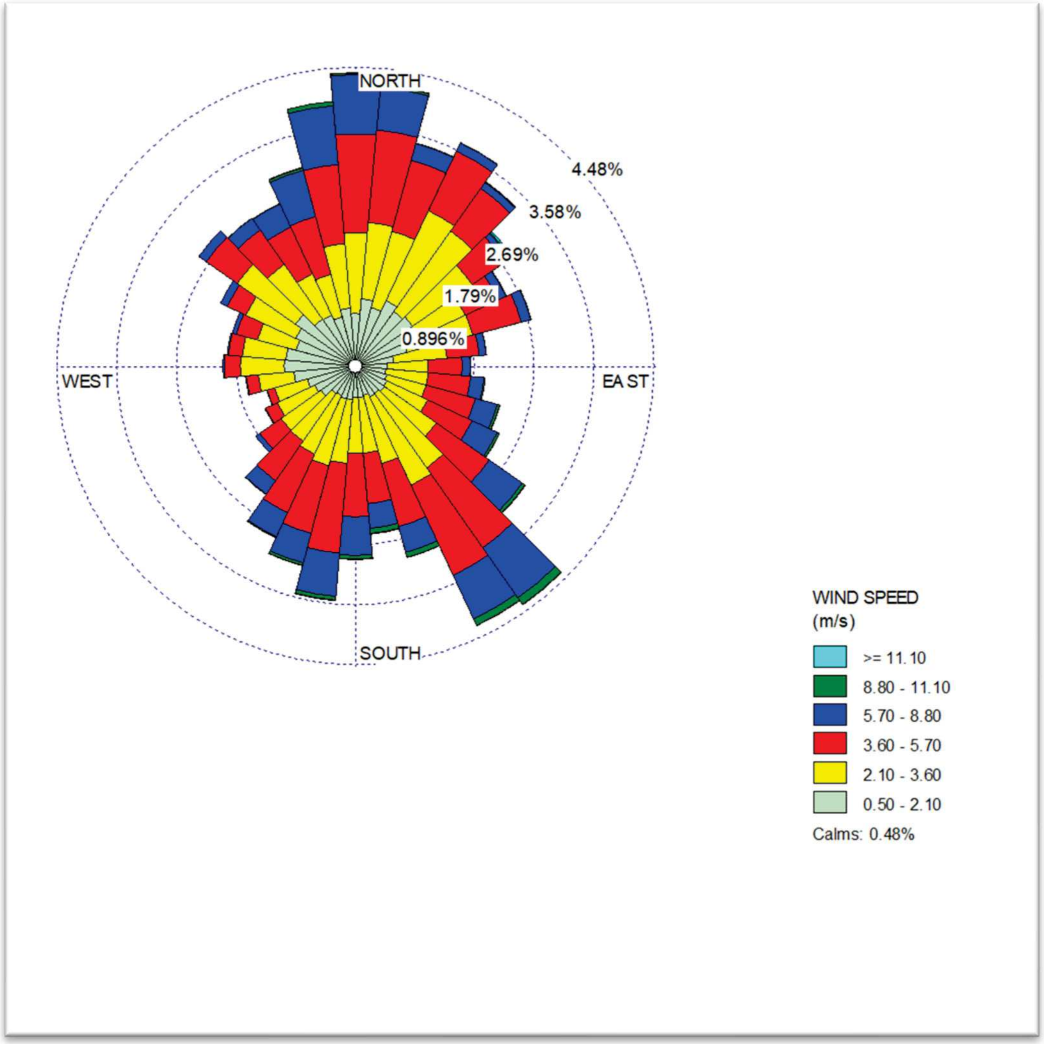


Figure 6 Receptor Grid

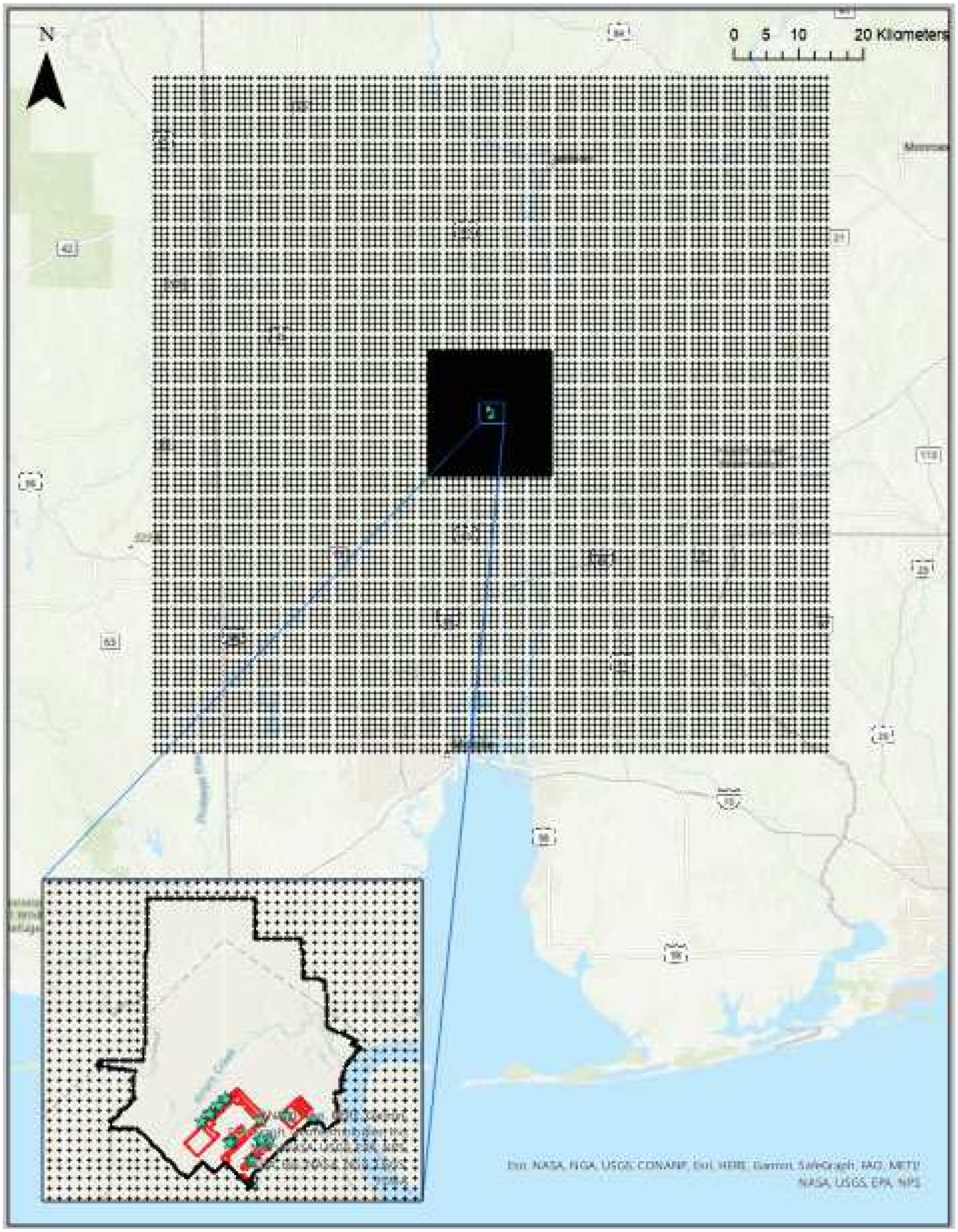


Figure 7 NO_2 1-Hour SIA

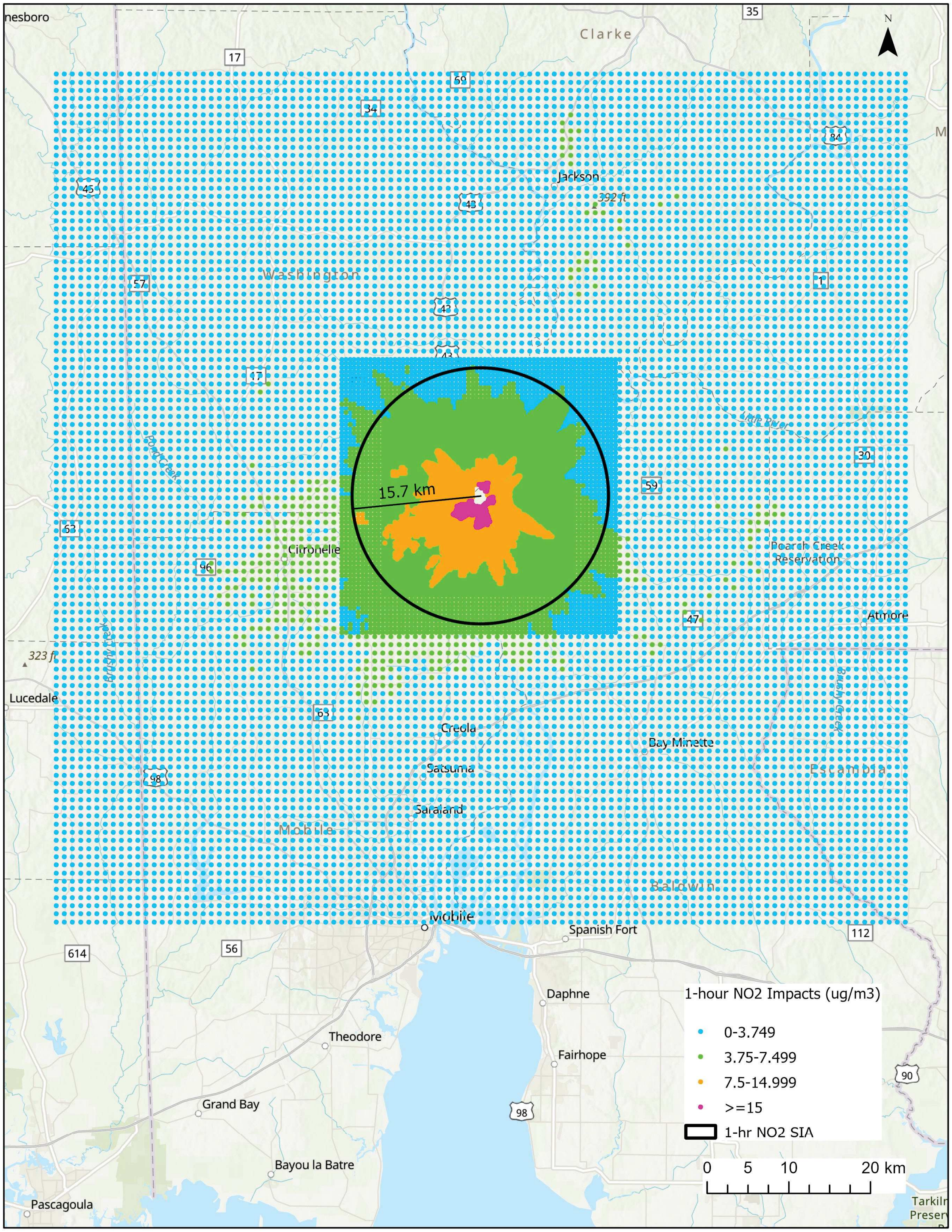


Figure 8 NO_2 Annual SIA

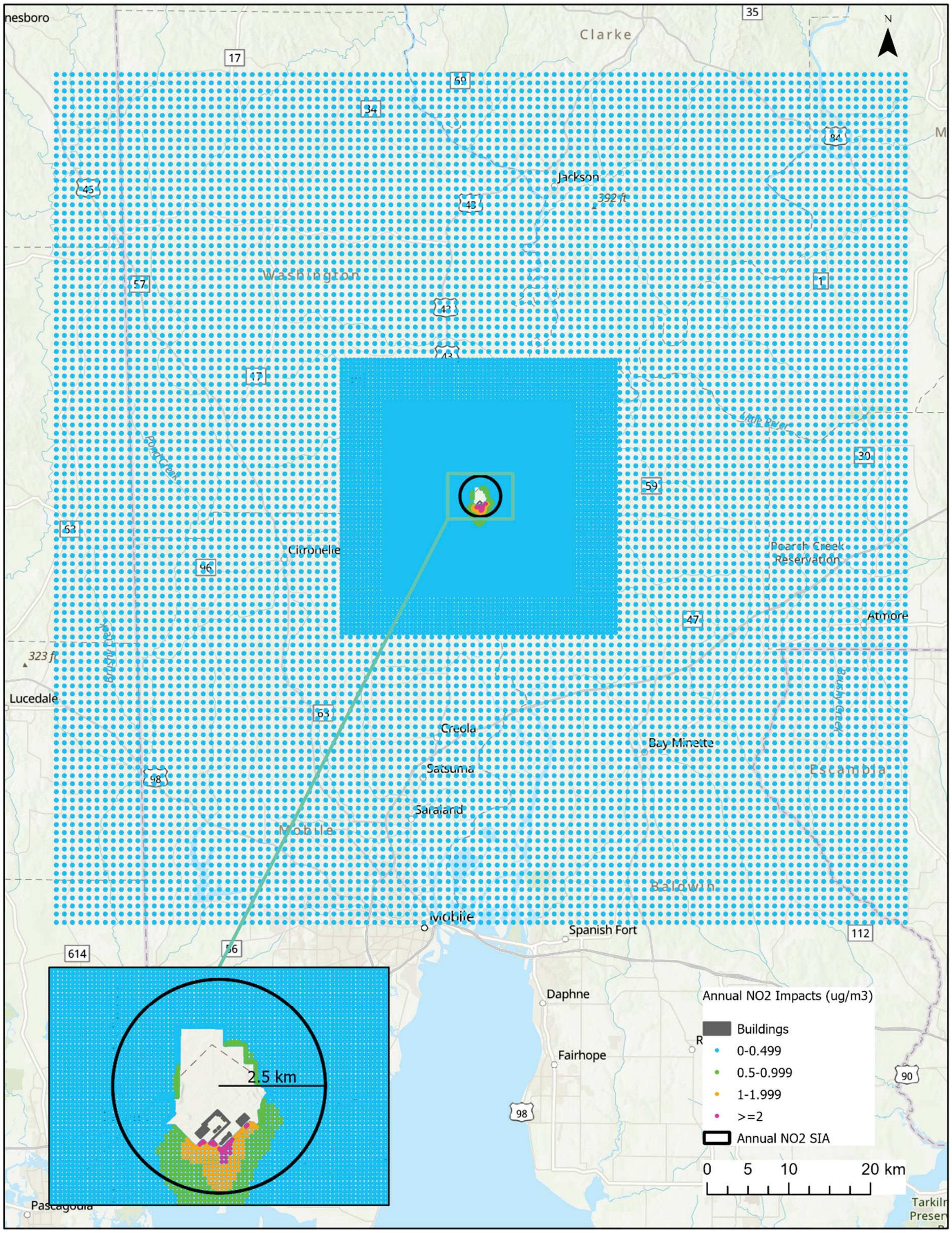


Figure 9 $PM_{2.5}$ 24-Hour SIA

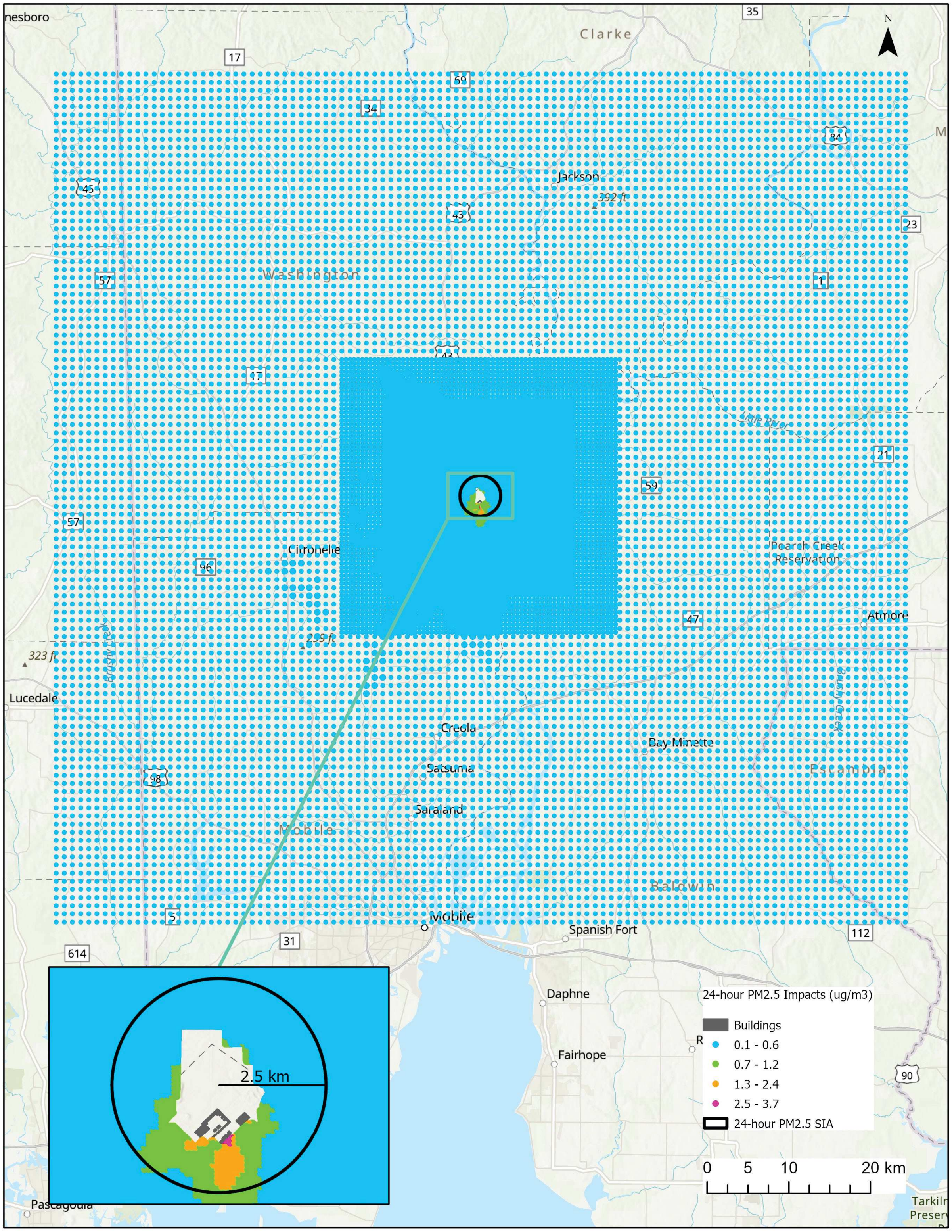


Figure 10 PM$_{2.5}$ Annual SIA

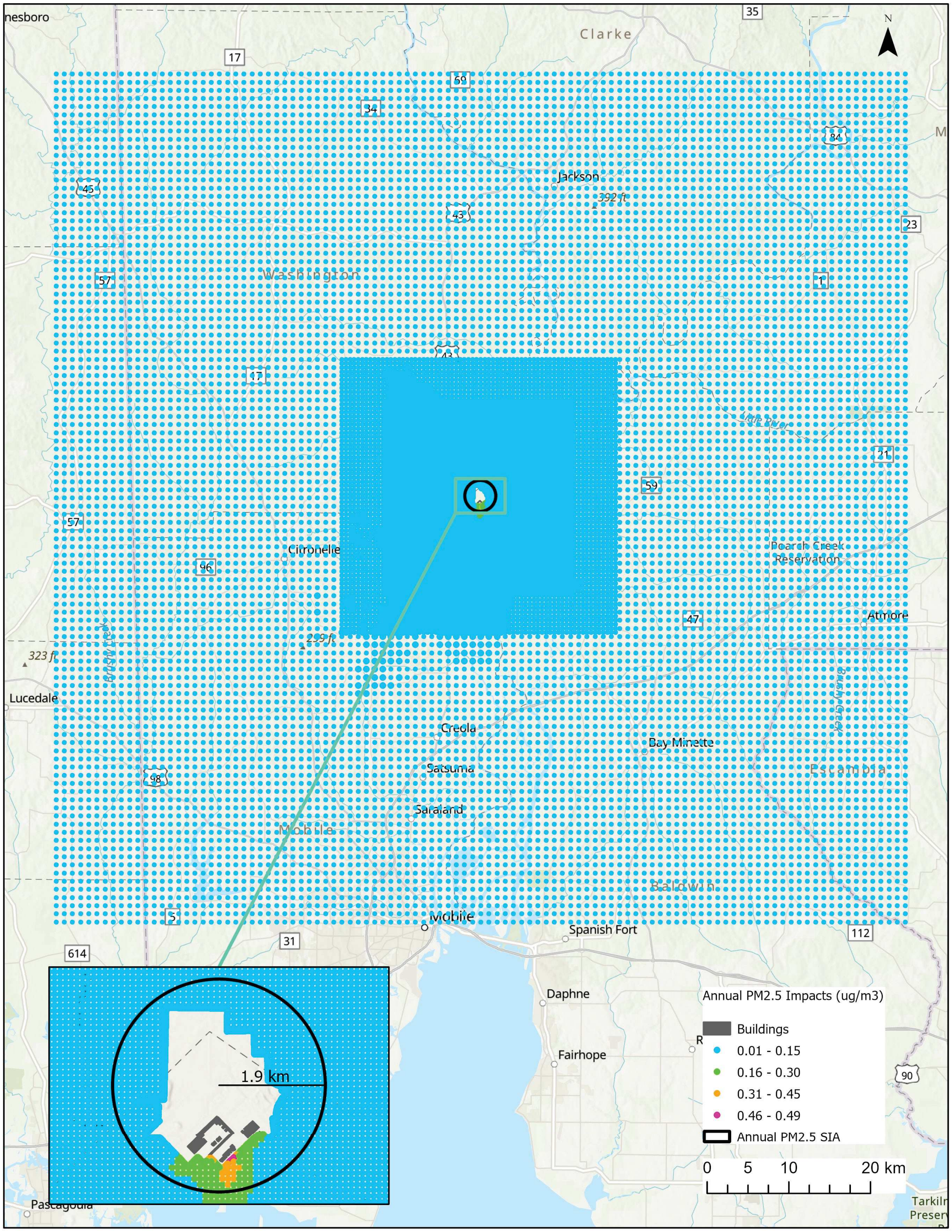


Figure 11 PM_{10} 24-Hour SIA

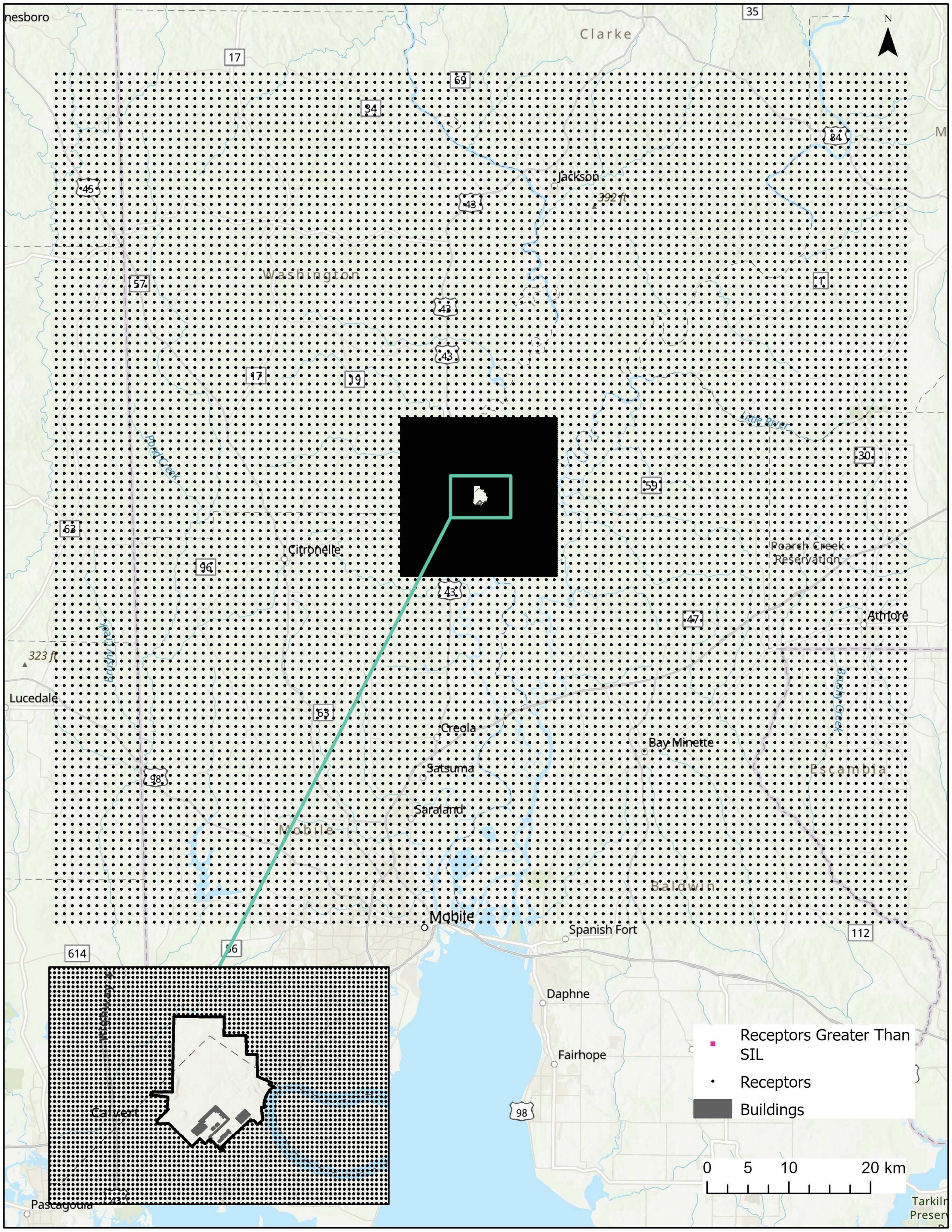


Figure 12 PM_{10} Annual SIA

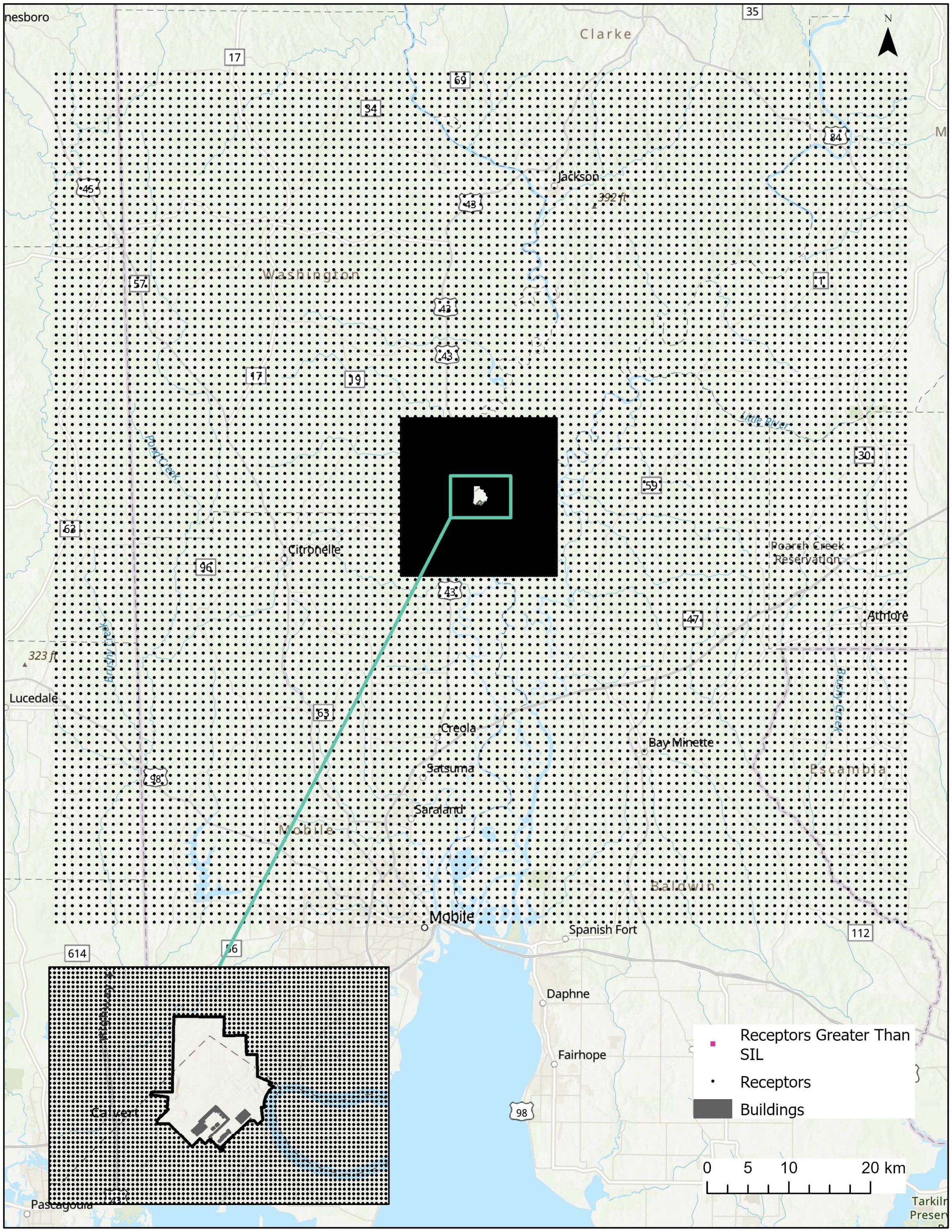


Figure 13 CO 1-Hour SIA

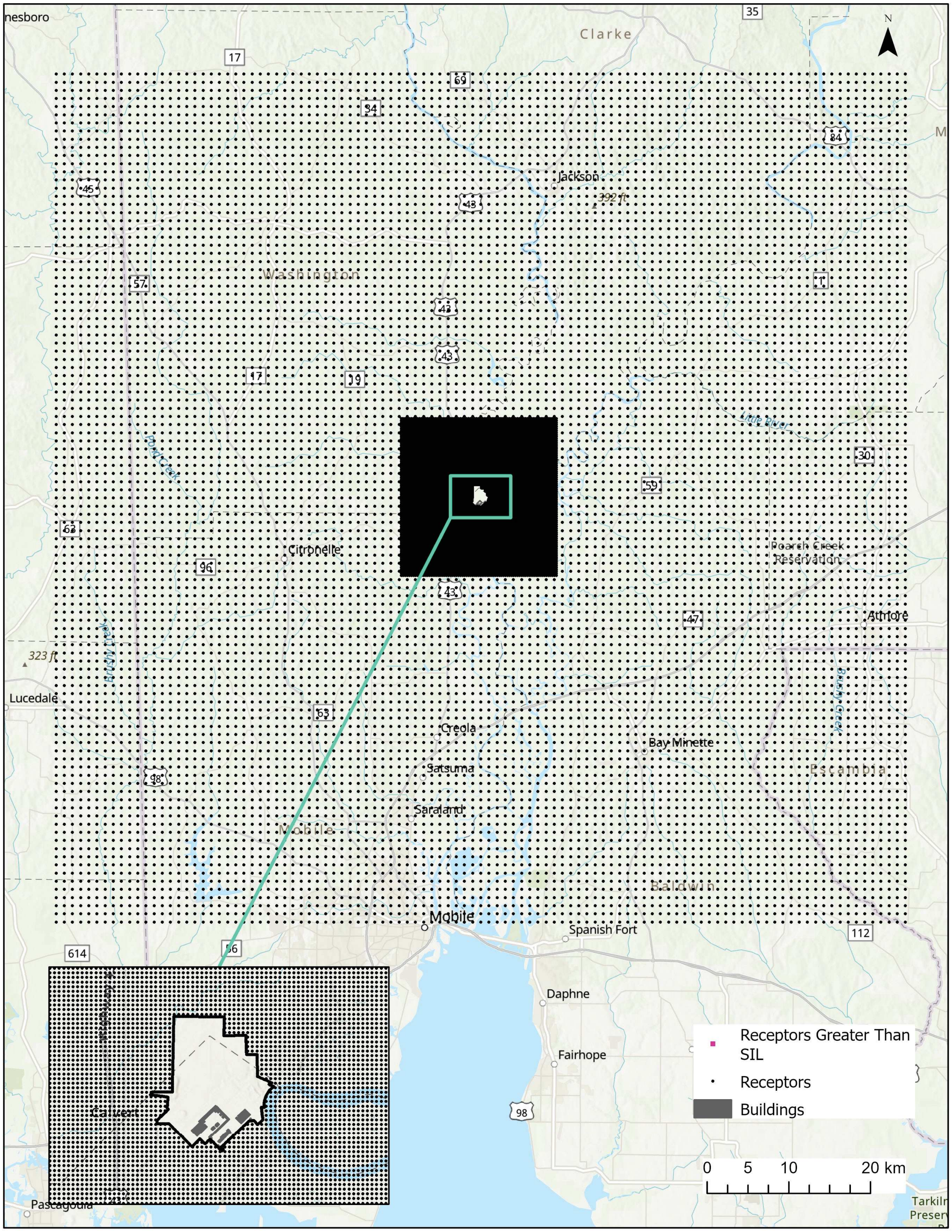


Figure 14 CO 8-Hour SIA

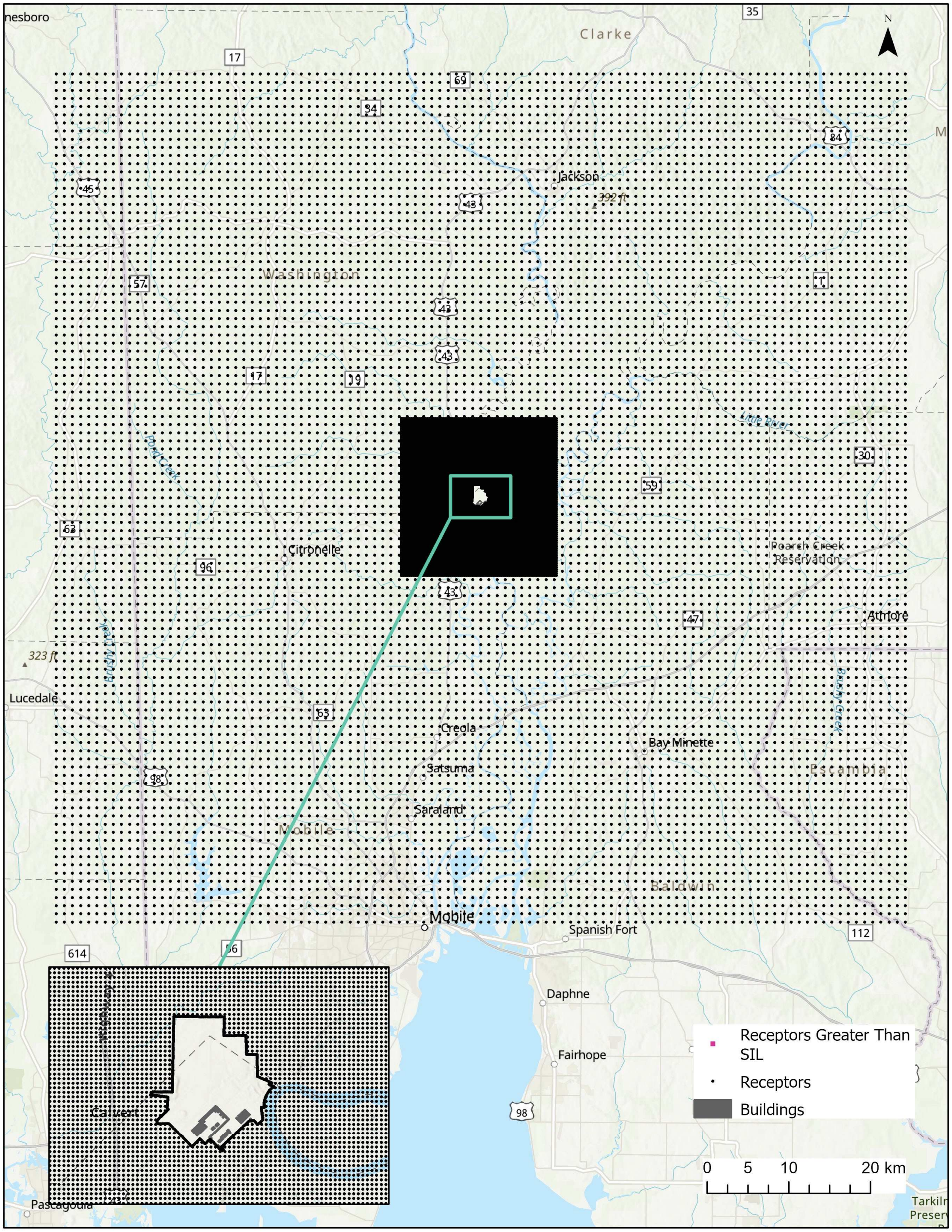


Figure 15 NO_2 1-Hour NAAQS

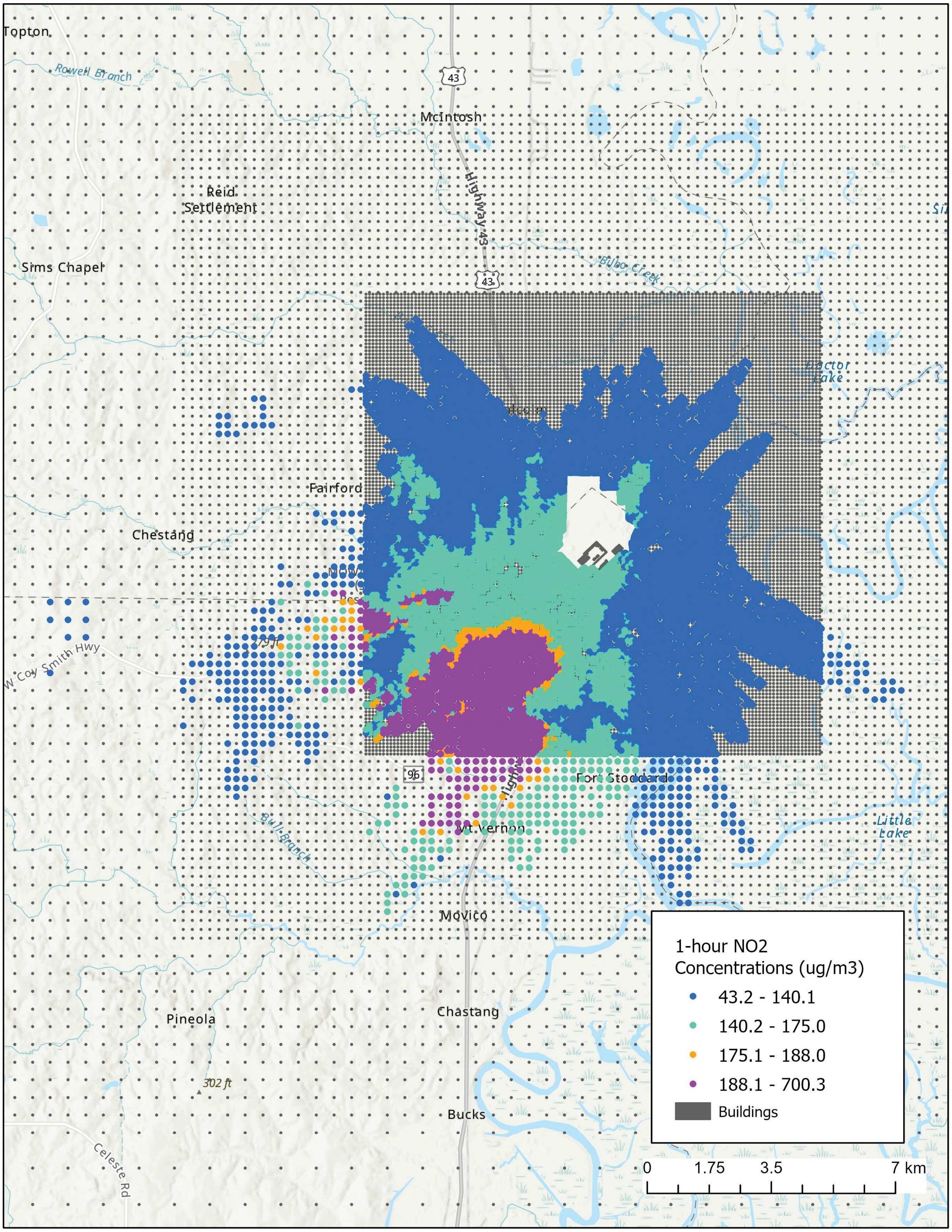


Figure 16 NO_2 Annual NAAQS

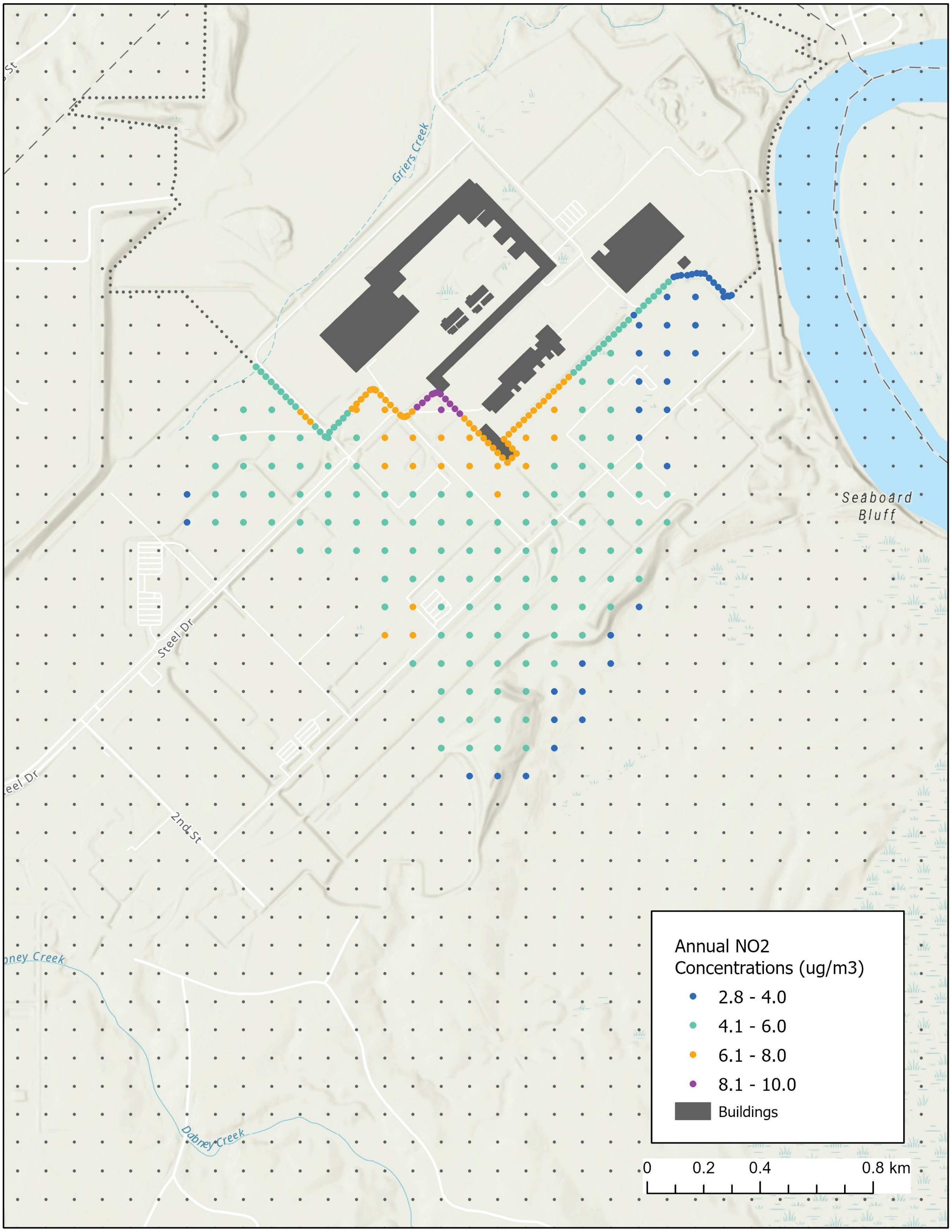


Figure 17 $PM_{2.5}$ 24-Hour NAAQS

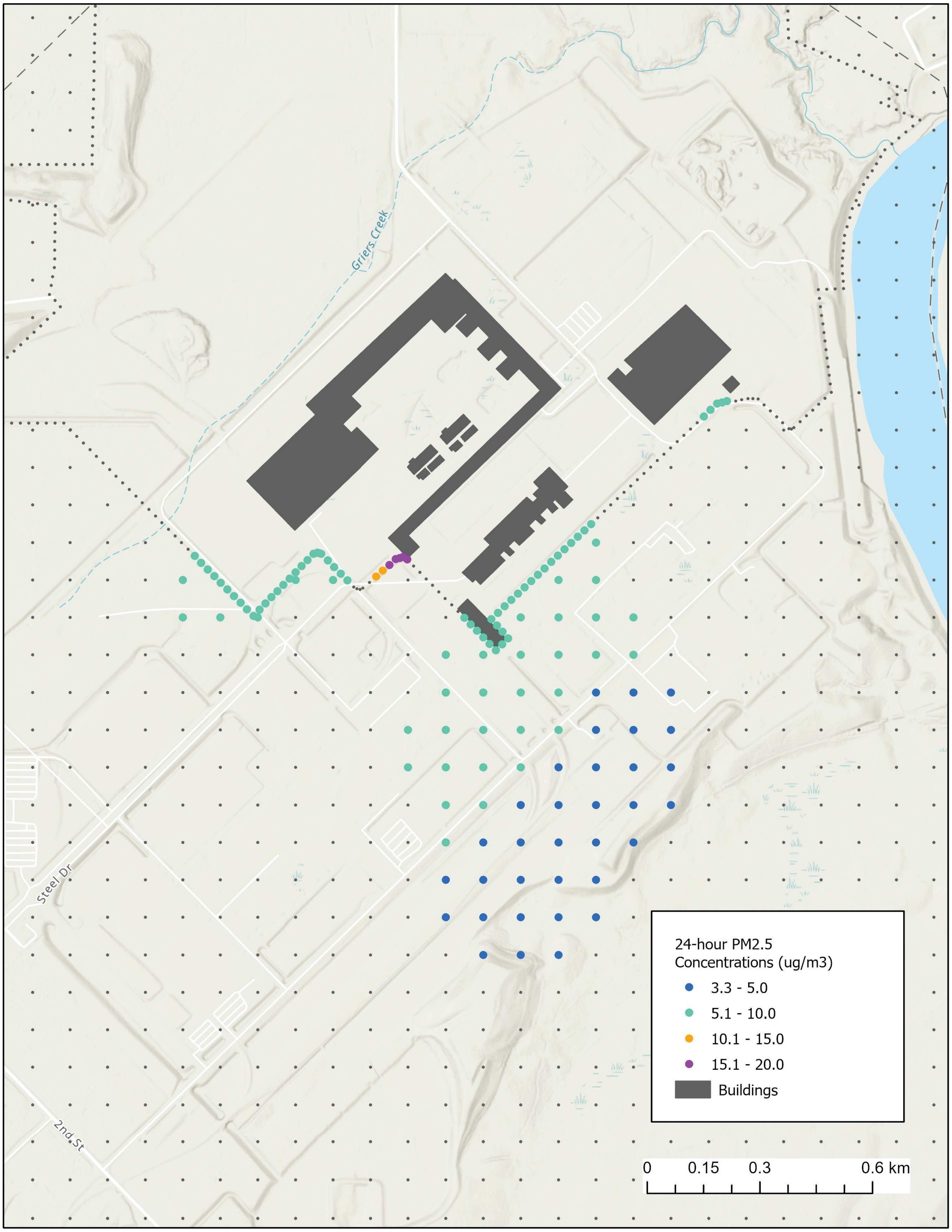


Figure 18 PM$_{2.5}$ Annual NAAQS

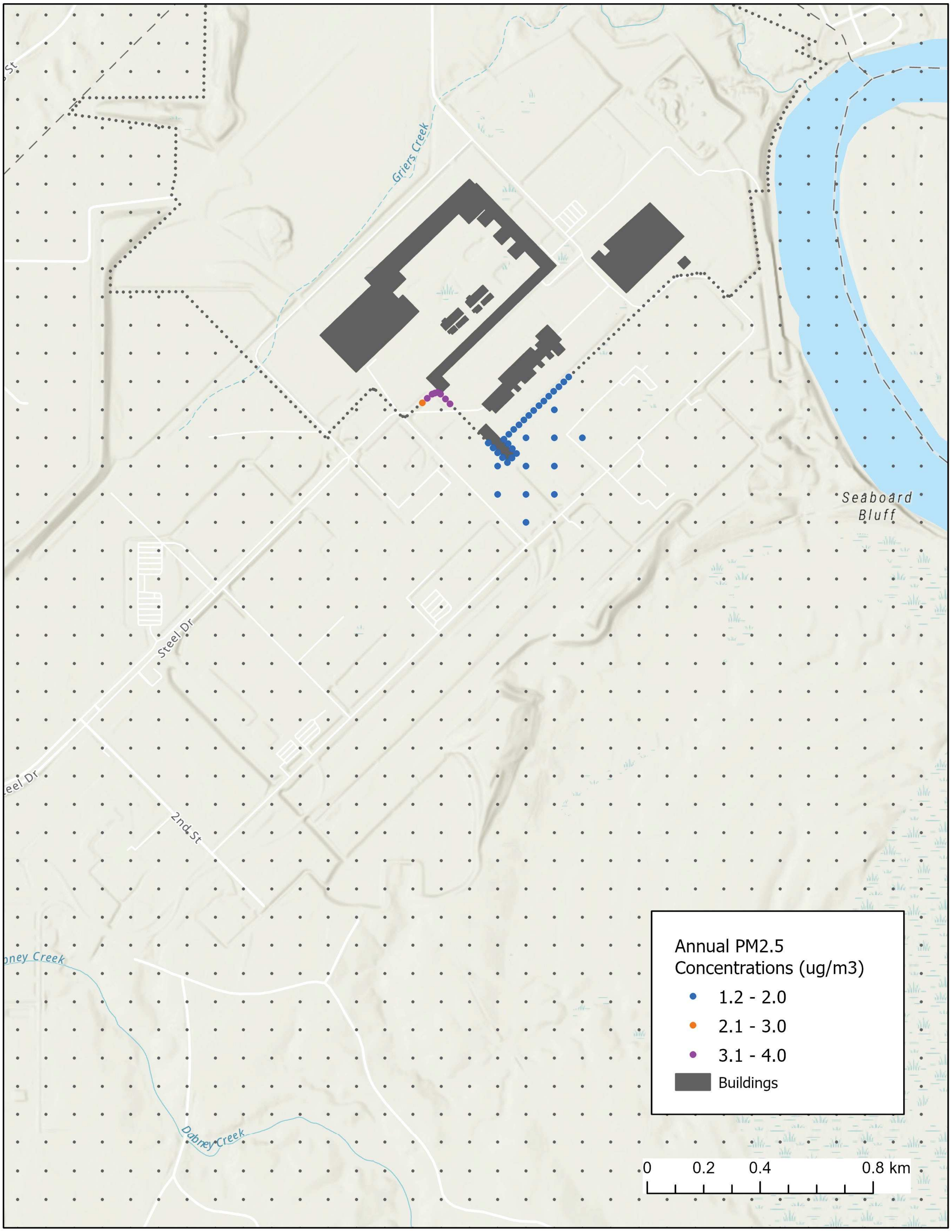


Figure 19 NO2 1-Hr NAAQS Results- Peak Impacts

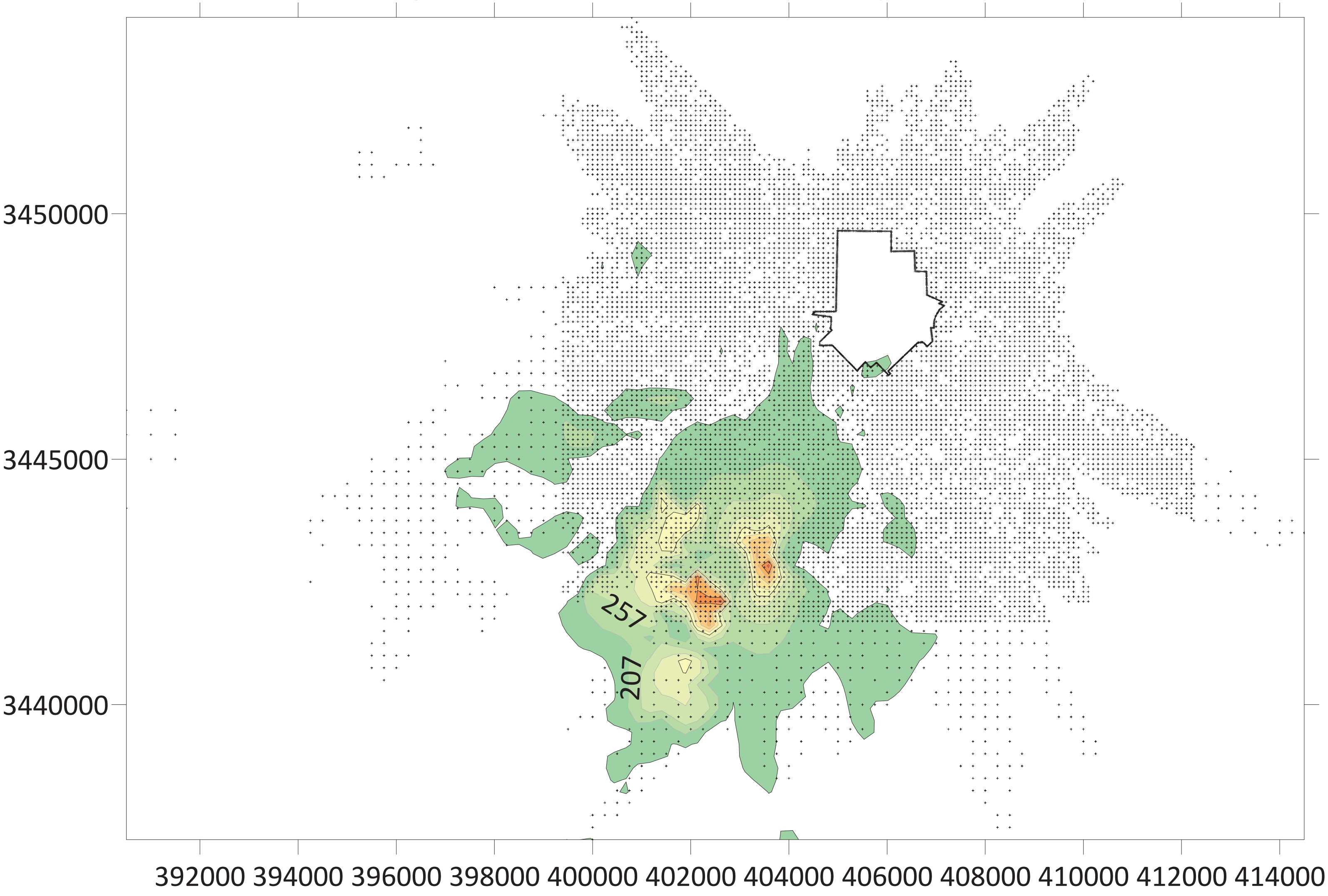


Figure 20 NO_2 Annual PSD Increment

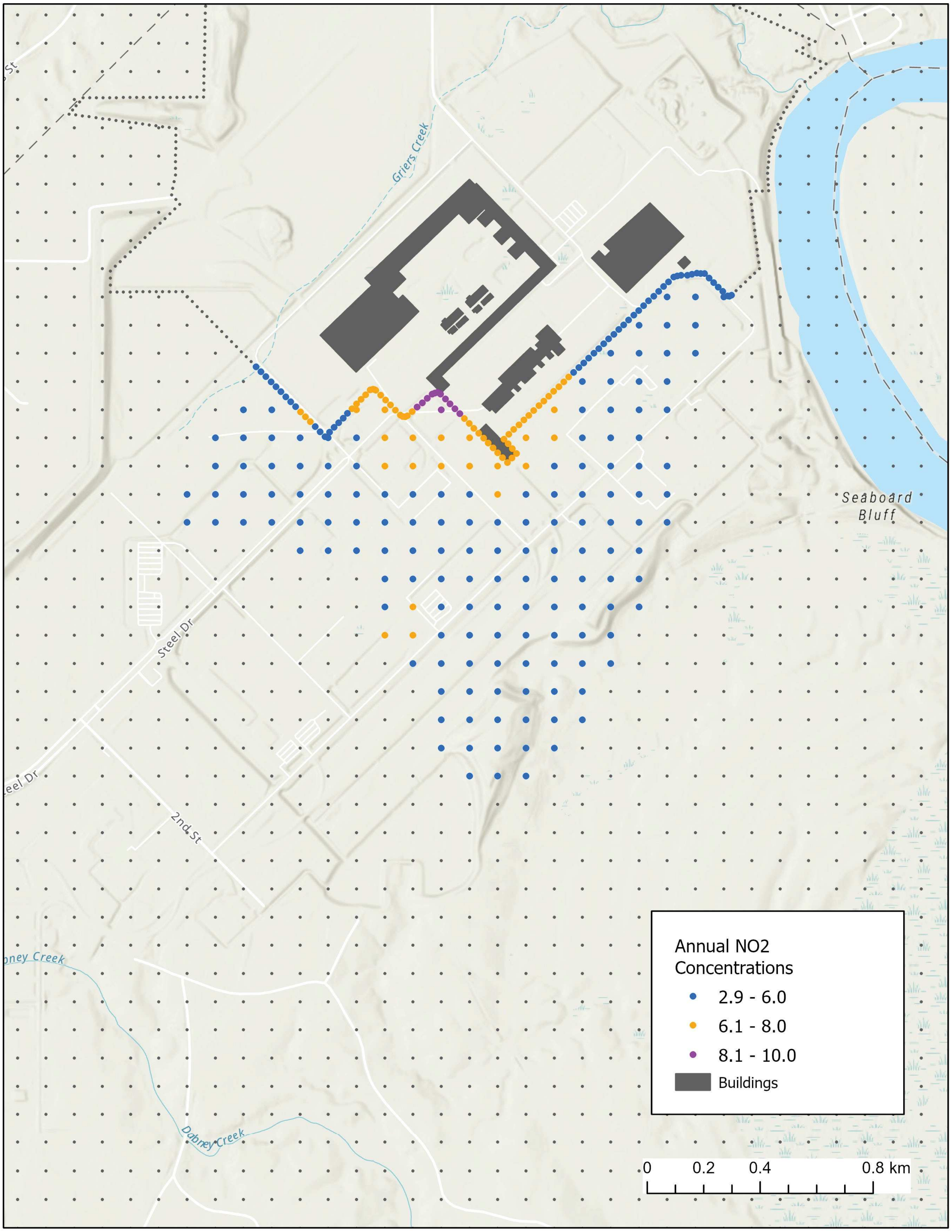


Figure 21 $PM_{2.5}$ 24-Hour PSD Increment

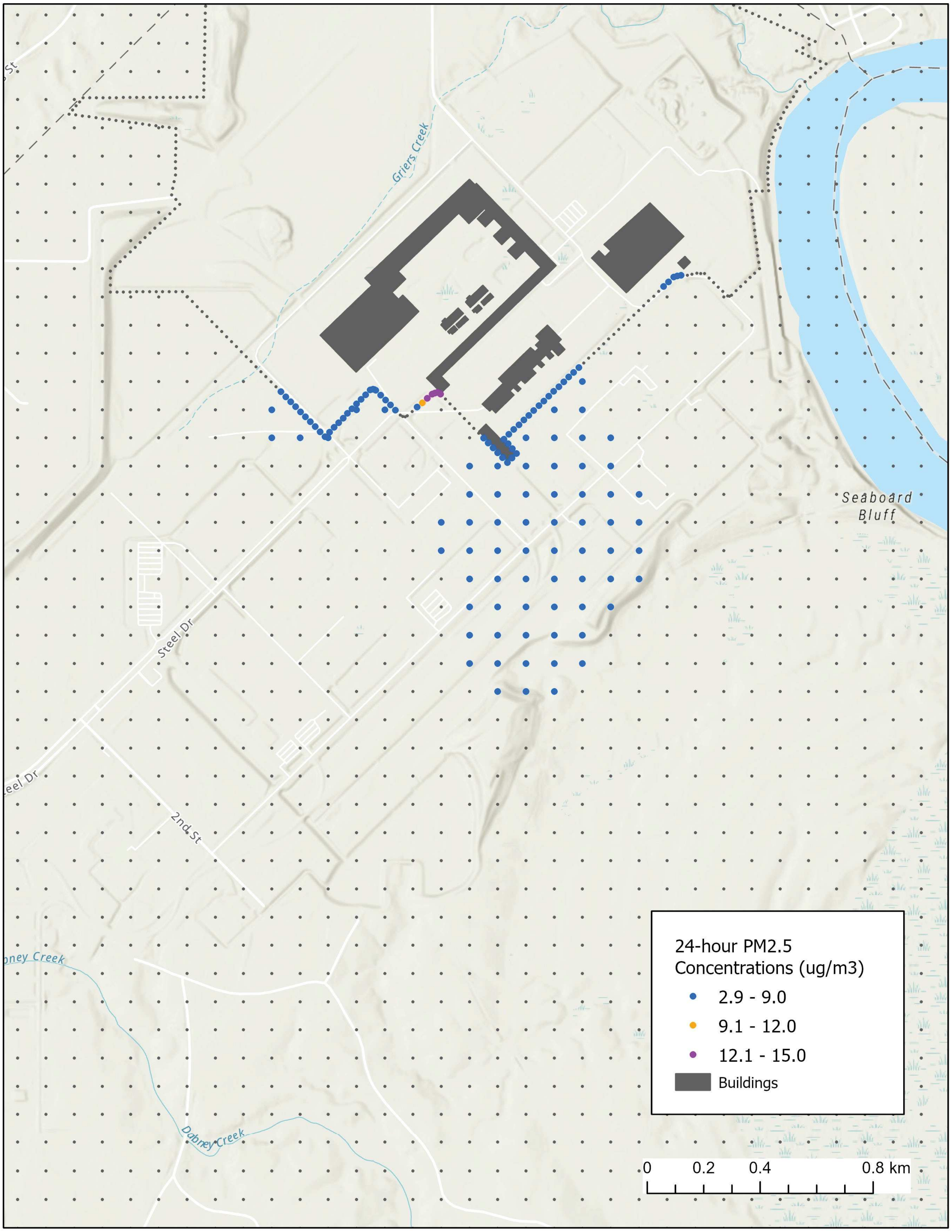
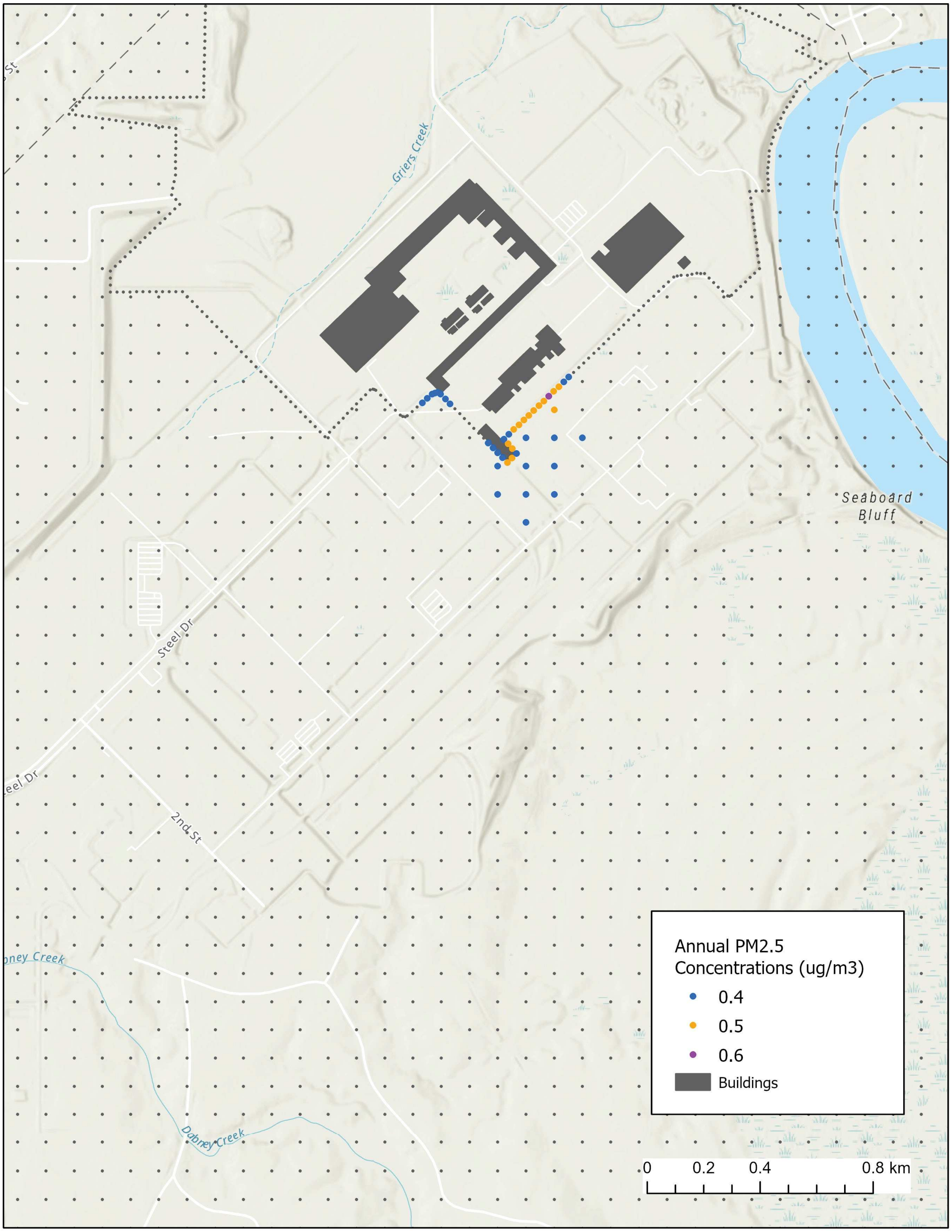


Figure 22 $PM_{2.5}$ 24-Annual PSD Increment



ATTACHMENT 2 – APPROVED MODELING PROTOCOL[13]

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[13] Please note that minor changes in stack heights for a few sources changed in the final modeling analysis.

OUTOKUMPU STAINLESS USA, LLC
CALVERT, AL

Air Dispersion Modeling Protocol

August 2023

CONTENTS

1. INTRODUCTION

Outokumpu Stainless USA, LLC (Outokumpu or OTK) owns and operates a stainless steel mill located in Calvert, Mobile County, Alabama. The area is currently classified as attainment or unclassifiable for all criteria pollutants. The plant currently operates under a Title V operating permit issued by the Alabama Department of Environmental Management (ADEM) on February 24, 2015 (Permit No. 503-0095). Outokumpu is proposing to make the following changes to the facility:

- Construction of a new Mixed Annealing and Pickling Line (MAPL):
    - Degreasing
    - Annealing Furnace
    - Shot Blaster
    - H_2SO_4 Steel Pickling
    - HNO_3/HF Steel Pickling
- Construction of a second Mixed Acid Regeneration Plant;
- Construction of a new Steckel Mill:
    - Small Holding Furnace (2)
    - Walking Beam Furnace (2)
    - Roughing Mill and Finishing Stands (2)
    - Steckel Mill Furnace (2)
- Additional Support Sources Throughout the Mill:
    - New Cold Rolling Mill
    - New Meltshop “Hot Box”
    - New Passive Annealing Furnace
    - New Slab Holding Furnace
    - Additional Ladle Treatment Stand

The facility location is shown in Figure 1 and Figure 2.

Based upon preliminary design information, a summary of estimated project emissions compared to the Prevention of Significant Deterioration (PSD) major modification thresholds is provided in Table 1.We have submitted to the appropriate Federal Land Manager (FLM) an applicability request form indicating that the calculated Q/D value for the project is 2.73; which is much lower than the screening threshold of 10 TPY established by the Federal Land Manager’s Air Quality Related Values Work Group (FLAG) 2010 Report.

Table 1The following pollutants trigger PSD review and therefore a dispersion modeling analysis to demonstrate compliance with the applicable air quality standards: PM_{10}, $PM_{2.5}$, NOx, and CO. Since PSD review is triggered for NOx, the analysis will also evaluate secondary $PM_{2.5}$ due to NOx and SO_2 emissions and ozone from NOx and VOC emissions. The applicable air quality thresholds and standards for these pollutants are provided in Table 2.

The general contents of this modeling protocol were discussed at the pre-protocol meeting on May 19, 2022 with ADEM, Outokumpu, and SOLA Environmental (SOLA). This modeling protocol defines the regulatory framework and technical methods to be used for the PSD Class II compliance demonstration that is required to support the permit application. The intent of this protocol is to provide ADEM with a description of the proposed modeling methodology in sufficient detail so that comments and input can be provided, if applicable, prior to submittal of the permit application and final compliance demonstration. The compliance demonstration will be conducted in accordance with guidance provided by ADEM and the Environmental Protection Agency (EPA) as outlined in the following documents:

- Guideline on Air Quality Models [published as 40 CFR 58, Appendix W] (Appendix W);
- ADEM PSD Air Quality Analysis Modeling Guidelines (September 2022);
- Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program; and
- Correspondence between SOLA and ADEM.

We have submitted to the appropriate Federal Land Manager (FLM) an applicability request form indicating that the calculated Q/D value for the project is 2.73; which is much lower than the screening threshold of 10 TPY established by the Federal Land Manager's Air Quality Related Values Work Group (FLAG) 2010 Report.

Table 1 Comparison of Project Emissions to PSD Major Modification Thresholds

	TSP	PM_{10}	$PM_{2.5}$	NO_X	SO_2	CO	VOC	Lead
Total Project Emissions Increase	56.6	52.74	43.3	328	2.38	190	21.9	0.002
PSD Major Modification Threshold	25.0	15.0	10.0	40.0	40.0	100.0	40.0	0.6
PSD Major? (Y/N)	Yes	Yes	Yes	Yes	No	Yes	No	No

Table 2 Applicable Air Quality Thresholds and Standards

Compounds	**Averaging Period**	**Significant Impact Level[1] ($\mu g/m^3$)**	**Significant Monitoring Concentration[1] ($\mu g/m^3$)**	**NAAQS ($\mu g/m^3$)**	**Class II PSD Increment ($\mu g/m^3$)**
Carbon Monoxide (CO)	1-Hour	2,000	--	40,000[2]	--
	8-Hour	500	575	10,000[b]	--
Nitrogen Dioxide (NO_2)	1-Hour	7.5[3]	--	188.7[4]	--
	Annual	1	14	100[a]	25[1]
Inhalable Particulate Matter (PM_{10})	24-Hour	5	10	150[5]	30[2]
	Annual	1	--	--	17
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	1.2	--	35[6]	9[2]
	Annual	0.3[7]	--	12[8]	4[1]
Ozone	8-Hour	1.0 ppb	--	70 ppb	--

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[11] The maximum high 1st-high predicted concentration modeled over five years of meteorological data.

[2] Not to be exceeded more than once per year.

[3] U.S. EPA interim SIL of 4 ppb, *U.S. EPA Memorandum, Guidance Concerning the Implementation of the 1-hour NO2 NAAQS for the Prevention of Significant Deterioration Program*, June 29, 2010.

[4] 1-hour NO_2 NAAQS of 100 ppb. 98th percentile of the maximum daily 1-hour concentration per year, averaged over five years.

[5] High sixth high over five years of concatenated meteorological data.

[6] Based on the 24-hour PM2.5 NAAQS for the 98th percentile (high-8th-high) of the 24-hour concentration averaged over five years.

[7] The 2016 *$PM_{2.5}$ and Ozone SIL Draft Guidance* provides that a state is authorized to use the annual $PM_{2.5}$ SIL of 0.3 μg/m³ from 40 C.F.R. § 51.165(b).

[8] The maximum 5-year average 1st-high predicted concentration modeled.

2. DISPERSION MODELING PROCEDURES

2.1 MODEL SELECTION

SOLA will use the current version of the EPA-approved American Meteorological Society/EPA Regulatory Model (AERMOD) modeling system to meet the dispersion modeling requirements for this analysis. AERMOD is recommended for use in modeling multi-source emissions, and can account for plume downwash, stack tip downwash, and point, area, and volume sources.

Current version numbers of the AERMOD model and pre-processors that will be used include:

- AERMAP version 18081,
- AERMET version 22112, and
- AERMOD version 22112.

Copies of all model input/output files and supporting data used in the modeling analysis will be provided with the permit application.

2.2 SOURCE CLASSIFICATION

In order to appropriately determine the applicable atmospheric boundary layer characteristics that affect a model's calculation of ambient concentrations, a determination was made of whether the area around the facility is considered urban or rural. The first method discussed in Section 5.1 of the AERMOD Implementation Guide (also referring therein to Section 7.2.3c of Appendix W) is called the "land use" technique because it examines the various land use within 3 km of a source and quantifies the percentage of area in various land use categories. If greater than 50% of the land use in the prescribed area is considered urban, then the urban option should be used in AERMOD. The latest 2016 National Land Cover Data (NLCD) was processed by AERSURFACE (version 20060) to create a 3 km radius around the facility and review the land use classifications in the prescribed area. Table 3 below provides the results of this analysis. The area surrounding the Outokumpu facility is approximately 15.2% urban, which is well below the recommended threshold of 50% for urban consideration. Figure 3 provides the visual representation of the 3 km circle to show which land was included in the analysis.

Table 3 AUER Land-Use Analysis

Category ID	Category Description	Number of Cells	Percent	Land Use Classification
11	Open Water	919	5.2%	Rural
21	Developed, Open Space	127	0.7%	Rural
22	Developed, Low Intensity	487	2.8%	Rural
23	Developed, Medium Intensity	1880	10.7%	Urban
24	Developed, High Intensity	783	4.5%	Urban
31	Barren Land	1	0.0%	Rural
41	Deciduous Forest	2718	15.5%	Rural
42	Evergreen Forest	6924	39.5%	Rural
43	Mixed Forest	3323	19.0%	Rural
52	Shrub/Scrub	0	0.0%	Rural
71	Grassland/Herbaceous	0	0.0%	Rural
81	Pasture/Hay	146	0.8%	Rural
82	Cultivated Crops	218	1.2%	Rural
90	Woody Wetlands	0	0.0%	Rural
95	Emergent Herbaceous Wetlands	0	0.0%	Rural
Total		17,526		
Urban Total		2,663	15.2%	
Rural Total		14,863	84.8%	

2.3 DOWNWASH

The effects of plume downwash will be considered for all point sources, based on building locations and heights relative to facility emission sources. Direction-specific downwash parameters will be calculated using the current version of the EPA-approved Building Profile Input Program (BPIPPRM Version 04274). Building dimensions for the structures will be obtained from information provided by Outokumpu. Table 4 provides the building dimensions and the southwest UTM coordinate for each structure included in the evaluation. A simplified plot plan of the facility, showing the location of all structures and point source locations used in the downwash calculations is provided in Figure 4.

In addition to the downwash for the facility's buildings, ADEM has provided the downwash for several nearby sources which will be included in the modeling.

Table 4 Building Dimensions

Figure 4 ID	Building Name	No. of Tiers	Tier	No. of Corners	Southwest UTM Coordinate	
					East (m)	North (m)
A	LMS	6	1	6	406,353	3,447,416
			2	4	406,507	3,447,572
			3	8	406,459	3,447,561
			4	4	406,500	3,447,500
			5	4	406,376	3,447,486
			6	4	406,353	3,447,416
	LMS_Ext	1		4	406,331	3,447,438
B	AODEAF	1		4	406,637	3,447,421
C	CAPL1	1		4	405,626	3,447,412
D	CAPL2	1		4	405,578	3,447,364
E	LCB	1		4	405,932	3,446,823
F	CRM1	1		4	405,925	3,447,703
G	CRM2	1		4	405,861	3,447,598
H	CRM3	1		4	405,927	3,447,577
I	CRM4	1		4	405,984	3,447,516
J	CRM5	1		4	406,095	3,447,464
K	HAPL	1		6	405,747	3,447,012
L	LFB1	1		4	405,498	3,447,033
M	LFB4	1		6	405,544	3,447,331
N	MAPL	1		4	405,529	3,447,367
O	BLDG1	2	1	4	405,947	3,447,342
			2	10	405,947	3,447,342
P	BLDG2	1		4	405,986	3,447,300
Q	BLDG3	1		6	405,932	3,447,273
R	BLDG4	2	1	4	405,860	3,447,261
			2	10	405,816	3,447,181
S	BLDG5	1		4	405,897	3,447,220
T	BLDG6	1		6	405,845	3,447,198
U	STM	1		6	406,225	3,447,149
	AUX1	1		4	406,238	3,447,114
	AUX2	1		4	406,199	3,447,091
	AUX3	1		4	406,166	3,447,059
	AUX4	1		4	406,136	3,447,030
	AUX5	1		4	406,082	3,446,975
	AUX6	1		4	406,058	3,446,952
	AUX7	1		4	406,158	3,447,133
	AUX8	1		4	406,132	3,447,107

2.3.1 GEP STACK HEIGHT

Appendix W requires the evaluation of the potential for physical structures to affect the dispersion of emissions from stack sources. The exhaust from stacks that are located within specified distances of buildings may be subject to "aerodynamic building downwash" under certain meteorological conditions. This determination is made by comparing actual stack height to the Good Engineering Practice (GEP) stack height. The modeled emission units at the proposed facility are evaluated in terms of their proximity to nearby structures. In accordance with recent AERMOD updates, an emission point is assumed to be subject to the effects of downwash at all release heights even if the stack height is above the U.S. EPA formula height, which is defined by the following formula:

$$H_{GEP} = H + 1.5L$$

Where:

H_{GEP} = GEP stack height,
H = structure height, and
L = lesser dimension of the structure (height or maximum projected width).

In addition to calculating direction-specific building dimensions, the BPIPPRM program also calculates the Good Engineering Practice (GEP) stack height. BPIP-PRIME is designed to incorporate the concepts and procedures expressed in the GEP Technical Support document, the Building Downwash Guidance document, and other related documents and has been adapted to incorporate the PRIME downwash algorithms. Most modeled source stacks at the proposed facility are less than 65 meters tall and therefore meet the requirements of GEP and credit for the entire actual height of each stack is used in this modeling analysis. The GEP analysis for the four (4) stacks that are taller than 65m is included in Table 5.

Table 5 GEP Analysis

Stack ID	Stack Height (m)	Calculated H_{GEP} (m)	GEP Stack Height Value (m)
LA23	80	52.63	65
LA24	80	52.29	65
LA26	80	32.82	65
LA27	80	32.60	65

2.4 METEOROLOGICAL DATA

Preprocessed meteorological data was provided by ADEM for the years 2017 – 2021 including surface observations from Mobile, AL and upper air observations from Slidell, LA[9]. A windrose of the processed meteorological data is provided in Figure 5. The transmittal readme document includes the following processing notes:

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[9] Email from Jim Owen (ADEM) to Brad Arnold (SOLA) on July 1, 2022.

- Soil moisture content (Bowen ratio) processed by year
- Seasonality processed by month
- 1-minute ASOS wind data was used
- The data was processed with the adjust u* option.

2.5 EMISSIONS INVENTORY

2.5.1 NEW SOURCES

The project emissions sources are comprised of the Steckel Mill, Mixed Annealing and Pickling Line, Mixed Acid Regeneration Plant, and other sources. It should be noted that all sources are vertical point sources and there are no horizontal point, capped point, volume, or area sources in this analysis. A few of the new emissions sources will vent through existing stacks. The Meltshop Hotbox (LO2A) and Ladle Treatment Stand (LO2B) will vent through existing stack LO2. The Slab Holding Box (LO42B) will vent through existing stack LO11.

For those pollutants/averaging periods with project-only impacts above the SILs, cumulative modeling will be required to demonstrate compliance with the applicable air quality standards. The cumulative modeling will include project sources, existing Outokumpu sources, and other nearby non-Outokumpu sources. ADEM has provided nearby non-Outokumpu sources for cumulative analysis. Table 6 provides a list of the project sources and their modeled parameters and the location of the project sources is provided in Figure 4.

2.5.2 EXISTING FACILITY AND NEARBY SOURCES

For those pollutants/averaging periods with project-only impacts above the SILs, cumulative modeling will be required to demonstrate compliance with the applicable air quality standards. The cumulative modeling will include project sources, existing Outokumpu sources, and other nearby non-Outokumpu sources. ADEM has provided nearby non-Outokumpu sources for the cumulative analysis.[10] We have used the sources as provided by ADEM with no modifications.

2.5.3 PRE-CONSTRUCTION MONITORING

Pre-construction monitoring will be addressed for all applicable pollutants in the final modeling report.

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[10] Email from Jackson Rogers (ADEM) to Brad Arnold on April 6, 2022.

Table 6 List of Project Sources and Parameters

Source	Unit ID	UTM East (m)	UTM North (m)	$PM_{2.5}$ Emissions (g/s)	PM_{10} Emissions (g/s)	NOx Emissions (g/s)	CO Emissions (g/s)	Stack Height (m)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)
New Meltshop Hot Box	LO2A	406674.1	3447406	5.63E-03	5.63E-03	7.41E-02	6.23E-02	61.0	307	15.35	4.88
Ladle Treatment Stand	LO2B	406674.1	3447406	9.39E-03	9.39E-03	0.124	0.104	61.0	307	15.35	4.88
Small Holding Furnace Phase 1	LA21	406209.9	3447193	2.25E-02	2.25E-02	0.302	0.249	30.0	473	3.64	1.10
Small Holding Furnace Phase 2	LA22	406233.3	3447216	2.25E-02	2.25E-02	0.302	0.249	30.0	473	3.64	1.10
Walking Beam Furnace Phase 1	LA23	406143.3	3447208	0.286	0.286	2.69	1.35	80.0	464	5.95	3.70
Walking Beam Furnace Phase 2	LA24	406160.6	3447224	0.286	0.286	2.69	1.35	80.0	464	5.95	3.70
Roughing/Finishing	LA25	406090.0	3446977	0.229	0.404	--	--	30.0	339	18.30	2.22
Steckel Mill Furnace Phase 1	LA26	406054.4	3446985	1.95E-02	1.95E-02	0.262	0.216	80.0	450	0.32	6.5
Steckel Mill Furnace Phase 2	LA27	406067.4	3446997	1.95E-02	1.95E-02	0.262	0.216	80.0	450	0.32	6.5
Passive Annealing Furnace	LO41B	406027.4	3446778	2.82E-02	2.82E-02	0.416	0.227	50	473	16.80	1.1
Slab Holding Furnace	LO42B	406398.0	3447456	2.35E-02	2.35E-02	0.315	0.259	40	303	11.80	1.4
MAPL Degreasing	LA43	405788.6	3447618	1.40E-02	1.40E-02	--	--	25	333	4.75	0.8
MAPL Annealing Furnace	LA44	405716.6	3447551	0.134	0.134	1.08	1.08	25	523	18.80	3.5
MAPL Shot Blaster	LA45	405639.3	3447476	1.71E-02	1.71E-02	--	--	25	318	13.40	0.9
MAPL H2SO4 Pickling	LA46	405623.8	3447463	9.98E-03	9.98E-03	--	--	25	303	10.61	0.8
APL HNO3/HF Pickling	LA47	405542.5	3447385	1.90E-02	1.90E-02	0.723	--	25	523	17.37	1
Cold Rolling Mill	LO51	406139.8	3447406	9.59E-02	0.177	--	--	45.0	293	19.50	1.90
ARP Oxide Transportation	LA71	405843.2	3447193	7.83E-03	7.83E-03	--	--	60	328	6.11	0.9
ARP DeNox	LA72	405828.7	3447179	1.04E-02	1.04E-02	0.202	0.112	60	589	5.60	0.94

2.6 BACKGROUND CONCENTRATIONS

Background ambient air quality concentrations will be added to the model-predicted cumulative impacts to determine the total air quality concentrations for comparison to the NAAQS. Background concentrations are current levels of ambient air pollution, external to the facility's own impacts and those of nearby sources, which are the result of non-modeled point, area, and mobile sources of air pollution. Background concentrations for NO_2 and $PM_{2.5}$ were provided by ADEM[11].

The background values are summarized in Table 7.

Table 7 Background Air Quality

Compounds	Averaging Period	Background Value ($\mu g/m^3$)	Monitor
Nitrogen Dioxide (NO_2)	1-Hour	31	Yorkville, GA
	Annual	7.5	ADEM Guidance
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	16	Chickasaw
	Annual	8.0	Chickasaw

2.7 RECEPTOR GRID AND FACILITY FENCELINE

Cartesian receptor grids centered on the facility will be defined using the Universal Transverse Mercator (UTM) Zone 16, NAD83 coordinate system. The grids will be designed to accurately resolve the highest predicted pollutant impacts while at the same time allowing for reasonable execution time. Several receptor grids of varying resolution will be defined for the required model analyses. The grids consist of a set of nested receptors placed at:

- 25-meter resolution along the ambient air boundary.
- 100-meter resolution extending to a distance of approximately 5 km from the ambient air boundary.
- 250-meter resolution extending to approximately 10 km from the ambient air boundary.
- 500-meter resolution extending to approximately 15 km from the ambient air boundary.
- 1,000-meter resolution extending to approximately 50 km from the ambient air boundary.

If the maximum predicted cumulative or increment impact occurs outside the 100-meter resolution grid, an additional refined (100-meter resolution) grid will be developed around the maximum impact receptor. The additional refined grid will extend to the nearest coarse grid receptor in each cardinal direction.

Receptor elevation and scale heights will be obtained using the AERMAP terrain processor. The digital terrain dataset provided as input to AERMAP will be the National Elevation Dataset (NED) digital terrain

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[11] Email from Michael Leach (ADEM) to Brad Arnold (SOLA) on November 9, 2022.

data at 1/3 arc-second resolution, which is equivalent to approximately 10 meters in the project area. The receptor grid is shown in Figure 6.

For cumulative modeling, Outokumpu will be using pollutant and averaging period specific receptor grids that included only receptors that were over the respective SIL. Additionally, for the particulate matter runs, the receptor grid will be split such that receptors on and within AM/NS's fence line are segregated and run separately excluding AM/NS's emission impacts from within its own property. The modeling runs for the receptors outside of AM/NS's fence line will be run normally including the project, Outokumpu's existing facility and all offsite inventory sources.

2.7.1 FENCELINE/PUBLIC ACCESS

In accordance with the U.S. EPA draft guidance Revised Policy on Exclusions from "Ambient Air"[12]; video surveillance, monitoring, routine security patrols, and clear signage may adequately preclude public access. Figure 7 provides a site aerial photograph including the property boundary. The image includes segments of the property which are described in this section including how the facility prohibits public access relative to ambient air:

Segment 1 – North Boundary

The north boundary is shown in green. Public access preclusion is largely accomplished by routine security patrols and signage. The facility boundary is cleared throughout the area to allow for a visible delineation of the beginning of Outokumpu's property. Signs are posted in 200-500 yard spacing along this area to indicate to the public that the area is private property. The area to the northwest of the facility is also largely comprised of woody wetlands that would prevent public access as a natural boundary. Any indication of trespass in this area is investigated as a matter of security for the facility. Any unauthorized personnel found to be on these properties are removed immediately.

Segment 2 – East Boundary

The east boundary is shown in yellow and it is a river boundary with the Tombigbee River. There is clear signage along the river to indicate that the facility is private property.

Segment 3 – South Boundary

The south boundary is shown in red, and it is the shared property boundary with AM/NS. AM/NS employees are trained to not cross the boundary onto Outokumpu property. There are signs posted on roadways indicating the facility property boundary. Security monitors the area regularly and all signs of trespass (by vehicle or by foot) are investigated. In addition, there is no public access into AM/NS's facility and therefore no through-public-access from AM/NS's facility onto Outokumpu's. AM/NS quotes the following measures to preclude public access onto their property: "video surveillance, monitoring, routine security patrols and clear signage".

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[12] U.S. Environmental Protection Agency, Draft Guidance: Revised Policy on Exclusions from "Ambient Air" November, 2018

2.8 NO_X TO NO_2 CONVERSION

The emitted NO_x will photochemically react with other atmospheric constituents to form NO_2, which is the pollutant for which EPA has established the NAAQS. EPA has instituted a three-tiered approach that addresses the conversion of NOx to NO_2. The three tiers are:

- Tier 1: assume full conversion of NOx to NO_2.
- Tier 2: run AERMOD with the Ambient Ratio Method 2 (ARM2) option invoked, which is based on empirical data to estimate the amount of conversion of NOx to NO_2 based on the modeled NOx concentration.
- Tier 3: The appropriate applications for the Ozone Limiting Method (OLM) and Plume Volume Molar Ratio Method (PVMRM) NO_2 modeling schemes.

The Tier 3 approach, using PVMRM, will be used to estimate 1-hour and annual average NO_2 impacts. The use of PVMRM requires ambient ozone data and the NOx to NO_2 in-stack ratio (ISR) for each modeled NO_X source. All sources will use the default ISR of 0.5 as dictated in the EPA memorandum titled "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2, National Ambient Air Quality Standard" (March 2011).

The ozone data from monitor 01-97-0003 was provided by ADEM for use in the analysis[13]. The Chickasaw monitor operates seasonally, collecting data only from March to October each year. To account for missing hours, the maximum hourly value for each month in the ozone data was calculated and stored. For months outside the monitoring season, the maximum hourly values from March were used as conservative substitutes for January and February and the maximum hourly values from October were used as conservative substitutes for November and December.

2.9 SECONDARY PARTICULATE AND OZONE FORMATION

The analysis of project emissions for the secondarily-formed pollutants, i.e., secondary $PM_{2.5}$ and ozone, is required by Appendix W for PSD sources. Secondary $PM_{2.5}$ and ozone are formed from the emissions of precursor pollutants, i.e., VOC, SO_2, and NO_X. Following ADEM guidance, the EPA's Modeled Emission Rates for Precursor Pollutants (MERPs) dataset will be used to estimate secondary $PM_{2.5}$ and ozone formation due to project emissions. The estimated secondary $PM_{2.5}$ will be added to the primary $PM_{2.5}$ impacts modeled by AERMOD for a total $PM_{2.5}$ concentration for comparison to all applicable air quality thresholds and standards. The estimated ozone formation will be compared to the ozone SIL, and if above the SIL, will be added to ambient ozone values.

2.9.1 SITE SELECTION

The Autauga County hypothetical source in Alabama has been selected as the representative source for the ozone and $PM_{2.5}$ MERPs analysis in the EPA's photochemical modeling study. There are no hypothetical sources within a 200 km radius of the project location according to the EPA database

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[13] Gina Curvin (ADEM) to Brad Arnold (SOLA) via email on November 10, 2022.

documentation. The Autauga site is about 210 km northeast of the facility. Although there are two coastal hypothetical sources, one in Bay County, Florida (around 250 km southeast of the site), and another in Orleans, Louisiana (approximately 215 km southwest of the site), they may be influenced by coastal meteorology due to their proximity to the ocean. Both the Autauga site and the project site are situated in rural areas close to urban/industrialized regions. Therefore, the Autauga hypothetical source is chosen as the representative source for the analysis of ozone and secondary $PM_{2.5}$ MERPs.

2.9.2 SECONDARY $PM_{2.5}$ FORMATION

Since the facility mainly consists of tall stacks, and the majority of NOx and SO_2 emissions for the project will come from stacks that are much taller than 10 m, the 90 m stack source category was selected to determine the appropriate MERP values for the Autauga hypothetical source. The emissions MERP value category (e.g., 500 tpy, 1000 tpy) was chosen based on the closest value to the annual emission estimates for the project. Table 8 shows the selected MERPs values for the Autauga County hypothetical source, the calculated $PM_{2.5}$ MERPs, project emissions increases of NOx and SO_2, and estimated secondary $PM_{2.5}$ impact associated with the expansion project.

Table 8 $PM_{2.5}$ MERPs Analysis

Averaging Period	**Precursor**	**Air Quality Threshold** (µg/m³)	**$PM_{2.5}$ MERP** (tpy)	**Project Emissions** (tpy)	**% of Air Quality Threshold**	**Secondary $PM_{2.5}$ Impact** (µg/m³)
24-hr	NO_X	1.2	7,875	328	4.16%	**0.050**
Annual	NO_X	0.3	50,999		0.64%	**0.00193**
24-hr	SO_2	1.2	2,224	2.38	0.11%	**0.00128**
Annual	SO_2	0.3	14,816		0.02%	**4.58E-05**
					24-hr Total	**0.051**
					Annual Total	**0.00198**

2.9.3 OZONE AMBIENT IMPACT ANALYSIS

Table 9 shows the selected MERPs values for the Autauga County hypothetical source, the calculated ozone MERPs, project emissions increases of NO_X and VOC, and estimated ozone impact associated with the expansion project.

Table 9 Ozone MERPs Analysis

Averaging Period	**Precursor**	**Air Quality Threshold** (ppb)	**Ozone MERP** (tpy)	**Project Emissions** (tpy)	**% of Air Quality Threshold**	**Secondary Ozone Impact** (µg/m³)
8-hour	NO_X	1.0	207	328	158%	**1.58**
8-hour	VOC	1.0	9,362	21.9	0.23%	**0.0023**
					Total	**1.58**

ADEM has provided a background concentration of 56 ppb for ozone. The cumulative ozone impact for his project (project impact plus background) is therefore 57.58 ppb, which is well below the NAAQS of 70 ppb.

3. IMPACT ANALYSES

3.1 SIGNIFICANT IMPACT ANALYSIS

Maximum predicted project impacts due to the emission increases will be compared to the PSD Class II SILs for NO_2, $PM_{2.5}$, PM_{10}, and CO. The impacts will also be compared to the significant monitoring concentrations (SMCs) following ADEM guidance. The purpose of the SIL analysis is to demonstrate whether significant ambient impacts due to project emissions could be expected, and if so, how far those significant concentrations extend past the facility ambient air boundary (i.e., the significant impact area or SIA). The areal extent of these receptors defines the SIA, which is then used to determine the nearby sources that need to be included in cumulative NAAQS and increment modeling.

If impacts for any pollutant and averaging period are less than or equal to the applicable SIL then the project will be deemed to not cause or contribute to any exceedances of the NAAQS or Class II PSD increment, and no further analyses will be required. If impacts exceed the SIL for any pollutant and averaging period, then a cumulative NAAQS and/or Class II PSD increment impact analysis will be performed for that pollutant/averaging period, as applicable. Preliminary modeling results have SIAs as shown in Table 10. The SIAs are shown in Figures 8 through 15.

Table 10 Significant Impact Areas

Pollutant	Avg. Period	SIA (km)
Nitrogen Dioxide (NO_2)	1-Hour	15.7
	Annual	2.5
Particulate Matter ($PM_{2.5}$)	24-Hour	2.5
	Annual	1.9

3.2 NAAQS AND PSD CLASS II INCREMENT ANALYSIS

For those pollutants/averaging periods with project-only impacts above the SILs, cumulative modeling will be required to demonstrate compliance with the applicable air quality standards. The cumulative modeling will be performed only for those receptors where the significant impact level is exceeded on a pollutant and averaging period basis. Compliance with the NAAQS will be based on the total estimated air quality concentration, which is the sum of the project impacts, existing Outokumpu source impacts, nearby source impacts, and background air quality data. It is assumed that the inventory provided by ADEM will be used for both the NAAQS and Class II PSD increment analysis. Compliance with the Class II PSD increments will be based on the total estimated air quality concentration, which is the sum of the project impacts, existing Outokumpu source impacts, and nearby source impacts.

3.3 CLASS I AQRV CONSIDERATIONS

Class I areas are federally protected areas for which more stringent air quality standards apply to protect unique natural, cultural, recreational, and/or historic values. Breton Wilderness Area is 150 km from the facility and is the only Class I area within 300 km.

The Federal Land Managers (FLM) possess the authority to safeguard air quality related values (AQRVs) and, in collaboration with the permitting authority, assess whether a proposed major emitting facility will have any detrimental effects on these values. AQRVs commonly subject to PSD modeling encompass visibility and the deposition of sulfur and nitrogen.

To ascertain whether a comprehensive AQRV analysis is necessary, the emission-to-Class I distance ratio (Q/D) for this project in the neighboring Class I areas was considered. According to the FLM's AQRV Work Group (FLAG) 2010 guidance, a Q/D value of ten or less indicates that AQRV analyses are not obligatory. The initial assessment of the Q/D for Breton Wilderness revealed that the Q/D is below 10, demonstrating minimal effects. A notification has been duly submitted (via e-mail) to the relevant FLM, requesting agreement on whether an AQRV analysis is required for this project. Attached is the notification to this protocol in Appendix B. We will use the CALPUFF Modeling System to consider deposition in the event the FLM does require an AQRV analysis.

3.4 ADDITIONAL IMPACT ANALYSIS

The air quality permit application will include an additional impact analysis as required by 40 CFR 52.21(o). This analysis will assess the potential impact on soils, vegetation, and visibility in the significant impact area caused by the net change in emissions due to the proposed project, and by general commercial, residential, industrial, and other growth associated with the project. The analysis will consist of the following elements:

- Growth analysis
- Ambient air quality impact analysis
- Soils and vegetation impact analysis
- Visibility analysis

3.4.1 GROWTH ANALYSIS

Since the project will not lead to any associated industrial, commercial, and residential growth, this analysis will be satisfied and addressed by the air quality analysis described in herein.

3.4.2 SOIL AND VEGETATION IMPACT ANALYSIS

Estimated impact to soils and vegetation will be based on a comparison of the air quality impacts due to project emissions to the secondary (or primary if no secondary standards are specified) NAAQS. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

3.5 VISIBILITY ANALYSIS

Visibility is not expected to be impacted by the project.

APPENDIX A - FIGURES

Figure 1 Area Map

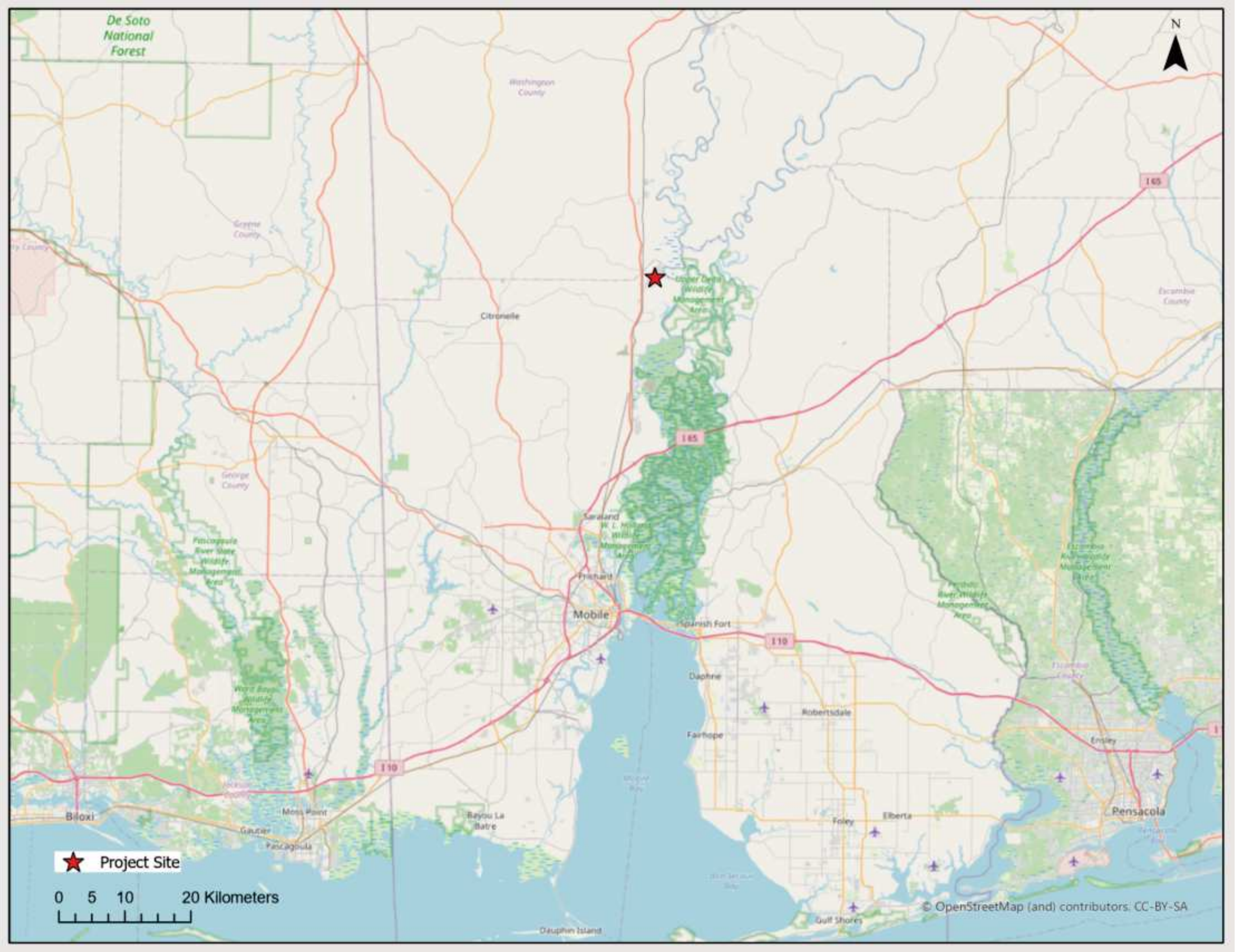


Figure 2 Local Map

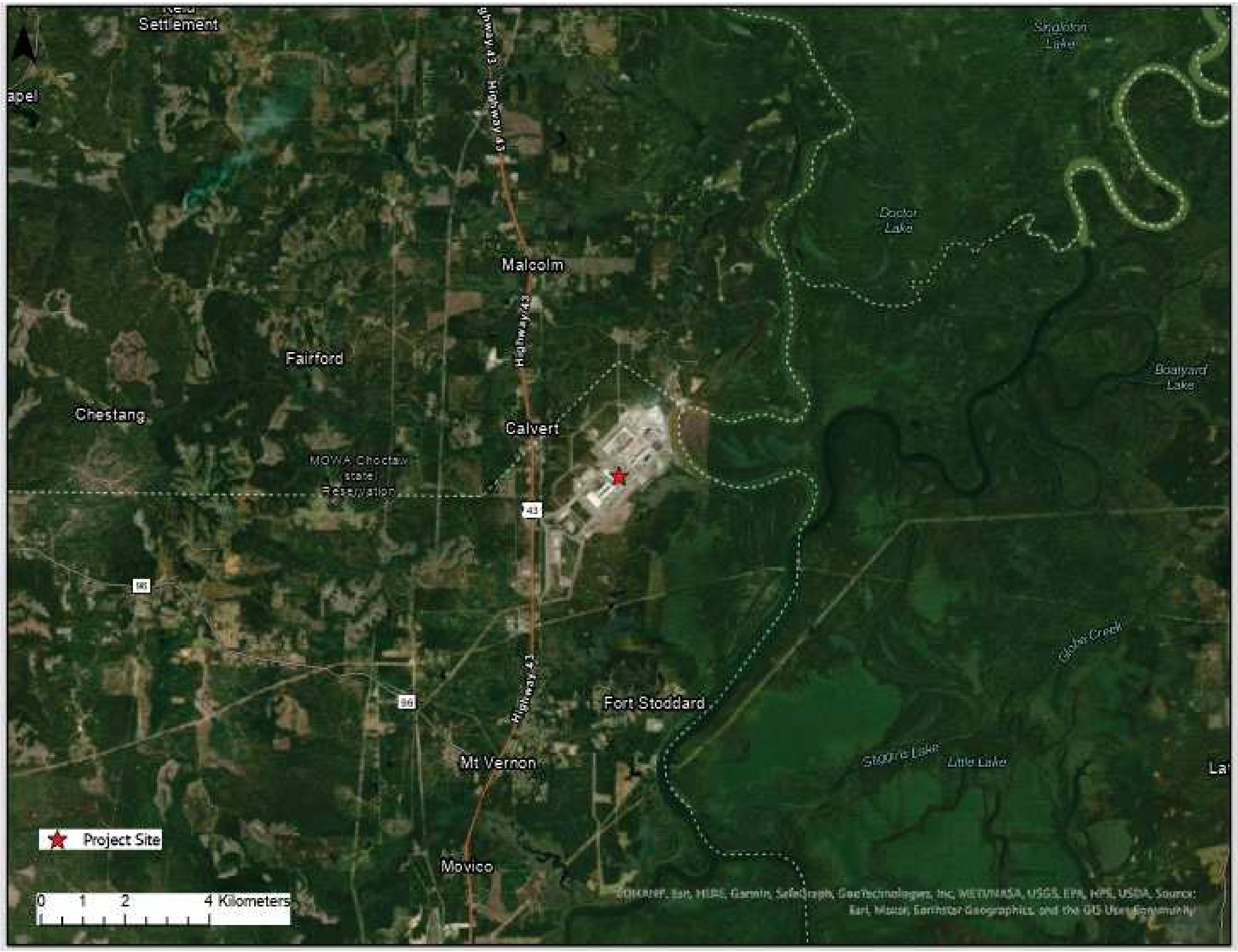


Figure 3 AUER 3-KM Analysis

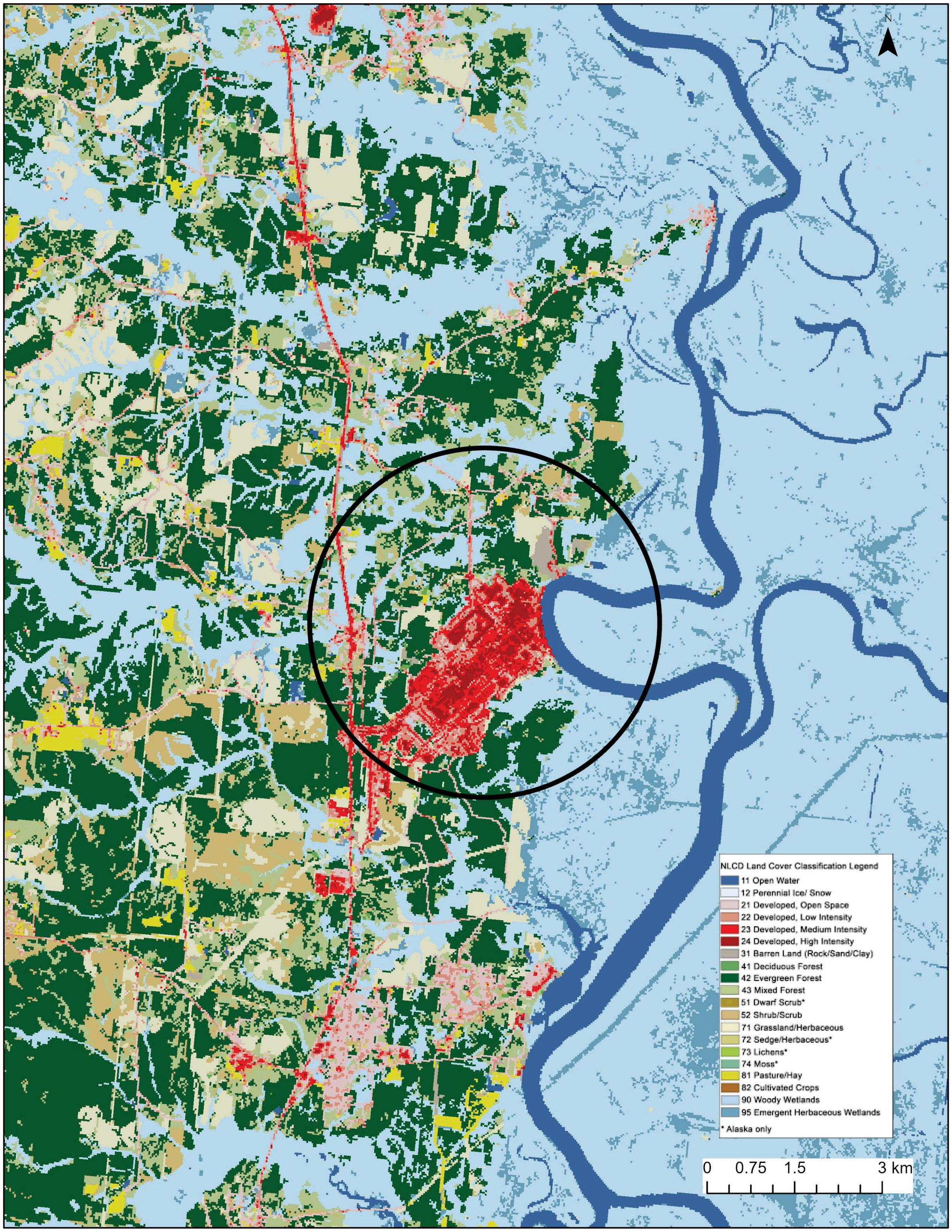
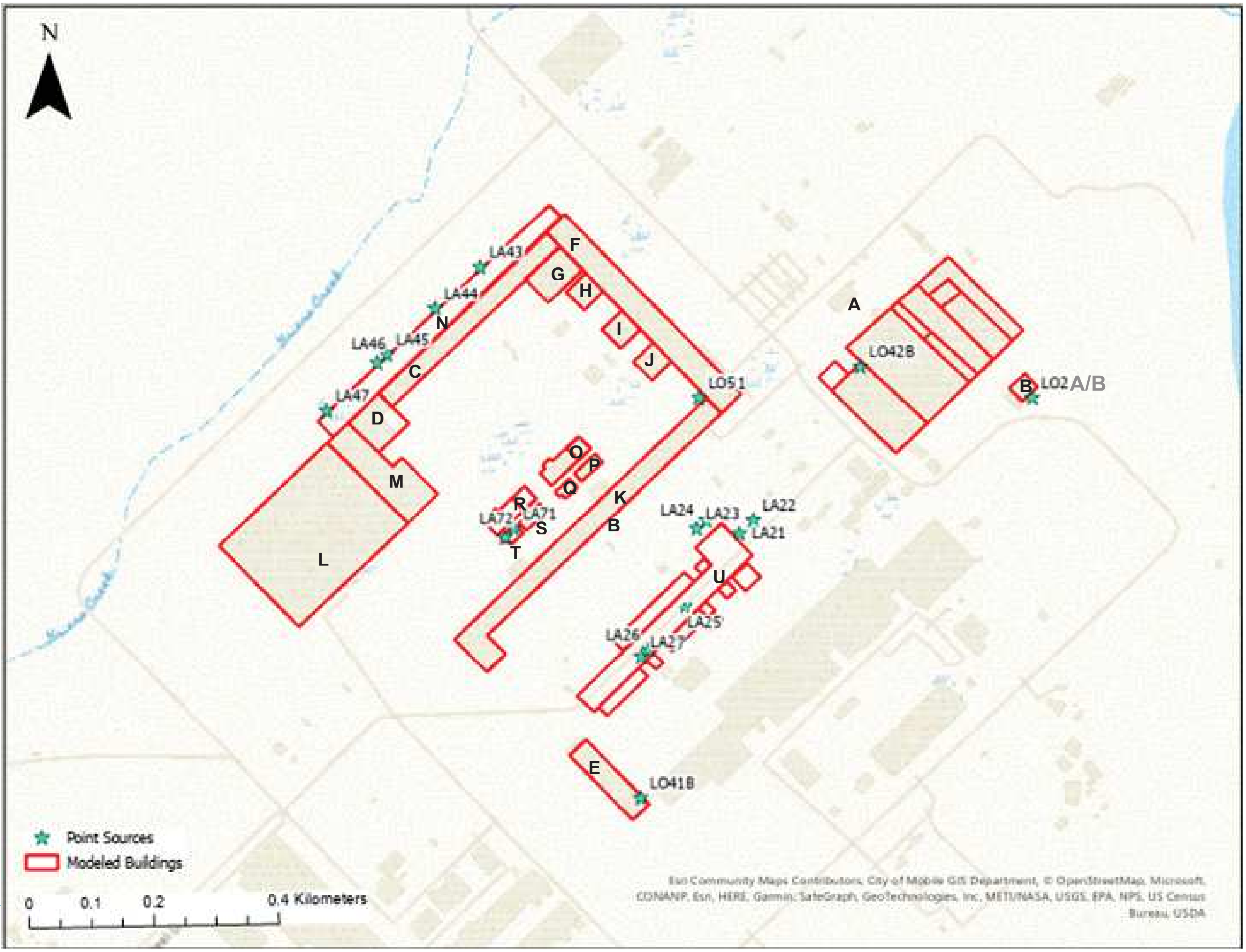


Figure 4 Digitized Facility Structures and Source Locations



Esri Community Maps Contributors, City of Mobile GIS Department, © OpenStreetMap, Microsoft, CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Figure 5 Mobile Wind Rose (2017-2021)

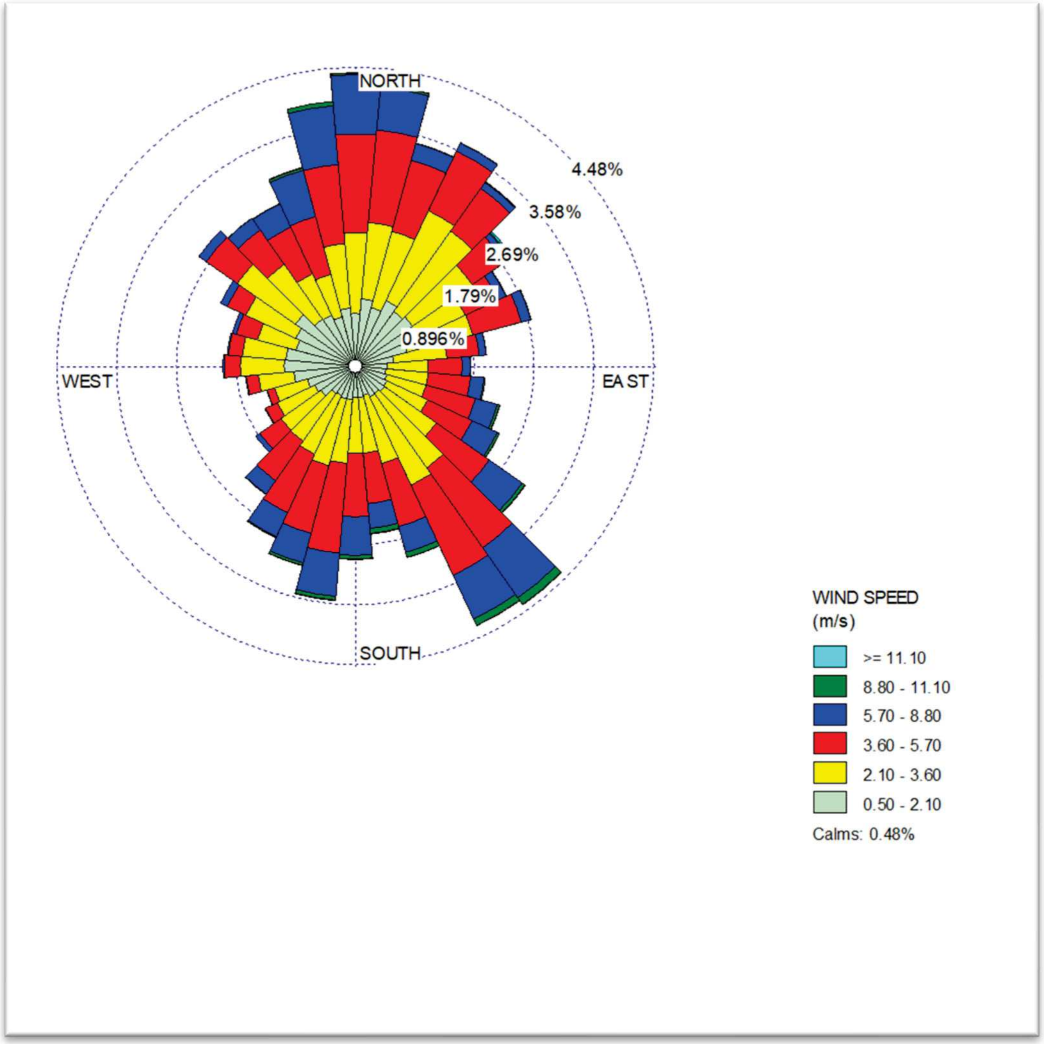


Figure 6 Receptor Grid

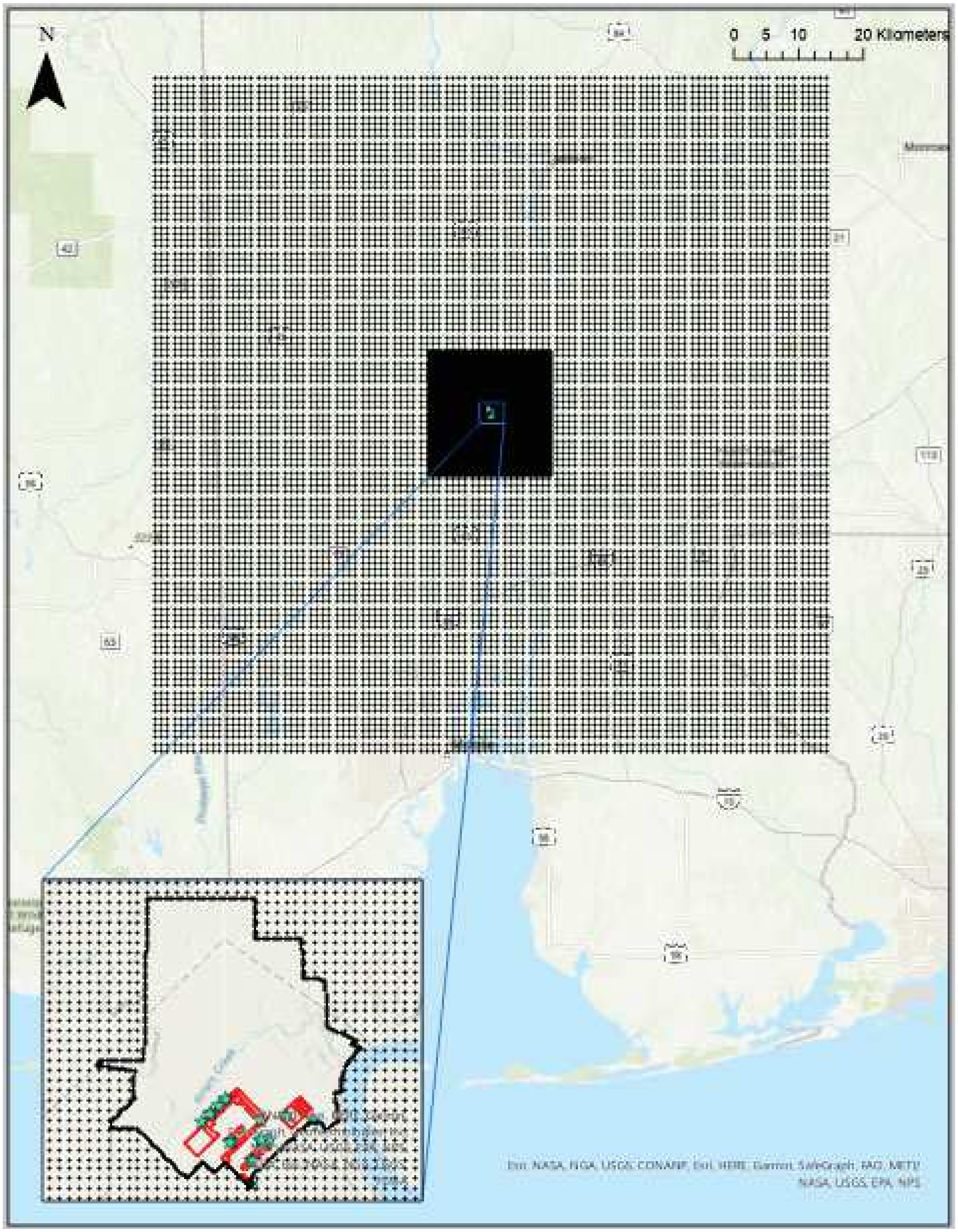


Figure 7 Property Boundary

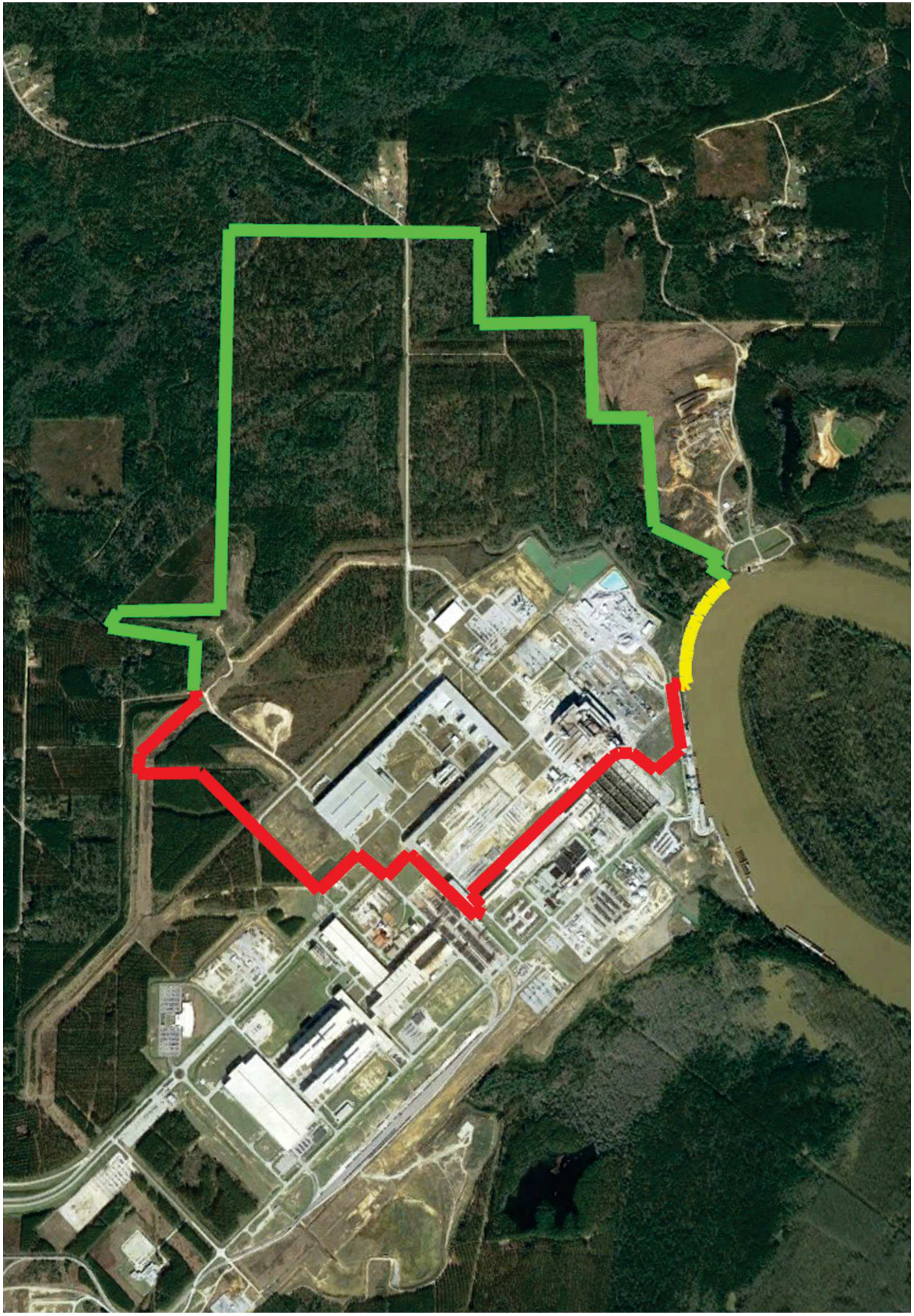


Figure 8 NO_2 1-Hour SIA

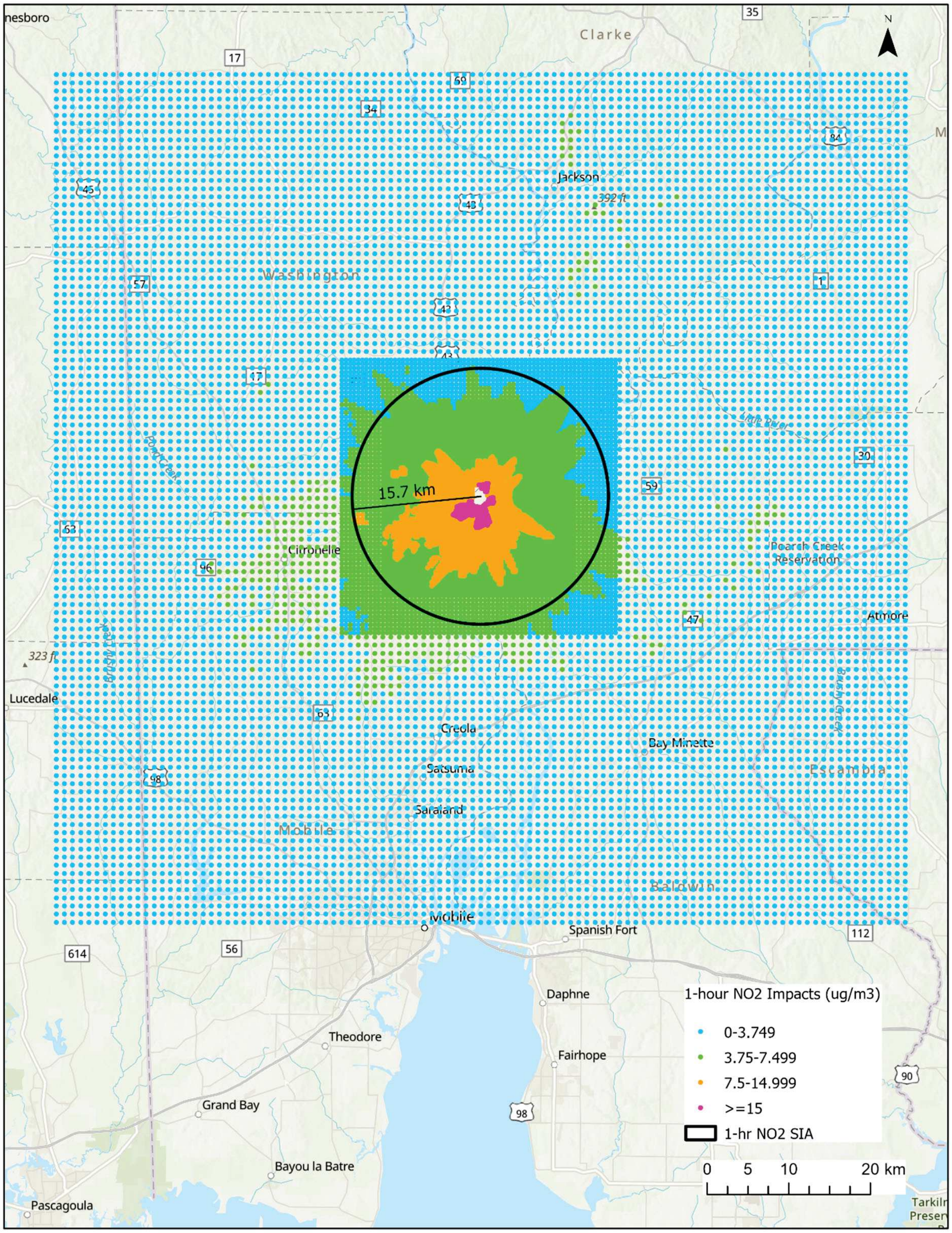


Figure 9 NO_2 Annual SIA

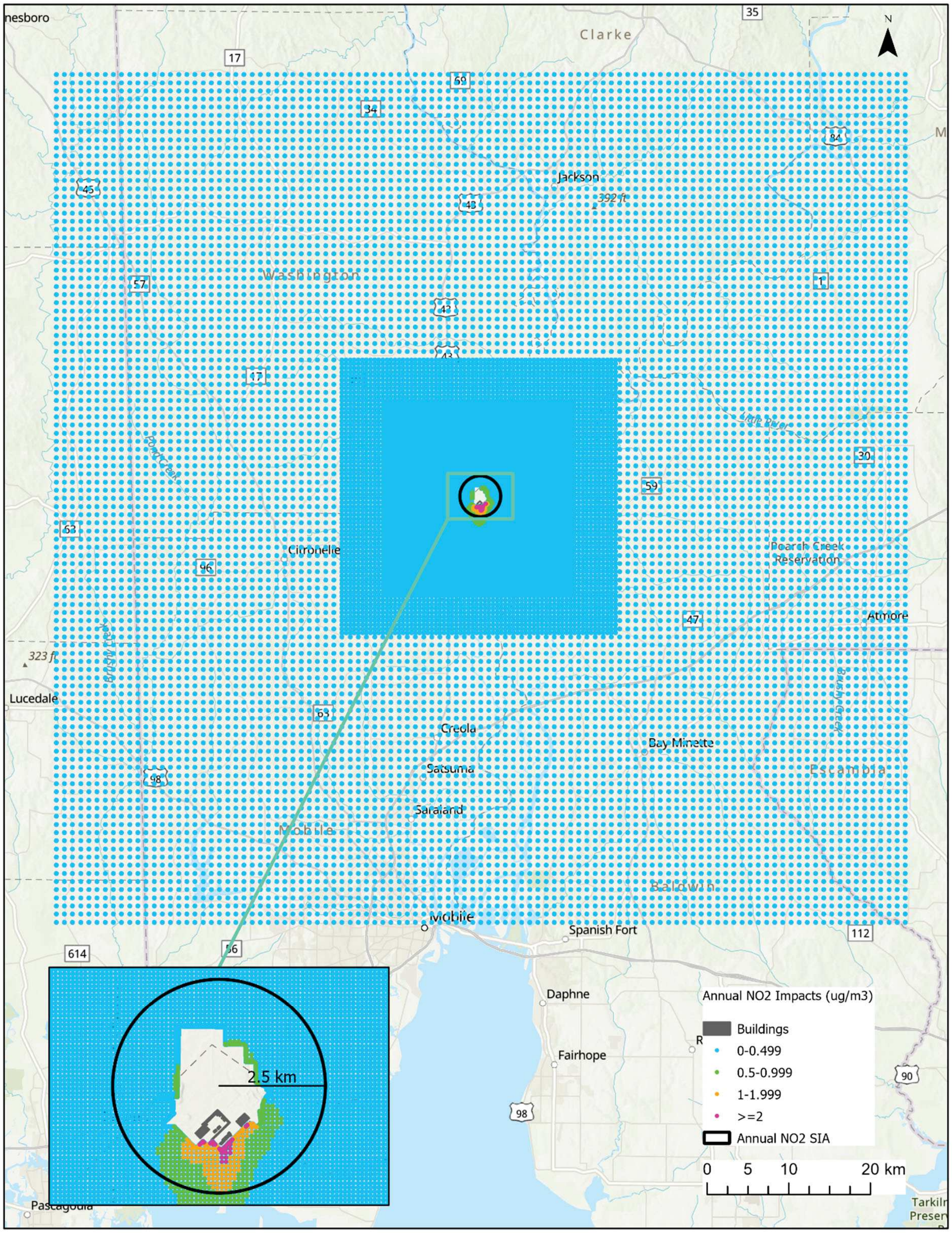


Figure 10 $PM_{2.5}$ 24-Hour SIA

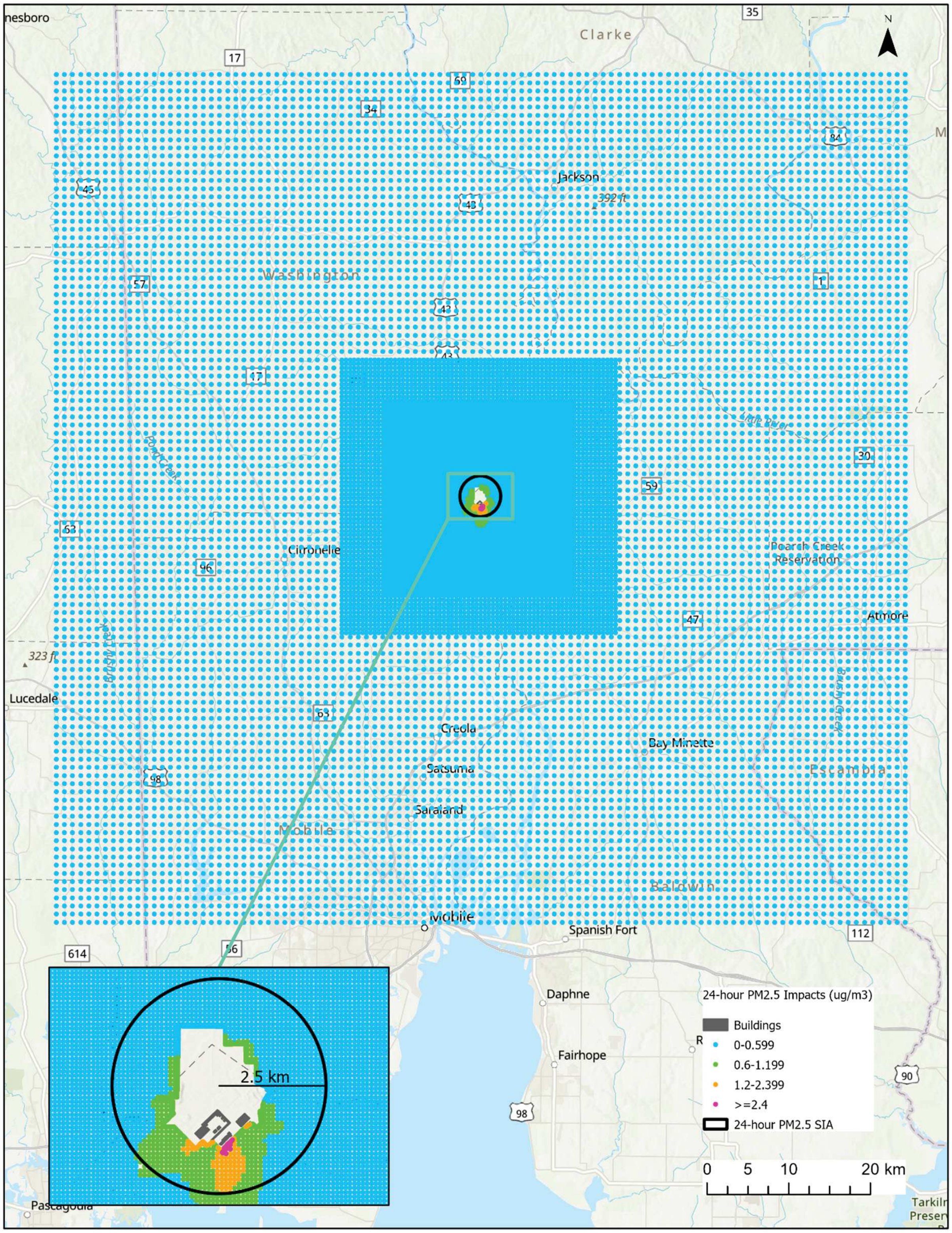


Figure 11 $PM_{2.5}$ Annual SIA

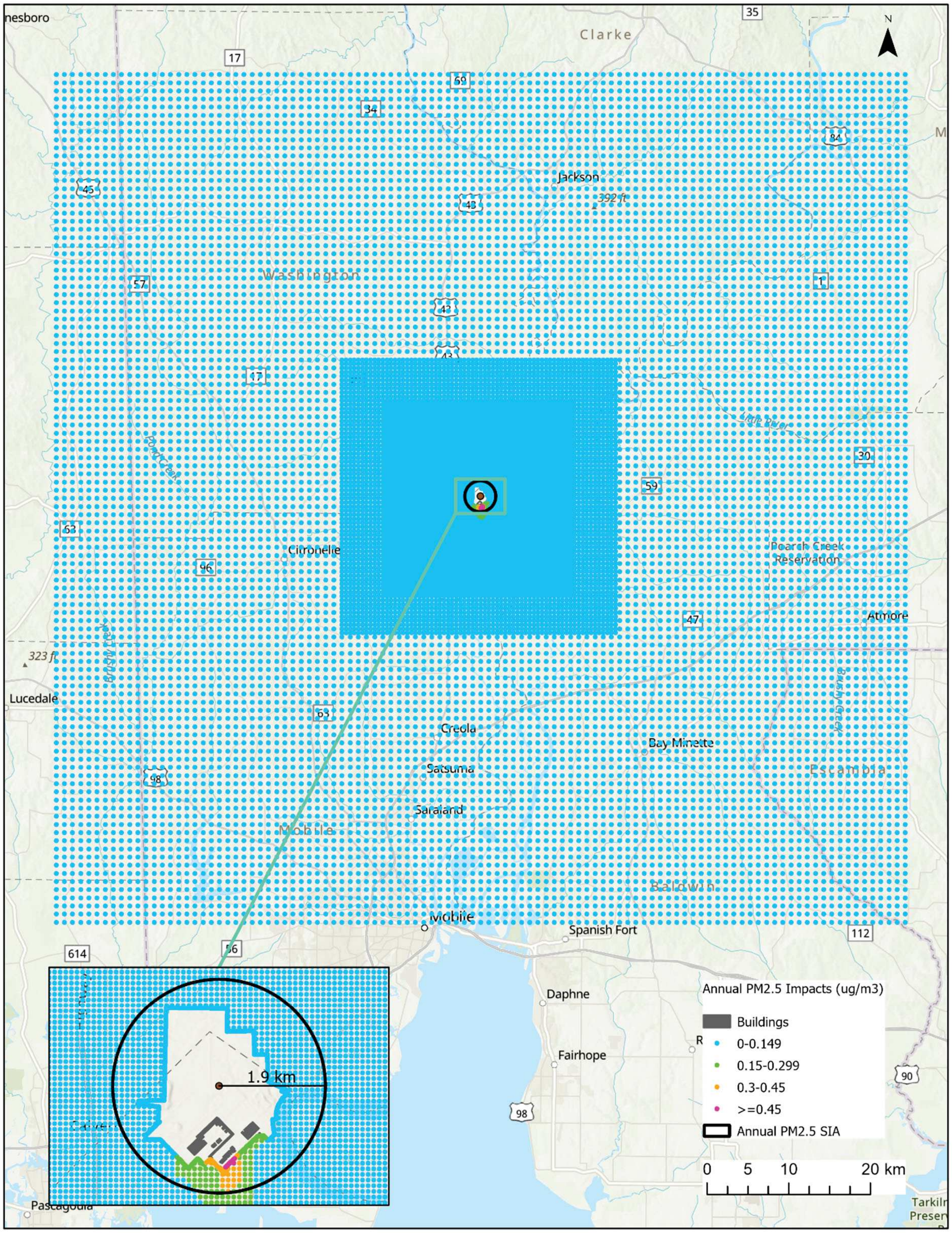


Figure 12 PM_{10} 24-Hour SIA

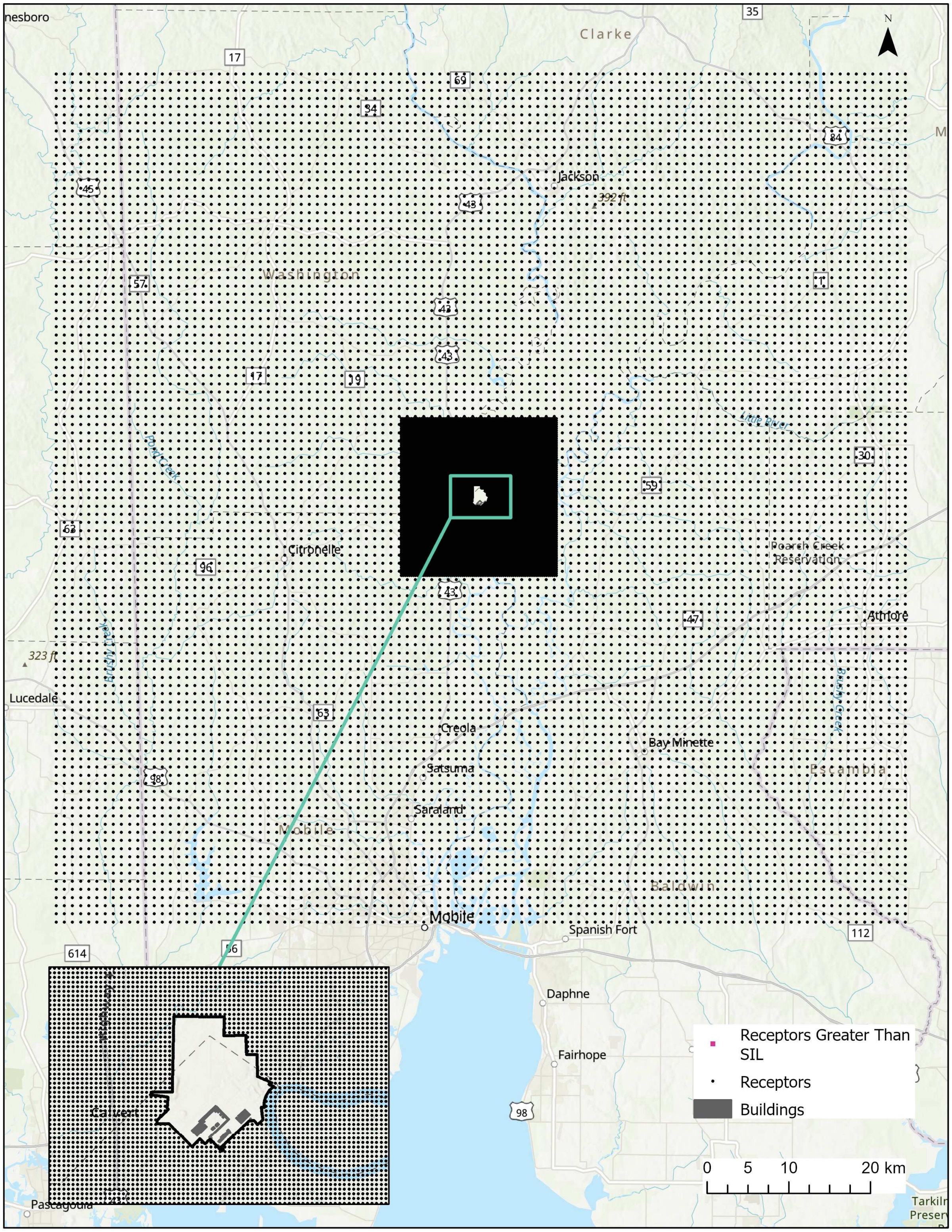


Figure 13 PM$_{10}$ Annual SIA

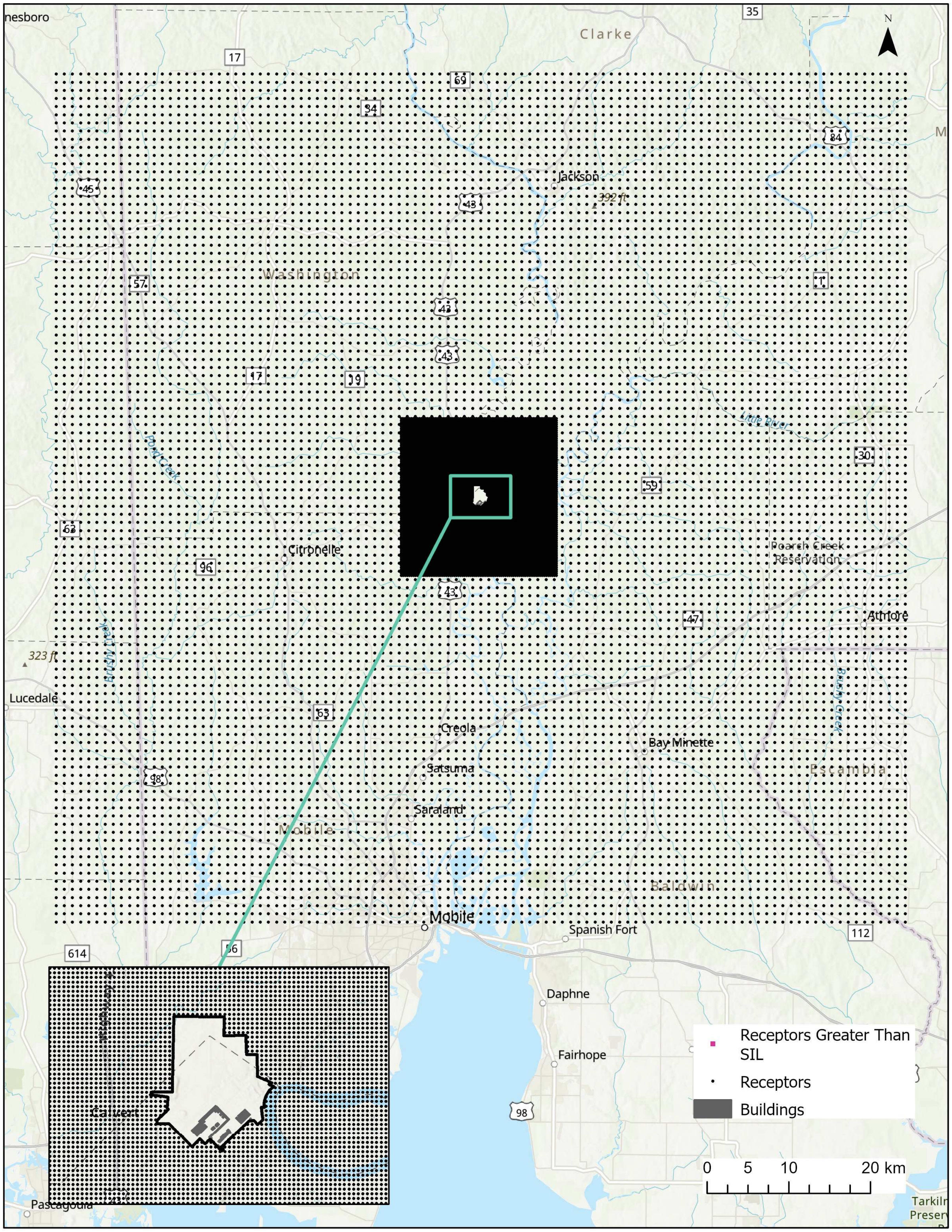


Figure 14 CO 1-Hour SIA

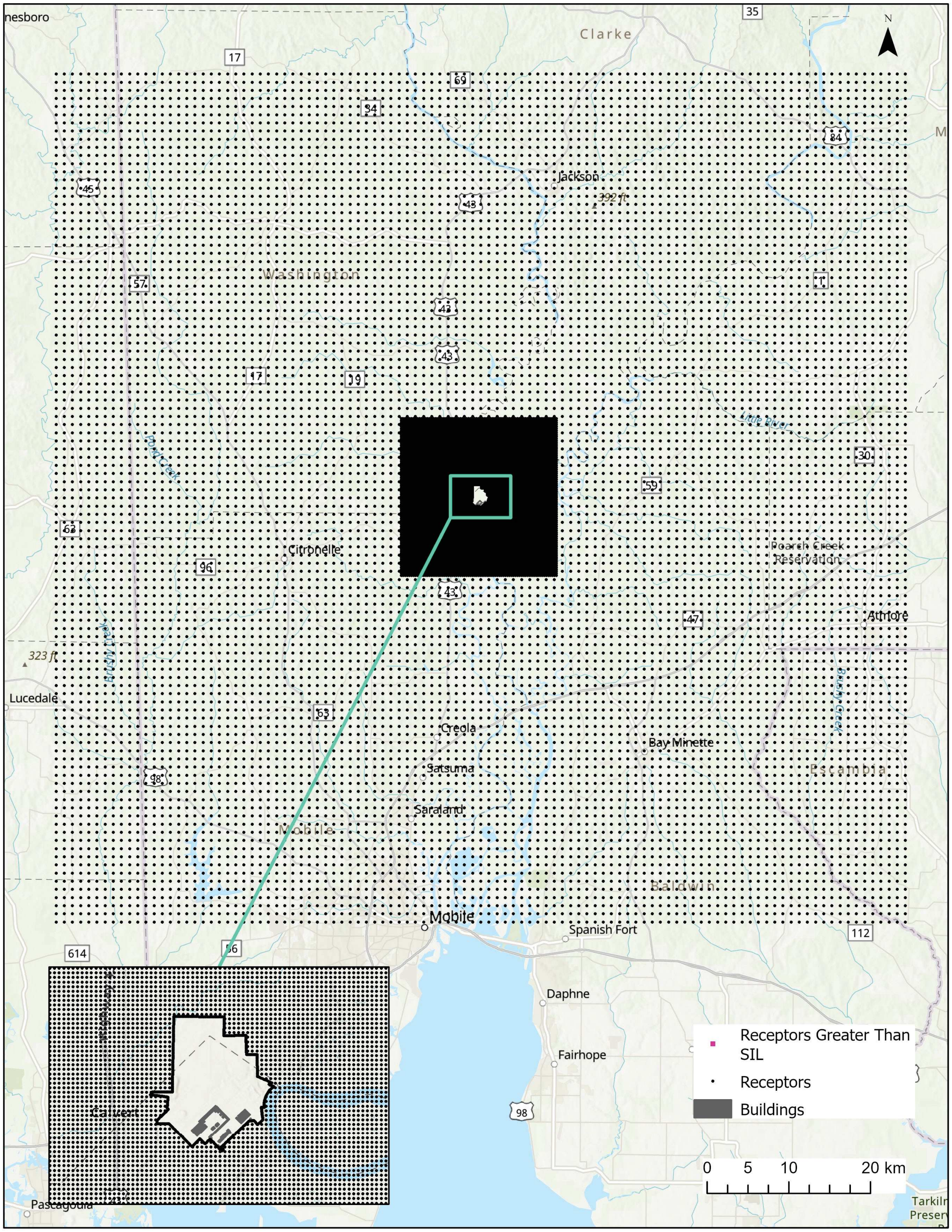
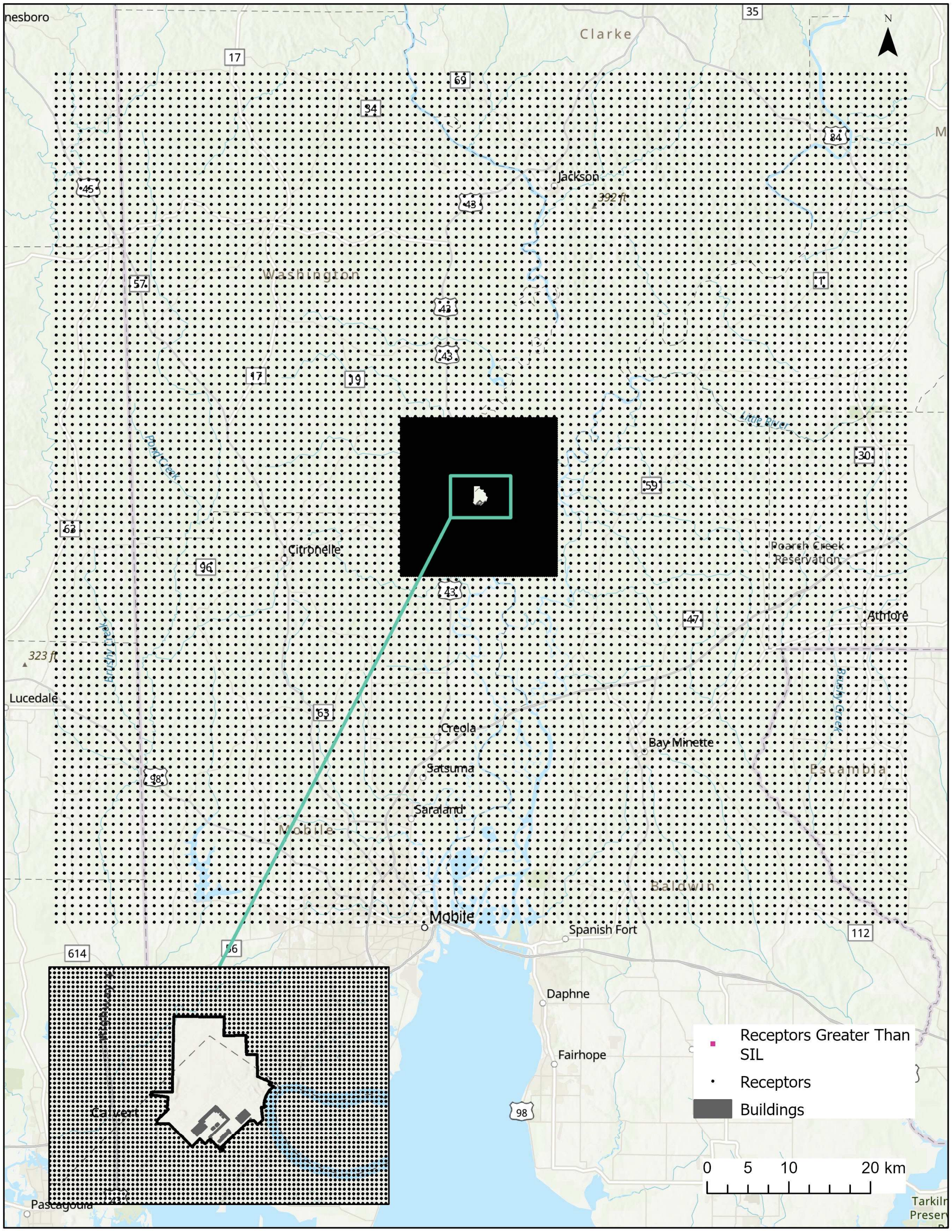


Figure 15 CO 8-Hour SIA



APPENDIX B – FLM CORRESPONDENCE

Brad Arnold

From: Brad Arnold
Sent: Friday, July 14, 2023 4:50 PM
To: aq_nepa@fws.gov; tim_allen@fws.gov; catherine_collins@fws.gov; jaron_ming@fws.gov
Cc: Wayne Denton; Rogers, R Jackson; Leach, Michael J; Travis, Megan L
Subject: Outokumpu Stainless USA, LLC
Attachments: OTK 2023 Applicability Request Form 1.0.pdf

To Whom It May Concern:

Outokumpu Stainless USA, LLC is proposing a modification at its steel mill in Calvert, Alabama. The attached applicability request form indicates that the calculated Q/D value for the project is 2.73 (and the facility is > 50 km from the Class I Area); which is much lower than the screening threshold of 10 TPY established by the Federal Land Manager's Air Quality Related Values Work Group (FLAG) 2010 Report. We will therefore not be conducting any Class I modeling analysis with the project. Please let us know if you have any questions regarding this document.

Thanks

Brad Arnold
Principal/Owner
SOLA Environmental, LLC
Office: 205-834-8922
Cell: 256-466-4027
brad.arnold@sola-environmental.com

SOLA ENVIRONMENTAL™

289 Highgate Hill Rd.
Indian Springs, AL 35124
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Request for Applicability of Class I Area Modeling Analysis
Southern Region, U.S. Fish and Wildlife Service

Facility Name (Company Name)	Outokumpu Stainless USA, LLC
New Facility or Modification?	Modification
Source Type	Steel Mill
Project Location (County/State/ Lat. & Long. in decimal degrees)	Mobile County, Alabama and 31.161, -87.989

Application Contacts

Applicant		*Consultant*		*Air Agency Permit Engineer*	
Company	Outokumpu Stainless USA, LLC	**Company**	SOLA Environmental	**Agency**	Alabama Department of Environmental Management
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Briefly Describe the Proposed Project

Outokumpu Stainless USA, LLC is proposing to make the following changes:

- The addition of a Mixed Annealing and Pickling Line (MAPL) to increase the facility's capacity to treat stainless steel.
- Construction of a new Steckel Mill to add additional steel rolling capabilities to the facility. The Steckel mill will be constructed in two phases. The emission sources and potential emissions from both phases are included in this permit application.
- Additional support sources throughout the mill:
    - New Cold Rolling Mill
    - New Meltshop Hotbox
    - New Passive Annealing Furnace
    - New Slab Holding Furnace
    - Additional Ladle Treatment Stand

Proposed Emissions and BACT – Walking Beam Furnaces (2)

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Nitrogen Oxides	93.5 (each)	0.070 lb/MMbtu BACT	Ultra-low NO_X burners (ULNB)
Sulfur Dioxide	0.79 (each)	0.6 lb/MMscf AP-42	N/A
Particulate Matter (filterable+condensable)	9.95 (each)	7.6 lb/MMscf BACT/AP-42	Good combustion practices
Volatile Organic Compounds	7.2 (each)	5.5 lb/MMscf AP-42	N/A

Proposed Emissions and BACT – Continuous Annealing Furnace

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Nitrogen Oxides	37.6	0.060 lb/MMbtu BACT	ULNB and Exhaust Gas Re-Circulation (EGR)
Sulfur Dioxide	0.37	0.6 lb/MMscf AP-42	N/A
Particulate Matter (filterable+condensable)	4.67	7.6 lb/MMscf BACT/AP-42	Good combustion practices
Volatile Organic Compounds	3.44	5.5 lb/MMscf AP-42	N/A

Proposed Emissions and BACT – Passive Annealing Furnace

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Nitrogen Oxides	14.5	0.11 lb/MMbtu BACT	ULNB and EGR
Sulfur Dioxide	0.08	0.6 lb/MMscf AP-42	N/A
Particulate Matter (filterable+condensable)	0.98	7.6 lb/MMscf BACT/AP-42	Good combustion practices
Volatile Organic Compounds	0.71	5.5 lb/MMscf AP-42	N/A

Proposed Emissions and BACT – Misc. Natural Gas Combustion Sources – 7 Units

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Nitrogen Oxides	57.0 (total)	0.100 lb/MMbtu BACT/AP-42	Good combustion practices
Sulfur Dioxide	0.34 (total)	0.6 lb/MMscf AP-42	N/A
Particulate Matter (filterable+condensable)	4.26 (total)	7.6 lb/MMscf BACT/AP-42	Good combustion practices
Volatile Organic Compounds	3.08 (total)	5.5 lb/MMscf AP-42	N/A

Proposed Emissions and BACT – Roughing Mill and Finishing Stand

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Particulate Matter (filterable+condensable)	14.0	0.0044 gr/dscf BACT	Wet Electrostatic Precipitator (WESP)

Proposed Emissions and BACT – MAPL Degreasing and Sodium Sulfate Pickling

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Particulate Matter (filterable+condensable)	0.83	0.0022 gr/dscf BACT	Wet Scrubber

Proposed Emissions and BACT – MAPL Mixed Acid Pickling

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Nitrogen Oxides	25.1	100 ppm BACT	De-NO_X SCR
Particulate Matter (filterable+condensable)	0.66	0.0022 gr/dscf BACT	Wet Scrubber

Proposed Emissions and BACT – Shotblasting

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Particulate Matter (filterable+condensable)	4.16	0.0030 gr/dscf BACT	Baghouse

Proposed Emissions and BACT – Cold Rolling Mill

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Particulate Matter (filterable+condensable)	6.41	0.0025 gr/dscf BACT	Mist Eliminator

Proposed Emissions and BACT – Mixed Acid Regeneration (Iron Oxide Handling)

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Particulate Matter (filterable+condensable)	0.68	0.0050 gr/dscf BACT	Baghouse

Proposed Emissions and BACT – Mixed Acid Regeneration (Process Gas)

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, etc?)***	***Proposed BACT***
Nitrogen Oxides	7.03	100 ppm BACT	De-NO_X SCR
Particulate Matter (filterable+condensable)	0.36	0.0043 gr/dscf BACT	Wet Scrubber

Proximity to U.S. Fish and Wildlife Service Class I Areas

Class I Area	Breton Wilderness Area		
Distance from Facility (km)	150.0		
Calculated Q/d (from above)	2.73		

ATTACHMENT 3 – ONSITE AND OFFSITE INVENTORY

Attachment 3
Outokumpu Onsite Inventory

Source	UTM Easting (m)	UTM Northing (m)	Elevation (m)	Stack Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)	PM$_{2.5}$ 24-Hr (g/s)	Emission Factor Reference	PM$_{2.5}$ Annual^3 (g/s)	NO$_2$ 1-Hr (g/s)	Emission Factor Reference	NO$_2$ Annual^3 (g/s)	Max. Hours of Operation 2021-2022 (hr/yr)	Constructed Date
LO1	406683	3447406	14.52	49.99	313	20.57	4.88	0.388	2	0.353	4.43	2	4.03	7,973	Before October 20, 2010
LO2	406674	3447406	14.56	49.99	307	15.36	4.88	0.169	2	0.153	1.33	2	1.21	7,953	Before October 20, 2010
LO4	406500	3447337	14.64	30.00	293	11.46	1.30	0.170	1	0.136	-	-	-	7,019	Before October 20, 2010
LO5_12	406616	3447518	14.65	37.80	303	9.05	2.50	0.263	1	0.163	-	-	-	5,426	Before October 20, 2010
LO11	406398	3447456	14.60	40.00	303	11.83	1.40	0.096	1	0.022	-	-	-	1,954	Before October 20, 2010
LO26	405908	3447375	14.02	4.60	469	14.22	0.61	0.027	1	0.013	0.126	1	5.98E-02	4,159	Before October 20, 2010
LO27	405902	3447380	14.01	4.60	469	14.22	0.61	0.027	1	0.013	0.126	1	5.98E-02	4,159	Before October 20, 2010
LO41A	406033	3446767	14.27	25.33	573	4.15	1.83	0.089	1	0.010	0.106	2	1.14E-02	945	Before October 20, 2010
LO42A	406500	3447268	14.39	12.00	473	2.76	1.00	0.024	1	0.003	0.015	2	1.75E-03	1,012	Before October 20, 2010
LO43	405833	3447106	14.26	30.00	466	8.28	2.50	0.137	1	0.108	0.869	2	0.68	6,887	Before October 20, 2010
LO45	405897	3447160	14.16	55.00	318	15.00	2.12	0.520	1	0.409	-	-	-	6,887	Before October 20, 2010
LO46	405959	3447220	14.20	30.00	303	10.61	0.50	0.050	1	0.040	-	-	-	6,887	Before October 20, 2010
LO47	406074	3447331	14.19	30.48	403	17.37	0.60	0.050	1	0.040	0.139	2	0.11	6,887	Before October 20, 2010
LO48	406103	3447450	14.24	55.00	293	16.37	1.80	0.692	1	0.600	-	-	-	7,594	Before October 20, 2010
LO49	406055	3447502	14.32	55.00	293	13.10	1.80	0.553	1	0.486	-	-	-	7,697	Before October 20, 2010
LO50	405995	3447561	14.26	55.00	293	13.10	1.80	0.553	1	0.464	-	-	-	7,341	Before October 20, 2010
LO52	405982	3447619	14.30	30.00	333	1.35	1.50	0.032	1	0.028	-	-	-	7,697	Before October 20, 2010
LO53	405808	3447549	14.16	30.50	623	16.80	1.70	0.120	1	0.105	0.212	2	0.19	7,697	Before October 20, 2010
LO55	405742	3447473	14.20	25.00	313	16.98	0.50	0.071	1	0.062	-	-	-	7,697	Before October 20, 2010
LO57	405682	3447428	14.21	25.50	513	12.28	0.99	0.057	1	0.050	0.233	2	0.20	7,697	Before October 20, 2010
LO71	405938	3447273	14.22	25.00	328	6.11	0.90	0.039	1	0.039	-	-	-	8,760	Before October 20, 2010
LO72	405921	3447257	14.21	25.00	589	5.60	0.94	0.012	2	0.009	0.377	2	0.30	6,867	Before October 20, 2010

1. Maximum permitted lb/hr value.
2. Latest compliance stack test.
3. Annual emission factors conservatively based on maximum of prior two years of actual operating data at the facility.

Attachment 3
Offsite Inventory - NOx 1-Hour

NOx 1-Hour		Stack		UTM Coordinates (km)		Emission Rate	Base Elev.	Stack Ht.	GEP	Diameter	Exit Temp	Exit Velocity
Facility No.	Unit Description	No.	Type**	East	North	(lb/hr)	(m)	(m)	(m)	(m)	ºK	(m/s)
102-0001	No. 2 Recovery Furnace (North Stack)	A11	V	414.62	3484.25	39.71	13.72		85.72	2.29	464	15.61
102-0001	No. 2 Recovery Furnace (South Stack)	B11	V	414.62	3484.24	39.71	13.72		85.72	2.29	464	13.34
102-0001	No. 3 Power Boiler	X020	V	414.65	3484.23	10.84	13.72	60.96		2.29	427	11.87
102-0001	No. 4 Power Boiler	X025	V	414.59	3484.16	12.27	13.72	60.96		1.83	425	18.93
102-0001	No. 5 Power Boiler	X029	V	414.55	3484.16	17.00	13.72	60.96		2.13	425	13.91
102-0001	No. 1 Lime Kiln	Z003	V	414.70	3484.18	17.00	13.72	42.06		1.07	350	14.15
102-0001	Combination Fuel Boiler	Z013	V	414.65	3484.27	68.38	13.72	60.96		2.44	337	16.27
102-S004	60 MMBtu/hr Wood-fired Boiler Stack	001	V	414.81	3484.94	6.42	16.76	23.47		0.95	350	14.33
102-S004	34.841 MMBtu/hr NGF Boiler	007	V	414.81	3484.96	3.14	17.98	12.19		0.66	466	14.35
108-0003	Boiler #6	011	V	404.38	3460.63	13.20	14.81	23.16		1.62	436	8.72
108-0003	Boiler #8	013	W	404.39	3460.64	12.94	14.81	12.19		1.47	422	12.13
108-0003	Boiler #4	118	V	404.35	3460.64	8.61	14.81	22.86		1.22	439	10.36
108-0003	Boiler #7	164	V	404.45	3461.07	30.35	14.81	18.44		1.17	430	19.40
108-0003	Vent Gas Combuster	IGEP1	V	404.27	3461.07	3.00	14.81	39.62		0.91	1255	5.64
108-0003	99.9 MMBTU Temp Boiler	TEMPBOILER	W	404.44	3461.07	3.60	16.76	8.38		1.42	455	9.58
108-0012	CAES Unit (Unit 1)	001	V	401.94	3458.38	121.80	13.72	27.74		3.06	407	23.59
108-0012	CT - 1 (Unit 2)	002	V	401.92	3458.29	97.00	13.72	27.43		6.25	818	28.35
108-0012	CT - 2 (Unit 3)	003	V	401.92	3458.27	92.60	13.72	27.43		6.25	818	28.35
108-0012	CT - 3 (Unit 4)	005	V	401.87	3458.23	104.70	13.72	27.43		6.40	879	41.22
108-0012	CT -4 (Unit 5)	006	V	401.87	3458.19	131.40	13.72	27.43		6.40	879	41.22
108-0017	2,000 Hp Superior Recip. Engine (C-100)	001	V	403.50	3458.30	7.92	15.24	6.10		0.46	700	64.19
108-0017	2,000 Hp Superior Recip. Engine (C-101)	002	V	403.50	3458.30	7.92	15.24	6.10		0.46	700	64.19
108-0017	4,735 Hp Caterpillar Recip. Engine (C-201)	003	V	403.50	3458.30	7.32	15.24	12.04		0.76	727	32.11
108-0017	4,735 Hp Caterpillar Recip. Engine (C-202)	004	V	403.50	3458.30	7.32	15.24	12.04		0.76	727	32.11
108-0017	4,735 Hp Caterpillar Recip. Engine w/ Catalytic Converter (C-200)	005	V	403.50	3458.30	7.32	15.24	12.04		0.76	727	32.11
108-0017	4,735 Hp Caterpillar Recip. Engine w/ catalytic converter (C-7400)	006	V	403.50	3458.30	3.94	15.24	12.04		0.76	816	32.11
108-0018	CT and Duct Burner	001	V	404.54	3459.32	64.20	13.11	30.78		4.65	454	26.77
108-0018	274 MMBTU/hr Boiler	002	V	404.53	3459.26	7.10	13.11	18.29		1.52	422	18.08
108-0018	184 MMBTU/hr Boiler	004	V	404.53	3459.29	7.80	13.11	18.29		1.83	436	9.16
108-0018	184 MMBTU/hr Boiler	006	V	404.53	3459.29	7.10	13.11	18.29		1.83	422	15.26
108-0020	Boiler A	001	V	403.28	3457.85	5.53	15.24	12.50		1.22	376	21.79
108-0020	Boiler B	002	V	403.26	3457.82	5.53	15.24	13.11		1.22	355	21.79
108-0020	Thermal Oxidizer	022	V	403.46	3457.88	4.03	14.94	24.69		0.91	511	3.02
108-0020	Boiler C	033	V	403.30	3457.78	5.53	15.24	12.19		1.22	355	21.79
108-0022	Area 12/19 Thermal Oxidizer with Tail Gas Scrubber	19EP34	V	404.70	3460.88	16.2	16.18	15.24		0.61	350	6.25
501-0007	Vent System	002	V	417.62	3413.99	20.2	45.72	6.10		0.71	922	2.02
502-S003	23.25 MMBtu/hr Boiler (No. 4)	001	V	451.13	3433.34	5.12	82.91	12.19		0.76	477	11.38
502-S003	29.5 MMBtu/hr Wood Waste Boiler with Multiclone (No. 5)	015	V	451.14	3433.32	6.49	82.91	10.67		0.76	451	14.51
503-0047	95.0 MMBTU/hr Boiler	55-B	V	402.20	3425.83	3.7	13.41	17.83		1.52	477	10.11
503-0047	100.0 MMBTU/hr Natural Gas Fired Boiler	55-C	V	402.20	3425.82	4.6	13.41	17.83		1.52	477	10.11
503-0047	238 MMBtu/hr Natural Gas Fired Boiler (No. 4)	ST02	V	402.40	3425.80	9.52	13.41	40.00		1.52	450	12.13
503-0047	238 MMBtu/hr Natural Gas Fired Boiler (No. 5)	ST03	V	402.38	3425.80	9.52	13.41	40.00		1.52	450	12.13
503-1001	Common 1, 2	001B	V	403.33	3430.73	550.20	6.40		#####	7.82	422	8.56
503-1001	Unit 4	004	V	403.46	3430.82	1448.10	6.40		#####	4.17	418	41.45
503-1001	Unit 5	005	V	403.71	3430.76	688.50	6.71		#####	9.45	331	18.29
503-1001	CT/DB 6A	007	V	402.65	3430.17	5.50	7.62	36.88		5.12	361	24.81
503-1001	CT/DB 6B	008	V	402.66	3430.14	19.20	7.62	36.88		5.12	361	24.81
503-1001	CT/DB 7A	009	V	402.62	3430.31	22.20	7.62	36.88		5.12	361	24.81
503-1001	CT/DB 7B	010	V	402.63	3430.28	20.90	7.62	36.88		5.12	361	24.81
503-1001	Auxiliary Package Boiler for Unit 5 Startup	005AUX	V	403.83	3430.78	20.90	6.40	24.38		1.52	422	21.20
503-2003	68 MMBTU/Hr Wood Boiler	001	V	397.60	3399.20	14.96	6.10	21.34		1.18	342	11.92
503-2022	Compressor No. 806	806	V	390.43	3427.45	3.05	55.02	4.27		0.25	794	29.81
503-3013	Diesel Cargo Pump Engine 1	P-1	V	399.97	3400.00	4.1013	9.14	2.13		0.10	524.82	12.49680
503-3013	Diesel Cargo Pump Engine 2	P-2	V	399.90	3399.90	4.1013	9.14	2.13		0.10	524.82	12.49680
503-3013	Diesel Firewater Engine	P-3	V	400.04	3399.90	6.7914	1.65	1.50		0.08	665.93	80.31480
503-3028	2,000 HP Cooper Recip (Engine 1101)	001	V	403.49	3443.02	50.2	12.60	8.05		0.30	741	46.92
503-3028	2,000 HP Cooper Recip (Engine 1102)	002	V	403.48	3443.02	50.2	12.66	8.05		0.30	741	46.92
503-3028	2,000 HP Cooper Recip (Engine 1103)	003	V	403.47	3443.02	50.2	12.74	8.05		0.30	741	46.92
503-3028	2,000 HP Cooper Recip Engine w/Catalytic Converter (Engine 1104)	004	V	403.46	3443.02	14.72	12.80	8.05		0.30	741	46.92
503-3028	2,000 HP Cooper Recip (Engine 1105)	005	V	403.45	3443.02	50.2	12.87	8.05		0.30	741	46.92
503-3028	2,700 HP Cooper Recip Engine (Engine 1106)	006	V	403.43	3443.02	2.82	12.96	15.24		0.64	561	27.22
503-3028	15,000 HP Solar Turbine w/SoLoNOx Combustors (Engine 1107)	007	V	403.43	3442.87	7.93	13.07	18.29		2.29	756	17.29
503-3028	15,000 HP Solar Turbine w/SoLoNOx Combustors (Engine 1108)	008	V	403.45	3442.87	6.17	12.92	18.29		2.29	760	17.29
503-3028	15,700 HP Pignone Combustion Turbine (Engine 1109)	009	V	403.48	3442.87	7.94	12.69	18.75		2.19	760	18.96
503-3031	16,834 Hp Turbine w/SoLoNOx	X002	V	374.11	3439.47	5.14	83.82	13.00		2.59	765	17.52
503-4003	No. 1 Crude Heater	005	V	398.86	3406.72	12.1	4.57	48.77		2.13	561	5.49
503-4003	No. 1 Reformer Heater	006	V	398.89	3406.72	14.25	4.57	33.53		1.83	575	9.14
503-4003	No. 2 Crude Heater	009	V	399.05	3406.82	5.6	4.57	36.12		2.29	466	5.30
503-4003	No. 2 Vacuum Tower Feed Heater	010	V	399.05	3406.85	3.76	4.57	49.07		2.44	589	3.11
503-4003	No. 2 Reformer No. 1, No. 2 & No. 3 Heaters	011	V	399.05	3406.78	11.93	4.57	37.87		2.29	644	3.47
503-4003	Refinery LP Flare	026	V	399.30	3406.75	6.43	4.57	60.35		0.61	811	13.60
503-4004	48 MMBtu/Hr - South Process Heater	002	V	398.00	3418.11	3.39	15.24	18.49		1.68	616	3.98
503-4004	48 MMBtu/Hr - North Process Heater	003	V	398.01	3418.12	3.27	15.24	18.49		1.68	616	3.99
503-4004	2700 BHP Ref. Compressor Engine - East Cooper [2700CB]	004	V	398.08	3418.16	15.65	18.14	11.58		0.61	922	34.04
503-4004	1626 BHP Inlet Compressor Engine - North Ingersoll [1626IR-A]	007	V	398.05	3418.20	21.33	15.24	7.92		0.45	950	18.39
503-4004	1626 BHP Inlet Compressor Engine - South Ingersoll [1626IR-B]	008	V	398.05	3418.19	23.93	15.24	7.92		0.45	811	23.77
503-4004	1642 BHP Inlet Compressor Engine - Waukesha [1642W]	009	V	397.93	3418.24	4.57	15.24	7.92		0.46	950	22.09
503-4004	600 BHP Inlet Compressor - South Cooper [600CB-B]	012	V	397.94	3418.19	3.77	15.24	5.49		0.30	644	17.57
503-4004	Primary Plant Flare	015	V	398.00	3418.00	5.32	15.24	41.15		1.62	1255	18.30
503-5001	74.5 MMBtu/hr Natural Gas Fired Boiler	FU203	V	402.84	3424.88	6.11	11.28	20.38		0.81	420	19.83
503-5001	92 MMBtu/hr Natural Gas Fired Boiler	FU204	V	402.83	3424.87	4.11	11.28	22.86		1.22	464	16.17
503-5003	Glass Furnace	X002	V	397.83	3402.30	3.12	7.62	15.24		0.71	505	13.70
503-5017	34.48 MMBTU/hr boiler	024	V	401.73	3427.73	3.19	12.19	7.01		0.61	480	17.48
503-8010	68 MMBtu/hrBoiler (Z001)	EP1	V	397.70	3403.25	5.12	3.05	10.67		0.91	450	12.94
503-8010	Boiler 8020 (33.5MMBtu/hr)	EP107	V	397.68	3403.24	3.08	3.05	7.62		0.76	505	13.25
503-8010	DeNox system on X059	EP129	V	397.65	3403.14	4.8	3.05	33.53		0.61	687	8.52
503-8010	59 MMBtu/hr Boiler (Z004 - CPU 21)	EP62	V	397.70	3403.26	4.91	3.05	8.72		1.52	516	1.81
503-8010	Baghouse (X060)	EP79	H	397.67	3403.22	24	3.05	30.48		0.61	464	16.17

Attachment 3
Offsite Inventory - NOx 1-Hour

NOx 1-Hour		Stack		UTM Coordinates (km)		Emission Rate	Base Elev.	Stack Ht.	GEP	Diameter	Exit Temp	Exit Velocity
Facility No.	Unit Description	No.	Type**	East	North	(lb/hr)	(m)	(m)	(m)	(m)	ºK	(m/s)
503-8010	Impingement Plate Vent (Z006)	EP83	V	397.62	3403.23	12.54	3.05	21.34		0.88	317	11.54
503-8065	Meltshop Baghouse	001	V	403.50	3423.58	71.4	9.14	53.34		7.62	392	16.56
503-8065	Reheat Furnace	003	V	403.23	3423.49	65.31	9.14	45.72		3.05	1044	17.50
503-8066	Unit 1	001	V	398.80	3402.16	20.20	4.88	60.96		5.85	364.00	19.51
503-2012	Tissue Machines	101B	V	399.69	3400.79	3.30	6.40	28.65		1.05	634	24.10
503-2012	Tissue Machines	103B	V	399.64	3400.79	3.60	7.32	35.36		1.27	430	23.50
503-2012	Tissue Machines	104B	V	399.63	3400.81	5.21	6.40	21.34		0.90	350	28.30
503-0095	845 MMBtu/hr Natural Gas-Fired Walking Beam Reheat Furnace (S-1)	S-1	V	406.62	3447.11	71.82	14.90	66.18		5.08	623	5.16
503-0095	Galvanizing Line 1 Annealing Furnace 1, 110 MMBtu/hr, (S-19)	S-19	V	405.57	3446.12	6.60	14.90	44.99		1.45	573	18.77
503-0095	845 MMBtu/hr Natural Gas Fired Walking Beam Reheat Furnace 2 (S-2)	S-2	V	406.61	3447.09	71.82	14.90	66.18		5.08	623	5.16
503-0095	Galvanizing Line 2 Annealing Furnace 2, 123.8 MMBtu/hr (S20)	S-20	V	405.53	3446.16	7.43	14.90	44.81		1.25	500	16.34
503-0095	Line 3 Annealing Furnace 3, 110 MMBtu/hr (S-21)	S-21	V	405.44	3446.20	6.60	14.90	44.99		1.45	573	17.45
503-0095	Line 4 Annealing Furnace 4 w/ SCR, 120 MMBtu/hr (S-22)	S-22	V	405.43	3446.26	7.20	14.90	45.70		1.25	566	29.20
503-0095	845 MMBtu/hr Natural Gas Fired Walking Beam Reheat Furnace 3 (S-3)	S-3	V	406.59	3447.07	71.82	14.90	66.18		5.08	623	5.16
503-0095	HCl Acid Regeneration Plant: Spray Roaster ARP w/ Scrubbing System (S60)	S-60	V	405.69	3446.63	4.58	14.90	45.72		1.01	358	17.34
503-0095	70.68 MMBtu/hr Batch Annealing Furnace (S63)	S-63	V	405.46	3446.82	6.86	14.90	25.15		5.08	310	1.17
503-0095	331 TPH EAF #1	S-64	V	406.75	3446.70	115.90	14.90	61.00		6.50	391	20.30
503-0095	331 TPH EAF #2	S-68	V	406.76	3446.67	115.90	14.90	61.00		6.50	391	20.30
503-5009	Carbon Disulfide Plant	CS-1	V	402.81	3426.64	3.90	10.67	45.72		1.98	811	12.50

INVENTORY KEYS

INCREMENT TYPE CODE*	
B	**Baseline Source**
C	**Increment Consuming Source**
E	**Increment Expanding Source**

STACK TYPE KEY (Last character in Stack no.)

CODE **	
D	A stack discharging downward, or nearly downward.
F	Fugative emissions, no stack exists.
H	A stack discharging in a horizonal direction.
P	A process vent, not otherwised classified.
R	A building roof vent.
V	A stack with an unobstructed opening discharging in a vertical, or nearly vertical direction.
W	A vertical Stack with a weather cap or similar obstruction in the exhaust stream.

NOx Facility Name

Facility No.	Facility Name	
102-0001	Boise White Paper	
102-S004	Scotch Gulf Lumber-Jackson Facility	
108-0003	BASF Corporation	
108-0012	PowerSouth-McIntosh	
108-0017	Bay Gas Storage Company	
108-0018	AL Power-Washington Cogen	
108-0020	Tate & Lyle Sucralose	
108-0022	Huntsman Advanced Materials	
501-0007	SI Group USA	
502-S003	Swift Lumber-Atmore	
503-0047	Lenzing Fibers	
503-0094	Gulf South Pipeline-Whistler Junction Compressor Station	
503-0106	Outokumpu	
503-1001	AL Power-Barry	
503-2003	Scotch and Gulf Lumber	
503-2022	Hilcorp Energy-Chunchula	
503-3013	Plains Marketing-Mobile Terminal	
503-3028	FL Gas-Mt. Vernon	
503-3031	Transcontinental Gas Pipe Line-Station 83-Citronelle	
503-4003	Vertex Refining Alabama LLC - Saraland Petroleum Refinery	
503-4004	Hilcorp Company-Hatter's Pond	
503-5001	FMC Corporation - Mobile Manufacturing Center	
503-5003	Occidental Chemical Corp-Mobile	
503-5017	Arkema	
503-8010	UOP-Mobile Plant	
503-8065	SSAB Alabama	
503-8066	Mobile Energy-Hog Bayou Energy	
503-2012	Kimberly-Clark	
503-0095	AM/NS Calvert LLC	
503-5009	Nouryon Functional Chemicals LLC - LeMoyne Site	

Attachment 3
Offsite Inventory - NOx Annual

NOx Annual		Stack		Increment	UTM Coordinates (km)		Emission Rate	Base Elev.	Stack Ht.	GEP	Diameter	Exit Temp	Exit Velocity
Facility No.	Unit Description	No.	Type**	Type	East	North	(lb/hr)	(m)	(m)	(m)	(m)	ºK	(m/s)
102-0001	No. 3 Power Boiler	X020	V	C	414.65	3484.23	10.84	13.72	60.96		2.29	427	11.87
102-0001	No. 4 Power Boiler	X025	V	C	414.59	3484.16	12.27	13.72	60.96		1.83	425	18.93
102-0001	No. 5 Power Boiler	X029	V	C	414.55	3484.16	17.00	13.72	60.96		2.13	425	13.91
102-0001	No. 1 Power Boiler	007	V	E	414.62	3484.24	42.70	13.72	18.29		1.68	433	6.82
102-0001	No. 2 Power Boiler	008	V	E	414.62	3484.24	42.70	13.72	18.29		1.98	436	4.56
102-S004	34.841 MMBtu/hr NGF Boiler	007	V	C	414.81	3484.96	3.14	17.98	12.19		0.66	466	14.35
108-0003	No. 7 Boiler	012	V	E	404.45	3461.07	36.20	14.81	14.63		1.52	422	12.13
108-0003	Area 2 Lodyne Surfactants	02EP3	V	E	404.45	3461.07	14.50	14.81	16.76		0.25	357	18.19
108-0003	Boiler #4	118	V	C	404.35	3460.64	8.61	14.81	22.86		1.22	439	10.36
108-0003	Boiler #7	164	V	C	404.45	3461.07	30.35	14.81	18.44		1.17	430	19.40
108-0003	Vent Gas Combuster	IGEP1	V	C	404.27	3461.07	3.00	14.81	39.62		0.91	1255	5.64
108-0003	99.9 MMBTU Temp Boiler	TEMPBOILER	W	C	404.44	3461.07	3.60	16.76	8.38		1.42	455	9.58
108-0003	Area 15 Hazardous Waste Incinerator	15EP1	V	E	404.45	3461.07	15.60	14.81	22.86		1.37	351	12.46
108-0003	Expanders	X118EXPAND	V	E	404.45	3461.07	8.40	14.81	12.19		1.22	604	5.09
108-0012	CAES Unit (Unit 1)	001	V	C	401.94	3458.38	121.80	13.72	27.74		3.06	407	23.59
108-0012	CT - 1 (Unit 2)	002	V	C	401.92	3458.29	97.00	13.72	27.43		6.25	818	28.35
108-0012	CT - 2 (Unit 3)	003	V	C	401.92	3458.27	92.60	13.72	27.43		6.25	818	28.35
108-0012	CT - 3 (Unit 4)	005	V	C	401.87	3458.23	104.70	13.72	27.43		6.40	879	41.22
108-0012	CT -4 (Unit 5)	006	V	C	401.87	3458.19	131.40	13.72	27.43		6.40	879	41.22
108-0017	2,000 Hp Superior Recip. Engine (C-100)	001	V	C	403.50	3458.30	7.92	15.24	6.10		0.46	700	64.19
108-0017	2,000 Hp Superior Recip. Engine (C-101)	002	V	C	403.50	3458.30	7.92	15.24	6.10		0.46	700	64.19
108-0017	4,735 Hp Caterpillar Recip. Engine (C-201)	003	V	C	403.50	3458.30	7.32	15.24	12.04		0.76	727	32.11
108-0017	4,735 Hp Caterpillar Recip. Engine (C-202)	004	V	C	403.50	3458.30	7.32	15.24	12.04		0.76	727	32.11
108-0017	4,735 Hp Caterpillar Recip. Engine w/ Catalytic Converter (C-200)	005	V	C	403.50	3458.30	7.32	15.24	12.04		0.76	727	32.11
108-0017	4,735 Hp Caterpillar Recip. Engine w/ catalytic converter (C-7400)	006	V	C	403.50	3458.30	3.94	15.24	12.04		0.76	816	32.11
108-0018	CT and Duct Burner	001	V	C	404.54	3459.32	64.20	13.11	30.78		4.65	454	26.77
108-0018	274 MMBTU/hr Boiler	002	V	C	404.53	3459.26	7.10	13.11	18.29		1.52	422	18.08
108-0018	184 MMBTU/hr Boiler	004	V	C	404.53	3459.29	7.80	13.11	18.29		1.83	436	9.16
108-0018	184 MMBTU/hr Boiler	006	V	C	404.53	3459.29	7.10	13.11	18.29		1.83	422	15.26
108-0020	Boiler A	001	V	C	403.28	3457.85	5.53	15.24	12.50		1.22	376	21.79
108-0020	Boiler B	002	V	C	403.26	3457.82	5.53	15.24	13.11		1.22	355	21.79
108-0020	Thermal Oxidizer	022	V	C	403.46	3457.88	4.03	14.94	24.69		0.91	511	3.02
108-0020	Boiler C	033	V	C	403.30	3457.78	5.53	15.24	12.19		1.22	355	21.79
108-0022	Area 12/19 Thermal Oxidizer with Tail Gas Scrubber	19EP34	V	C	404.70	3460.88	16.2	16.18	15.24		0.61	350	6.25
501-0007	Vent System	002	V	C	417.62	3413.99	20.2	45.72	6.10		0.71	922	2.02
502-S003	23.25 MMBtu/hr Boiler (No. 4)	001	V	C	451.13	3433.34	5.12	82.91	12.19		0.76	477	11.38
502-S003	29.5 MMBtu/hr Wood Waste Boiler with Multiclone (No. 5)	015	V	C	451.14	3433.32	6.49	82.91	10.67		0.76	451	14.51
503-0047	95.0 MMBTU/hr Boiler	55-B	V	C	402.20	3425.83	3.7	13.41	17.83		1.52	477	10.11
503-0047	100.0 MMBTU/hr Natural Gas Fired Boiler	55-C	V	C	402.20	3425.82	4.6	13.41	17.83		1.52	477	10.11
503-0047	238 MMBtu/hr Natural Gas Fired Boiler (No. 4)	ST02	V	C	402.40	3425.80	9.52	13.41	40.00		1.52	450	12.13
503-0047	238 MMBtu/hr Natural Gas Fired Boiler (No. 5)	ST03	V	C	402.38	3425.80	9.52	13.41	40.00		1.52	450	12.13
503-1001	Common 1, 2	001	V	E	403.33	3430.73	1177.90	6.40		#####	7.82	422	8.56
503-1001	Unit 4	004	V	C	403.46	3430.82	1448.10	6.40		#####	4.17	418	41.45
503-1001	Unit 5	005	V	C	403.71	3430.76	688.50	6.71		#####	9.45	331	18.29
503-1001	CT/DB 6A	007	V	C	402.65	3430.17	5.50	7.62	36.88		5.12	361	24.81
503-1001	CT/DB 6B	008	V	C	402.66	3430.14	19.20	7.62	36.88		5.12	361	24.81
503-1001	CT/DB 7A	009	V	C	402.62	3430.31	22.20	7.62	36.88		5.12	361	24.81
503-1001	CT/DB 7B	010	V	C	402.63	3430.28	20.90	7.62	36.88		5.12	361	24.81
503-1001	Auxiliary Package Boiler for Unit 5 Startup	005AUX	V	C	403.83	3430.78	20.90	6.40	24.38		1.52	422	21.20
503-2003	93 MMBtu/hr Gas Boiler	002	V	E	397.52	3399.45	8.86	3.96	15.24		1.12	547	16.47
503-3013	Diesel Cargo Pump Engine 1	P-1	V	C	399.97	3400.00	4.1013	9.14	2.13		0.10	524.82	12.49680
503-3013	Diesel Cargo Pump Engine 2	P-2	V	C	399.90	3399.90	4.1013	9.14	2.13		0.10	524.82	12.49680
503-3028	2,700 HP Cooper Recip Engine (Engine 1106)	006	V	C	403.43	3443.02	2.82	12.96	15.24		0.64	561	27.22
503-3028	15,000 HP Solar Turbine w/SoLoNOx Combustors (Engine 1107)	007	V	C	403.43	3442.87	7.93	13.07	18.29		2.29	756	17.29
503-3028	15,000 HP Solar Turbine w/SoLoNOx Combustors (Engine 1108)	008	V	C	403.45	3442.87	6.17	12.92	18.29		2.29	760	17.29
503-3028	15,700 HP Pignone Combustion Turbine (Engine 1109)	009	V	C	403.48	3442.87	7.94	12.69	18.75		2.19	760	18.96
503-3031	16,834 Hp Turbine w/SoLoNOx	X002	V	C	374.11	3439.47	5.14	83.82	13.00		2.59	765	17.52
503-4004	1642 BHP Inlet Compressor Engine - Waukesha [1642W]	009	V	C	397.93	3418.24	4.57	15.24	7.92		0.46	950	22.09
503-4004	Primary Plant Flare	015	V	C	398.00	3418.00	5.32	15.24	41.15		1.62	1255	18.30
503-4004	2600 BHP Inj Compressor Engine - West Ingersoll [2600IR-B]	006	V	E	398.09	3418.08	12.61	12.04	9.14		0.61	811	29.05
503-4005	93 MMBtu/Hr Gas Boiler - A	25-301A	V	E	388.45	3424.55	9.12	51.82	9.14		1.07	561	13.08
503-4005	600 Bhp RIC Gas Engine - Cooper- Bessemer - Inlet Comp A	42-101A	V	E	388.33	3424.45	12.11	51.82	7.62		0.46	700	5.93
503-4005	600 Bhp RIC Gas Engine - Cooper- Bessemer - Inlet Comp B	42-101B	V	E	388.33	3424.48	13.52	51.82	7.62		0.46	700	5.93
503-4005	600 Bhp RIC Gas Engine - Cooper- Bessemer - Inlet Comp C	42-101C	V	E	388.33	3424.48	12.15	51.82	7.62		0.46	700	5.93
503-4005	2500 Bhp RIC Gas Engine - Ingersoll-Rand - Ref Comp A	42-401A	V	E	388.46	3424.45	21.66	51.82	12.50		0.61	655	13.01
503-4005	2500 BHP RIC Gas Engine - Ingersoll-Rand - Ref Comp B	42-401B	V	E	388.46	3424.44	36.86	51.82	12.50		0.61	655	13.01
503-4005	2500 Bhp RIC Gas Engine - Ingersoll-Rand -Inj Comp A	42-801A	V	E	388.46	3424.43	27.45	51.82	12.19		0.61	672	13.34
503-4005	2500 BHP RIC Gas Engine - Ingersoll-Rand - Inj Comp B	42-801B	V	E	388.46	3424.42	19.26	51.82	12.19		0.61	672	13.34
503-4005	2500 BHP RIC Gas Engine - Ingersoll-Rand - Inj Comp C	42-801C	V	E	388.50	3424.35	44.20	51.82	11.28		0.61	659	23.77
503-4005	2500 BHP RIC Gas Engine - Ingersoll-Rand - Inj Comp D	42-801D	V	E	388.50	3424.35	44.20	51.82	11.28		0.61	624	23.77
503-4005	1200 Bhp Turbine Gas Engine - Solar Turbine - Gen A	43-501A	V	E	388.50	3424.35	3.07	51.82	8.84		0.69	444	19.56
503-4005	1200 Bhp Turbine Gas Engine - Solar Turbine - Gen B	43-501B	V	E	388.50	3424.35	3.07	51.82	8.84		0.69	444	19.56
503-4007	40.00 MMBtu/hr NG-fired Boiler - South Terminal	B102	V	E	399.50	3402.50	7.51	1.83	6.40		0.41	450	15.16
503-4007	38.00 MMBtu/hr - South Fractionator Heater	H100	V	E	399.50	3402.50	3.80	1.83	26.64		1.37	570	4.90
503-4007	38.00 MMBtu/hr - North Fractionator Heater	H200	V	E	399.50	3402.50	3.80	1.83	27.43		1.37	570	4.90
503-4007	48.00 MMBtu/hr - Vacuum Charge Heater	H301	V	E	399.50	3402.50	4.80	1.83	30.54		1.60	600	5.44
503-5001	74.5 MMBtu/hr Natural Gas Fired Boiler	FU203	V	C	402.84	3424.88	6.11	11.28	20.38		0.81	420	19.83
503-5002	Z001 40 MMBtu/hr Boiler	001	V	E	402.64	3425.67	5.72	13.41	12.19		1.01	586	8.28
503-5002	Z002 40 MMBtu/hr Boiler	002	V	E	402.64	3425.67	5.72	13.41	12.19		1.01	586	8.28
503-5002	Z003 40 MMBtu/hr Boiler	003	V	E	402.64	3425.67	5.72	13.41	12.19		1.01	586	8.28
503-5002	Z004 55 MMBtu/hr Boiler	004	V	E	402.64	3425.67	7.86	13.41	12.19		0.99	586	13.72
503-5002	Z005 55 MMBtu/hr Boiler	005	V	E	402.64	3425.67	7.86	13.41	12.19		0.99	586	13.72
503-5002	Z006 55 MMBtu/hr Boiler	006	V	E	402.64	3425.67	7.86	13.41	12.19		0.99	586	13.72
503-5002	Z007 97 MMBtu/hr Boiler	007	V	E	402.64	3425.67	13.86	13.41	15.24		1.22	436	10.99
503-5002	Z008 97 MMBtu/hr Boiler	008	V	E	402.64	3425.67	13.86	13.41	15.24		1.22	436	10.99
503-5002	Z011 140 MMBtu/hr Boiler	011	V	E	402.64	3425.67	37.30	13.41	9.14		1.37	433	13.55
503-5002	Rayon	R403	V	E	402.64	3425.67	6.72	13.41	10.36		0.91	300	11.14
503-5003	Glass Furnace	X002	V	C	397.83	3402.30	3.12	7.62	15.24		0.71	505	13.70

Attachment 3
Offsite Inventory - NOx Annual

NOx Annual		Stack		Increment	UTM Coordinates (km)		Emission Rate	Base Elev.	Stack Ht.	GEP	Diameter	Exit Temp	Exit Velocity
Facility No.	Unit Description	No.	Type**	Type	East	North	(lb/hr)	(m)	(m)	(m)	(m)	ºK	(m/s)
503-5017	34.48 MMBTU/hr boiler	024	V	C	401.73	3427.73	3.19	12.19	7.01		0.61	480	17.48
503-8010	Boiler 8020 (33.5MMBtu/hr)	EP107	V	C	397.68	3403.24	3.08	3.05	7.62		0.76	505	13.25
503-8010	DeNox system on X059	EP129	V	C	397.65	3403.14	4.8	3.05	33.53		0.61	687	8.52
503-8010	59 MMBtu/hr Boiler (Z004 - CPU 21)	EP62	V	C	397.70	3403.26	4.91	3.05	8.72		1.52	516	1.81
503-8010	Baghouse (X060)	EP79	H	C	397.67	3403.22	24	3.05	30.48		0.61	464	16.17
503-8010	Impingement Plate Vent (Z006)	EP83	V	C	397.62	3403.23	12.54	3.05	21.34		0.88	317	11.54
503-8065	Meltshop Baghouse	001	V	C	403.50	3423.58	71.4	9.14	53.34		7.62	392	16.56
503-8065	Reheat Furnace	003	V	C	403.23	3423.49	65.31	9.14	45.72		3.05	1044	17.50
503-8066	Unit 1	001	V	C	398.80	3402.16	20.20	4.88	60.96		5.85	364.00	19.51
503-0095	845 MMBtu/hr Natural Gas-Fired Walking Beam Reheat Furnace (S-1)	S-1	V	C	406.62	3447.11	71.82	14.90	66.18		5.08	623	5.16
503-0095	Galvanizing Line 1 Annealing Furnace 1, 110 MMBtu/hr, (S-19)	S-19	V	C	405.57	3446.12	6.60	14.90	44.99		1.45	573	18.77
503-0095	845 MMBtu/hr Natural Gas Fired Walking Beam Reheat Furnace 2 (S-2)	S-2	V	C	406.61	3447.09	71.82	14.90	66.18		5.08	623	5.16
503-0095	Galvanizing Line 2 Annealing Furnace 2, 123.8 MMBtu/hr (S20)	S-20	V	C	405.53	3446.16	7.43	14.90	44.81		1.25	500	16.34
503-0095	Line 3 Annealing Furnace 3, 110 MMBtu/hr (S-21)	S-21	V	C	405.44	3446.20	6.60	14.90	44.99		1.45	573	17.45
503-0095	Line 4 Annealing Furnace 4 w/ SCR, 120 MMBtu/hr (S-22)	S-22	V	C	405.43	3446.26	7.20	14.90	45.70		1.25	566	29.20
503-0095	845 MMBtu/hr Natural Gas Fired Walking Beam Reheat Furnace 3 (S-3)	S-3	V	C	406.59	3447.07	71.82	14.90	66.18		5.08	623	5.16
503-0095	HCl Acid Regeneration Plant: Spray Roaster ARP w/ Scrubbing System (S60)	S-60	V	C	405.69	3446.63	4.58	14.90	45.72		1.01	358	17.34
503-0095	70.68 MMBtu/hr Batch Annealing Furnace (S63)	S-63	V	C	405.46	3446.82	6.86	14.90	25.15		5.08	310	1.17
503-0095	331 TPH EAF #1	S-64	V	C	406.75	3446.70	115.90	14.90	61.00		6.50	391	20.30
503-0095	331 TPH EAF #2	S-68	V	C	406.76	3446.67	115.90	14.90	61.00		6.50	391	20.30

INVENTORY KEYS

INCREMENT TYPE CODE*	
B	**Baseline Source**
C	**Increment Consuming Source**
E	**Increment Expanding Source**

STACK TYPE KEY (Last character in Stack no.)

CODE **	
D	A stack discharging downward, or nearly downward.
F	Fugative emissions, no stack exists.
H	A stack discharging in a horizonal direction.
P	A process vent, not otherwised classified.
R	A building roof vent.
V	A stack with an unobstructed opening discharging in a vertical, or nearly vertical direction.
W	A vertical Stack with a weather cap or similar obstruction in the exhaust stream.

NOx Facility Name

Facility No.	Facility Name	
102-0001	Boise White Paper	
102-S004	Scotch Gulf Lumber-Jackson Facility	
108-0003	BASF Corporation	
108-0012	PowerSouth-McIntosh	
108-0017	Bay Gas Storage Company	
108-0018	AL Power-Washington Cogen	
108-0020	Tate & Lyle Sucralose	
108-0022	Huntsman Advanced Materials	
501-0007	SI Group USA	
502-S003	Swift Lumber-Atmore	
503-0047	Lenzing Fibers	
503-1001	AL Power-Barry	
503-2003	Scotch and Gulf Lumber	
503-3013	Plains Marketing-Mobile Terminal	
503-3028	FL Gas-Mt. Vernon	
503-3031	Transcontinental Gas Pipe Line-Station 83-Citronelle	
503-4004	Hilcorp Company-Hatter's Pond	
503-4005	Hilcorp Energy Company - Annie Hill 8-10 Tank Battery	
503-4007	Center Point Terminal Chickasaw, LLC - Chickasaw Terminal	
503-5001	FMC Corporation - Mobile Manufacturing Center	
503-5002	Acordis Cellulosic Fibers, Inc.	
503-5003	Occidental Chemical Corp-Mobile	
503-5017	Arkema	
503-8010	UOP-Mobile Plant	
503-8065	SSAB Alabama	
503-8066	Mobile Energy-Hog Bayou Energy	
503-0095	AM/NS Calvert LLC	

Attachment 3
Offsite Inventory - PM2.5

PM2.5		Stack		Increment	UTM Coordinates (km)		Emission Rate	Base Elev.	Stack Ht.	GEP	Diameter	Exit Temp	Exit Velocity
Facility No.	Unit Description	No.	Type**	Type	East	North	(lb/hr)	(m)	(m)	(m)	(m)	ºK	(m/s)
503-5017	D-200 Dryer Unit	IM-1	V	B	401.45	3427.57	10.8	14.02	36.88		1.14	347	26.68
503-5017	Durastrength Dryer B	IM-2	V	B	401.49	3427.58	10.4	14.02	38.71		1.18	358	31.79
503-5017	Metablen II Unit	IM-3	V	B	401.47	3427.58	3.55	14.02	42.67		1.19	339	21.63
503-5017	Metablen I Unit	IM-4	V	E	401.70	3427.69	5.25	13.72	37.00		0.81	325	28.50
503-5017	Tga Unit Process	TGA8	V	E	401.70	3427.69	7.7	13.72	18.29		0.30	294	3.04
102-0001	No. 2 Recovery Furnace	A11	V	B	414.62	3484.25	20.75	13.72		85.72	2.29	454	16.76
102-0001	No. 2 Recovery Furnace	B11	V	B	414.62	3484.24	20.75	13.72		85.72	2.29	454	16.76
102-0001	No. 5 Power Boiler	X029	V	B	414.55	3484.16	4.52	13.72	60.96		2.13	425	13.91
102-0001	No. 1 Lime Kiln	Z003	V	B	414.70	3484.18	10.81	13.72	42.06		1.07	350	14.14
102-0001	No. 2 Smelt Tank	Z012	V	B	414.67	3484.24	12.69	13.72	64.92		1.52	345	7.25
102-0001	Combination Fuel Boiler	Z013	V	B	414.65	3484.27	119.10	13.72		64.92	2.44	337	16.27
108-0001	Merged Units	CS4	V	E	413.64	3484.17	52.06	12.50		126.49	5.55	327	14.35
108-0001	Boiler #3	MS3	V	E	413.51	3484.13	38.25	11.46		121.62	5.03	327	17.46
108-0012	CAES Turbine (Unit 1)	001	V	B	401.94	3458.38	3.50	13.72		64.92	3.06	407	23.59
108-0012	Simple Cycle CT - 1 (Unit 2)	002	V	B	401.92	3458.29	25.20	13.72	27.43		6.25	818	28.35
108-0012	Simple Cycle CT - 2 (Unit 3)	003	V	B	401.92	3458.27	25.20	13.72	27.43		6.25	818	28.35
108-0012	Simple Cycle CT - 3 (Unit 4)	005	V	B	401.87	3458.23	10.70	13.72	27.43		6.40	879	41.22
108-0012	Simple Cycle CT - 4 (Unit 5)	006	V	B	401.87	3458.19	11.80	13.72	27.43		6.40	879	41.22
108-0018	Combustion Turbine with Duct Burner	001	V	B	404.54	3459.32	5.00	13.11	30.78		4.65	454	26.77
503-1001	Merged Units	001	V	B	403.33	3430.73	3.62	6.40		153.92	7.82	422	8.56
503-1001	Unit Number Three	001	V	E	403.33	3430.73	17.4	6.40		153.92	7.82	422	8.56
503-1001	Unit Number Four Power Boiler	004	V	B	403.45	3430.82	14.30	6.40		182.88	4.17	421	41.34
503-1001	Unit Number Five	005	V	B	403.71	3430.76	146.77	6.71		182.88	9.45	331	18.29
503-1001	CT/DB 6A	007	V	B	402.65	3430.17	32.40	7.62	36.88		5.12	357	24.81
503-1001	CT/DB 6B	008	V	B	402.66	3430.14	32.40	7.62	36.88		5.12	357	24.81
503-1001	CT/DB 7A	009	V	B	402.62	3430.31	32.40	7.62	36.88		5.12	357	24.81
503-1001	CT/DB 7B	010	V	B	402.63	3430.28	32.40	7.62	36.88		5.12	357	24.81
503-1001	Unit 8	012	V	C	402.50	3429.76	21.51	7.62	54.86		7.01	355	21.09
503-1001	Unit 9	013	V	C	402.62	3429.63	21.51	7.62	54.86		7.01	355	21.09
503-2021	Merged Units	003	V	E	399.61	3401.05	177.20	3.96		140.60	5.64	467	16.76
503-2021	No. 8 Recovery Furnace	006	V	E	399.58	3401.10	6.31	3.96		65.00	3.20	477	22.00
503-2021	No. 6 Power Boiler	002	V	E	399.60	3400.85	31.5	4.57	60.35		2.87	340	12.02
503-0095	845 MMBtu/hr Natural Gas-Fired Walking Beam Reheat Furnace (S-1)	S-1	V	B	406.62	3447.11	6.29	14.90		65.00	5.08	623	5.16
503-0095	Tandem Mill w/ Mist Eliminator (S-12)	S-12	V	B	405.46	3446.82	7.57	14.90	33.49		3.00	303	14.54
503-0095	845 MMBtu/hr Natural Gas Fired Walking Beam Reheat Furnace 2 (S-2)	S-2	V	B	406.61	3447.09	6.29	14.90		65.00	5.08	623	5.16
503-0095	845 MMBtu/hr Natural Gas Fired Walking Beam Reheat Furnace 3 (S-3)	S-3	V	B	406.59	3447.07	6.29	14.90		65.00	5.08	623	5.16
503-0095	Finishing Mill w/ Wet Scrubber (S-5)	S-5	V	B	405.46	3446.82	7.06	14.90	29.99		2.00	313	17.68
503-0095	Processor and Stretcher/Leveler w/ Baghouse (S-6)	S-6	V	B	405.46	3446.82	3.76	14.90	31.99		1.30	303	18.82
503-0095	331 TPH EAF #1	S-64	V	C	406.75	3446.70	62.05	14.90	61.00		6.50	391	20.30
503-0095	Continuous Caster #1 Contact Steam	S-65	V	C	406.87	3446.97	3.44	14.90	40.58		1.42	333	42.28
503-0095	331 TPH EAF #2	S-68	V	C	406.76	3446.67	62.05	14.90	61.00		6.50	391	20.30
503-0095	Continuous Caster #2 Contact Steam	S-69	V	C	406.83	3447.01	3.44	14.90	40.58		1.42	336	42.28
503-0095	Processor and Stretcher/Leveler w/ Baghouse (S-7)	S-7	V	B	405.46	3446.82	3.76	14.90	31.99		1.30	303	18.82
503-0129	HCL Steel Pickling Line w/ Wet Scrubber & Mist Eliminator (S-2)	S-2	V	C	404.32	3444.93	3.10	13.72	23.77		0.76	330	10.77
108-0003	Area 15 Hazardous Waste Incinerator	15EP1	V	E	404.45	3461.07	8.10	14.81	22.86		1.37	351	12.46
108-0008	Z008 249 MMBtu/hr Coal Fi	008	V	E	404.00	3458.50	3.20	15.24	45.72		1.55	429	21.40

INVENTORY KEYS

INCREMENT TYPE CODE*	
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STACK TYPE KEY (Last character in Stack no.)

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D	A stack discharging downward, or nearly downward.
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P	A process vent, not otherwised classified.
R	A building roof vent.
V	A stack with an unobstructed opening discharging in a vertical, or nearly vertical direction.
W	A vertical Stack with a weather cap or similar obstruction in the exhaust stream.

NOx Facility Name

Facility No.	Facility Name	
503-5017	Arkema Inc	
102-0001	Boise White Paper, LLC	
108-0001	PowerSouth Energy Cooperative Inc - Lowman	
108-0012	PowerSouth Energy Cooperative Inc - McIntosh	
108-0018	Alabama Power Company - Washington County Cogen	
503-1001	Alabama Power Company - Barry	
503-2021	Mobile Energy Services Company	
503-0095	AM/NS Calvert LLC	
503-0129	Steel Warehouse Company, LLC. - Steel Warehouse Company	
108-0003	BASF Corporation	
108-0008	Olin Chemical Corporation	

ATTACHMENT 4 – AIR DISPERSION MODELING FILES

APPENDIX F

PROPOSED COMPLIANCE ASSURANCE MONITORING

Prevention of Significant Deterioration Application

Outokumpu Stainless USA, LLC
1 Steel Drive
Calvert, Mobile County, Alabama

September 2023

Contents

Introduction

Under 40 CFR Part 64, compliance assurance monitoring (CAM), facilities are required to prepare and submit monitoring plans for certain emission units. The CAM plans provide an on-going and reasonable assurance of compliance with emission limits. Under the general applicability criteria, this regulation applies only to emission units that are subject to an emission limitation or standard (other than an emissions limit or standard exempt under 40 CFR §64.3(b)), and that use a control device to achieve compliance with such emission limit or standard, and whose pre-controlled emission levels exceed the major source thresholds under the Title V permitting program.

Several pieces of equipment proposed in the pending PSD application will require controls to comply with emission limits established under the PSD and Title V permitting programs and have pre-control emission levels that exceed the Title V major source thresholds of 100 tpy for any criteria pollutant or 10 tpy for any hazardous air pollutant (HAP). This CAM plan addresses the monitoring approach, performance indicators, and rationale for selecting the performance indicators and their ranges to verify compliance with the proposed emission limits for the sources in Table 1.

Table 1 – Units Subject to CAM

Unit ID	Control Type	Pollutant Controlled
LA25	Wet Electrostatic Precipitator (WESP)	Particulate Matter
LA45	Baghouse	Particulate Matter
LA47	Scrubber	Hydrogen Fluoride
LA47	Selective Catalytic Reduction (SCR)	Nitrogen Oxides (NOx)
LA71	Baghouse	Particulate Matter
LA72	SCR	NOx
LO51	Mist Eliminator	Particulate Matter

LA25 – Wet Electrostatic Precipitator (WESP)

MONITORING APPROACH

Monitoring of the WESP for compliance is accomplished by:

1. Monitoring voltage;
2. Performing routine inspections and preventative maintenance; and
3. Monitoring visible emissions.

RATIONALE FOR SELECTION OF PERFORMANCE INDICATORS

The rationale for the selection of performance indicators associated with the above monitoring is as follows:

1. Monitoring voltage was selected as a performance indicator because the WESP operates by creating an electric discharge in the flue gas, ionizing the air, and adding a negative charge to the particulate matter. This particulate matter adheres to the electrodes within the WESP and is removed from the flue gas as the gas passes through. A minimum voltage is required to demonstrate that the WESP is successfully operating.
2. Inspection and preventative maintenance was selected as a performance indicator. Qualified maintenance personnel will conduct the inspections and preventative maintenance in accordance with work practices and procedures.
3. Monitoring of visible emissions was selected as a performance indicator because opacity is a good indicator of proper operation and maintenance of the WESP. When the WESP is operating optimally, there will be no visible emissions. In general, an increase in visible emissions indicates reduced performance of the WESP. The emission unit has an opacity standard of less than 10 percent.

RATIONALE FOR SELECTION OF INDICATORS RANGES

The rationale for the selection of the indicator ranges associated with the performance indicators above is as follows:

1. The indicator range for voltage will be based on the level recommended by the manufacturer.
2. The indicator range for maintenance and inspection will be based on scheduling and work practices and procedures.
3. The indicator range for opacity will be based on a 6-minute average opacity of less than 10 percent. This indicator range was selected based on AAC 335-3-14-.04 and because an increase in visible emissions is indicative of an increase in particulate emissions

CAM Plan for LA25 - Wet Electrostatic Precipitator (WESP)			
	Indicator 1	**Indicator 2**	**Indicator 3**
I. **Indicator**	Voltage	Inspection/Maintenance	Opacity
Measurement Approach	The WESP voltage will be measured using the WESP controller.	Semi-annual inspections and applicable maintenance according to work practices and procedures.	A visual check for emissions will be performed at least once per day. These checks will be performed by a person familiar with EPA Method 22. If visible emissions are detected, follow up with observation using EPA Reference Method 9.
II. Indicator Range	An excursion is defined as a 3-hr block average below the minimum required voltage.	Excursions are defined as both not conducting semiannual inspections properly and not performing maintenance according to work practices and procedures.	An excursion is defined as the presence of visible emissions greater than 10% opacity. Excursions trigger an inspection, corrective action, and reporting requirement.
III. Performance Criteria			
A. Data Representativeness	The voltage will be measured using the instrumentation provided with the WESP.	Inspections will be performed on the WESP.	Visual inspection logs will be maintained by environmental department.
B. Verification of Operation Status	Not Applicable	Not Applicable	Not Applicable
C. QA/QC Practices and Criteria	Controller will develop and implement a periodic performance check system.	Qualified personnel will perform inspections and maintenance in accordance with manufacturer recommendations.	Use of a trained visible emission observer.
D. Monitoring Frequency	At least once every 15 minutes	Semi-annual inspections and preventative maintenance conducted as needed.	Daily
E. Data Collection Procedures	The voltage will be recorded with date and time.	Records are maintained to document inspections and required maintenance.	Daily visual observations of opacity are recorded on V.E. Form.
F. Averaging Period	3-hr block average	Not Applicable	6-minute average (Method 9)

LA45 – Baghouse

MONITORING APPROACH

Monitoring of the baghouse for compliance is accomplished by:

1. Monitoring differential pressure;
2. Monitoring visible emissions;
3. Performing routine inspections and preventative maintenance.

RATIONALE FOR SELECTION OF PERFORMANCE INDICATORS

The rationale for the selection of performance indicators associated with the above monitoring is as follows:

1. Monitoring differential pressure (or "pressure drop") provides a means of detecting a change in operation that could lead to an increase in emissions. In general, baghouses are designed to operate at a relatively constant pressure drop. An increase in pressure drop could indicate infrequent cleaning cycles, damaged cleaning equipment, blinded bags, or increased airflow. Decreases in pressure drop may indicate significant holes or tears or missing bags. A pressure drop across the baghouse also serves to indicate that there is airflow through the control device. Pressure drop through the baghouse is monitored continuously using a differential pressure gauge. The pressure drop is measured between the material side and the clean side of the filter bags. The indicator range for the baghouse pressure drop is defined by the manufacturer and is applicable when the compartment is in service.
2. A visible emission (opacity) is indicative of good operation and maintenance of the baghouse. When the baghouse is operating optimally, there are little visible emissions from the exhaust. n general, an increase in visible emissions indicates reduced performance of the baghouse (i.e., loose or torn bags). Visual observations using USEPA Reference Method 22 are performed daily. Upon observation of visible emissions, an observation using USEPA Method 9 will be conducted to determine opacity. These emission units have an opacity standard of 10 percent.
3. Inspection and preventative maintenance was selected as a performance indicator. Qualified maintenance personnel will conduct the inspections and preventative maintenance in accordance with work practices and procedures.

RATIONALE FOR SELECTION OF INDICATORS RANGES

The rationale for the selection of the indicator ranges associated with the performance indicators above is as follows:

1. The indicator range for differential pressure will be based on the range recommended by the manufacturer.
2. The indicator range for opacity will be based on a 6-minute average opacity of less than 10 percent. This indicator range was selected based on AAC 335-3-14-.04 and because an increase in visible emissions is indicative of an increase in particulate emissions.
3. The indicator range for maintenance and inspection will be based on best work practices and procedures.

CAM Plan for LA45 - Baghouse			
	Indicator 1a	**Indicator 1b** *(To be used when Indicator 1a is unavailable)*	**Indicator 2**
I. Indicator	Differential Pressure	Opacity	Bag Condition
Measurement Approach	Continuous monitoring of pressure drop across the baghouse using differential pressure gauge	EPA Reference Method 22, if visible emissions are detected, follow up with EPA Reference Method 9	Visual Inspection
II. Indicator Range	As specified by the manufacturer	An excursion is defined as the presence of visible emissions greater than 10% opacity. Excursions trigger an inspection, corrective action, and reporting requirement.	Bag deterioration
Ill. Performance Criteria			
A. Data Representativeness	Not Applicable	Not Applicable	Baghouse and bags to be maintained per manufacturer specification.
B. Verification of Operation Status	Not Applicable	Not Applicable	Not Applicable
C. QA/QC Practices and Criteria	Trained personnel perform inspections and maintenance.	Use of a trained visible emission observer.	Trained personnel perform inspections and maintenance.
D. Monitoring Frequency	Continuous	Daily	As determined by trained personnel
E. Data Collection Procedures	Remote monitoring to electronic data collection system	Daily visual observations of opacity are recorded on visible emissions observation form.	Not Applicable
F. Averaging Period	Not Applicable	6-minute average (Method 9)	Not Applicable

LA47 – Scrubber

MONITORING APPROACH

Monitoring of the wet scrubber for compliance is accomplished by:

1. Monitoring makeup water flow rate, and
2. Monitoring recirculation water flow rate.

RATIONALE FOR SELECTION OF PERFORMANCE INDICATORS

To achieve the required emission reduction, a minimum water flow rate must be supplied to absorb the given amount of pollutant in the gas stream. The liquid to gas (L/G) ratio is a key operating parameter for a scrubber. If the L/G ratio decreases below the minimum, sufficient mass transfer of the pollutant from the gas phase will not occur. Maintaining the minimum liquid flow, even during periods of reduced gas flow will ensure the required L/G ratio is achieved at all times.

Because this particular unit is capable of recirculating a portion of the scrubbing material (water), both the makeup water and the recirculating water flow rates must be tuned to achieve the appropriate L/G ratio.

RATIONALE FOR SELECTION OF INDICATORS RANGES

The minimum liquid flow for makeup water and recirculation water required to maintain the proper L/G ratio at the maximum gas flow and vapor loading through the scrubber will be determined by the manufacturer as part of the unit's commissioning.

CAM Plan for LA47 - Prescrubber		
	Indicator 1	**Indicator 2**
I. **Indicator**	Makeup Water Flow Rate	Recirculation Water Flow Rate
Measurement Approach	The makeup water flow rate will be continuously monitored using prescrubber controller.	The recirculation water flow rate will be continuously monitored using prescrubber controller.
II. Indicator Range	An excursion is defined as a 3-hr rolling average below the minimum required makeup water flow rate as specified by the manufacturer. An excursion triggers corrective action within 2 hours.	An excursion is defined as a 3-hr rolling average below the minimum required recirculation water flow rate as specified by the manufacturer. An excursion triggers corrective action within 2 hours.
III. Performance Criteria		
A. Data Representativeness	The makeup water flow rate will be measured using a flow meter provided with the prescrubber.	The recirculation water flow rate will be measured using a flow meter provided with the prescrubber.
B. Verification of Operation Status	Not Applicable	Not Applicable
C. QA/QC Practices and Criteria	Controller will develop and implement a periodic performance check system.	Controller will develop and implement a periodic performance check system.
D. Monitoring Frequency	At least once every 15 minutes	At least once every 15 minutes
E. Data Collection Procedures	The makeup water flow rate will be recorded with date and time.	The recirculation water flow rate will be recorded with date and time.
F. Averaging Period	3-hr rolling average	3-hr rolling average

LA47 – Selective Catalytic Reduction

MONITORING APPROACH

Monitoring of the SCR system for compliance is accomplished by:

1. Monitoring outlet NO_X concentration via continuous emissions monitoring system (CEMS), and
2. Monitoring NO_X emissions via annual performance testing.

RATIONALE FOR SELECTION OF PERFORMANCE INDICATORS

Direct monitoring of the pollutant targeted for the SCR system (NO_X) is the best performance indicator of NO_X removal. A CEMS will be installed to monitor the NO_X concentration in the SCR's outlet exhaust steam. Outlet NO_X concentration is used in conjunction with the flue gas flow rate to determine the controlled mass emission rate of the source. In addition, a performance stack test will be conducted in accordance with USEPA Reference Method 7E to directly measure NO_X emissions from the SCR exhaust stack every 12 months.

RATIONALE FOR SELECTION OF INDICATORS RANGES

The rationale for the selection of the indicator ranges associated with the performance indicators above is as follows:

1. The indicator range for the CEMS will be set at 80 ppmvd on a 1-hour average.
2. The indicator range for the stack test will be set at 100 ppmvd in accordance with the testing provisions of USEPA Reference Method 7E.

CAM Plan for LA47 - DeNOx SCR		
	Indicator 1	**Indicator 2**
I. Indicator	NOx Emissions	NOx Emissions
Measurement Approach	CEMS	EPA Reference Method 7E
II. Indicator Range	While the unit is operating, an excursion is defined as a NOx concentration exceeding 80 ppmvd on a 1-hour average. Excursions trigger an inspection, corrective action, and a reporting requirement.	An excursion is defined as a NOx measured emissions greater than 100 ppmvd and 5.74 lb/hr. Excursions trigger an inspection, corrective action, and a reporting requirement.
III. Performance Criteria		
A. Data Representativeness	Measurement is being made inside the exhaust of the DeNOx system.	Measurement is being made at the emission point (DeNox exhaust).
B. Verification of Operation Status	Not Applicable	Record stack flow rate during the stack test.
C. QA/QC Practices and Criteria	The CEMs will be operated in accordance with 40 CFR part 60, Appendix B, performance specifications.	The test team will be familiar with Reference method 7E.
D. Monitoring Frequency	Continuous.	At least once every 12 months.
E. Data Collection Procedures	The pressure differential will be recorded with date and time.	The stack test will be documented with date and name of the people conducting the test
F. Averaging Period	1-hour	In accordance with EPA Reference Method 7E.

LA71 – Baghouse

MONITORING APPROACH

Monitoring of the baghouse for compliance is accomplished by:

1. Monitoring differential pressure;
2. Monitoring visible emissions;
3. Performing routine inspections and preventative maintenance.

RATIONALE FOR SELECTION OF PERFORMANCE INDICATORS

The rationale for the selection of performance indicators associated with the above monitoring is as follows:

1. Monitoring differential pressure (or "pressure drop") provides a means of detecting a change in operation that could lead to an increase in emissions. In general, baghouses are designed to operate at a relatively constant pressure drop. An increase in pressure drop could indicate infrequent cleaning cycles, damaged cleaning equipment, blinded bags, or increased airflow. Decreases in pressure drop may indicate significant holes or tears or missing bags. A pressure drop across the baghouse also serves to indicate that there is airflow through the control device. Pressure drop through the baghouse is monitored continuously using a differential pressure gauge. The pressure drop is measured between the material side and the clean side of the filter bags. The indicator range for the baghouse pressure drop is defined by the manufacturer and is applicable when the compartment is in service.
2. A visible emission (opacity) is indicative of good operation and maintenance of the baghouse. When the baghouse is operating optimally, there are little visible emissions from the exhaust. n general, an increase in visible emissions indicates reduced performance of the baghouse (i.e., loose or torn bags). Visual observations using USEPA Reference Method 22 are performed daily. Upon observation of visible emissions, an observation using USEPA Method 9 will be conducted to determine opacity. These emission units have an opacity standard of 10 percent.
3. Inspection and preventative maintenance was selected as a performance indicator. Qualified maintenance personnel will conduct the inspections and preventative maintenance in accordance with work practices and procedures.

RATIONALE FOR SELECTION OF INDICATORS RANGES

The rationale for the selection of the indicator ranges associated with the performance indicators above is as follows:

1. The indicator range for differential pressure will be based on the range recommended by the manufacturer.
2. The indicator range for opacity will be based on a 6-minute average opacity of less than 10 percent. This indicator range was selected based on AAC 335-3-14-.04 and because an increase in visible emissions is indicative of an increase in particulate emissions.
3. The indicator range for maintenance and inspection will be based on best work practices and procedures.

CAM Plan for LA71 - Baghouse			
	Indicator 1a	**Indicator 1b** *(To be used when Indicator 1a is unavailable)*	**Indicator 2**
I. Indicator	Differential Pressure	Opacity	Bag Condition
Measurement Approach	Continuous monitoring of pressure drop across the baghouse using differential pressure gauge	EPA Reference Method 22, if visible emissions are detected, follow up with EPA Reference Method 9	Visual Inspection
II. Indicator Range	As specified by the manufacturer	An excursion is defined as the presence of visible emissions greater than 10% opacity. Excursions trigger an inspection, corrective action, and reporting requirement.	Bag deterioration
Ill. Performance Criteria			
A. Data Representativeness	Not Applicable	Not Applicable	Baghouse and bags to be maintained per manufacturer specification.
B. Verification of Operation Status	Not Applicable	Not Applicable	Not Applicable
C. QA/QC Practices and Criteria	Trained personnel perform inspections and maintenance.	Use of a trained visible emission observer.	Trained personnel perform inspections and maintenance.
D. Monitoring Frequency	Continuous	Daily	As determined by trained personnel
E. Data Collection Procedures	Remote monitoring to electronic data collection system	Daily visual observations of opacity are recorded on visible emissions observation form.	Not Applicable
F. Averaging Period	Not Applicable	6-minute average (Method 9)	Not Applicable

LA72 – Selective Catalytic Reduction (SCR)

MONITORING APPROACH

Monitoring of the SCR system for compliance is accomplished by:

3. Monitoring outlet NO_X concentration via continuous emissions monitoring system (CEMS), and
4. Monitoring NO_X emissions via annual performance testing.

RATIONALE FOR SELECTION OF PERFORMANCE INDICATORS

Direct monitoring of the pollutant targeted for the SCR system (NO_X) is the best performance indicator of NO_X removal. A CEMS will be installed to monitor the NO_X concentration in the SCR's outlet exhaust steam. Outlet NO_X concentration is used in conjunction with the flue gas flow rate to determine the controlled mass emission rate of the source. In addition, a performance stack test will be conducted in accordance with USEPA Reference Method 7E to directly measure NO_X emissions from the SCR exhaust stack every 12 months.

RATIONALE FOR SELECTION OF INDICATORS RANGES

The rationale for the selection of the indicator ranges associated with the performance indicators above is as follows:

3. The indicator range for the CEMS will be set at 80 ppmvd on a 1-hour average.
4. The indicator range for the stack test will be set at 100 ppmvd in accordance with the testing provisions of USEPA Reference Method 7E.

CAM Plan for LA72 - DeNOx SCR		
	Indicator 1	**Indicator 2**
I. Indicator	NOx Emissions	NOx Emissions
Measurement Approach	CEMS	EPA Reference Method 7E
II. Indicator Range	While the unit is operating, an excursion is defined as a NOx concentration exceeding 80 ppmvd on a 1-hour average. Excursions trigger an inspection, corrective action, and a reporting requirement.	An excursion is defined as a NOx measured emissions greater than 100 ppmvd and 1.61 lb/hr. Excursions trigger an inspection, corrective action, and a reporting requirement.
III. Performance Criteria		
A. Data Representativeness	Measurement is being made inside the exhaust of the DeNOx system.	Measurement is being made at the emission point (DeNox exhaust).
B. Verification of Operation Status	Not Applicable	Record stack flow rate during the stack test.
C. QA/QC Practices and Criteria	The CEMs will be operated in accordance with 40 CFR part 60, Appendix B, performance specifications.	The test team will be familiar with Reference method 7E.
D. Monitoring Frequency	Continuous.	At least once every 12 months.
E. Data Collection Procedures	The pressure differential will be recorded with date and time.	The stack test will be documented with date and name of the people conducting the test
F. Averaging Period	1-hour	In accordance with EPA Reference Method 7E.

LO51 – Mist Eliminator

MONITORING APPROACH

Monitoring of the mist eliminator for compliance is accomplished by monitoring visible emissions.

RATIONALE FOR SELECTION OF PERFORMANCE INDICATORS

Monitoring of visible emissions was selected as a performance indicator because opacity is a good indicator of proper operation and maintenance of the mist eliminator. When the mist eliminator is operating optimally, there will be no visible emissions. In general, an increase in visible emissions indicates reduced performance of the mist eliminator. The emission unit has an opacity standard of less than 10 percent.

RATIONALE FOR SELECTION OF INDICATORS RANGES

The indicator range for opacity will be based on a 6-minute average opacity of less than 10 percent. This indicator range was selected based on AAC 335-3-14-.04 and because an increase in visible emissions is indicative of an increase in particulate emissions

CAM Plan for LO51 - Mist Eliminator	
	Indicator 1
I. Indicator	Opacity
Measurement Approach	EPA Reference Method 22, if visible emissions are detected, follow up with EPA Reference Method 9
II. Indicator Range	An excursion is defined as the presence of visible emissions greater than 10% opacity. Excursions trigger an inspection, corrective action, and reporting requirement.
Ill. Performance Criteria	
A. Data Representativeness	Not Applicable
B. Verification of Operation Status	Not Applicable
C. QA/QC Practices and Criteria	Use of a trained visible emission observer.
D. Monitoring Frequency	Daily
E. Data Collection Procedures	Daily visual observations of opacity are recorded on visible emissions observation form.
F. Averaging Period	6-minute average (Method 9)