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ENVIRONMENTAL PROTECTION DIVISION

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NARRATIVE

TO: Heather Brown

FROM: Cynthia Dorrough

DATE: July 28, 2022

Facility Name:	**Aurubis Richmond LLC**
AIRS No.:	245-00209
Location:	Augusta, GA (Richmond County)
Application #:	28364
Date of Application:	April 11, 2022

Background Information

Aurubis Richmond LLC (Aurubis) proposes to construct a copper scrap recycling plant on Valencia Way in Augusta, Georgia. The facility will process low-grade copper bearing scrap materials, Waste Electrical and Electronic Equipment (WEEE) and general copper metal bearing materials. Generated valuable materials from the process will be directly available for market consumption as well as further treated in the existing Aurubis production network. In addition to the core element copper, multiple metals such as tin, lead, nickel, zinc and further precious metals will be recovered.

The facility is a greenfield facility and no previously Division-permitted sources were constructed at the proposed location. The proposed facility will consist of the following emission sources. Control equipment associated with the emission sources will be discussed in detail in the Equipment List

- Four (4) Top Blown Rotary Converters (TBRC) each equipped with a Preheater. Emissions from the converter/preheater will be primarily controlled via baghouses with supplemental control devices used to further control emissions prior to exiting from the primary baghouses;
- One Lead Tin Alloy Furnace (LTAF) with a Heater and Ladle Treatment Stand (LTS) controlled via baghouse;
- Slag Holding Furnace (SHF) off gas, SHF Tapping Hood, Dry Slag Granulation (DSG), Copper Casting Unit (CCU) – Tilting Chair, CCU – Launder, CCU Mould Filling;
- Small Sampling Furnaces (electric-powered);
- Two (2) Carbon Silos;
- Two (2) Flue Dust Silos;
- Cooling Tower;
- Three (3)Diesel Fueled Emergency Generators;
- Slag Storage and Processing including Wind Erosion.

Raw materials handling and processing including storage, blending, pre-treatment, sampling and analyzing and a feed mix charging system is also a source of emissions;

Aurubis will produce copper ingots primarily from printed circuit boards, shredded metals, metal fractions, and copper cables using the top blown rotary converter (TBRC) process. Raw material is delivered to the site, then the material is analyzed for chemical composition and quality control. Material is then shredded to the desired fraction size for melting. In the smelting, converting and refining process valuable metal is separated from the waste and organic material. After casting, the copper ingots are conveyed to storage for off-site transfer. The dry slag formed in the TBRCs is granulated and sent to storage for off-site shipment.

The secondary copper recovery process consists of scrap pretreatment, smelting, and casting into ingots. The pretreatment will include manual and mechanical methods of sorting the scrap. There will be no sweating, or kiln drying at this facility.

Scrap Pretreatment

Scrap materials are delivered by truck and enter the plant at an entrance facility. The trucks enter an uncovered or a covered lot pile area where the raw material is unloaded. Vehicles such as forklifts, front loaders and excavators are operated in these areas. The empty trucks leave the area by passing an automatic tire cleaning unit to prevent dragging material onto public roads. Inside of the lot piles, as well as inside the sampling area, excavators and front loaders will be operated to move raw material within the site. Packaging will be removed from the material and an initial sample for moisture will be taken. Samples are also taken to the laboratory facilities for further treatment and analysis. Three (electric) shredder lines are operated in the laboratory and sampling area.

Materials will then be unloaded in the material handling area in open and covered lot piles depending on specific material and particle size. Flux materials will be unloaded directly into the feed mix hall. Metal shredder material will be unloaded from trucks in the open lot pile area outside as well. Metal shredders will basically be supplied at the needed particle size for the converter process already. Several storage boxes are used in the open lot pile area for the metal shredder material and the metal shredder material is further transported by front end loader to the feed mix hall.

Material that is processed in the shredding area include

- Printed Circuit Board material with a low copper grade,
- Printed Circuit Board materials with a medium or high copper grade and
- Insulated copper wire (ICW) material.

Materials that don’t meet the needed physical properties and particle size distributions are sent through the shredding process consisting of three shredder aggregates. ICW and copper scrap are fed into the first shredder (pre-shredder) by front loader or excavator into a filling hopper. Material flow from the first shredder is conveyed by belt into the feed mix hall. Circuit boards will be fed in to the second shredder system (two shredders in line) used to achieve the final physical properties. All shredder aggregates, belt conveyors and generally all intersections between aggregate conveying materials are ventilated with the plants secondary baghouse system (Baghouse 3).

After completion of the shredding process, materials are conveyed into the feed mix hall which is a closed building where all materials for processing in the furnaces are mixed after their respective preprocessing. Internal revert material is also provided in the feed mix hall for reprocessing. The input mixtures entering the TBRCs must be uniform and suitable for charging.

Vehicles such as front loaders, forklifts and excavators will be operated in the feed mix hall. The feed mix hall is equipped with material storage boxes for organizing and mixing the material handling and designed to cover the input material supply of the whole plant for at least three days which results in nine converter batches.

Representative Sampling Process

In the shredder area, the raw material will be broken down to grain sizes which can be treated in the sampling furnaces. In addition to breaking down raw material in the shredding area, representative samples will be taken of shredded material for further analysis. The weight of these samples will be between 50 and 500 kilograms (kg) depending on the kind of material.

The first steps in the sampling area are to dry sand mill the samples, before they are further reduced. In large and small induction furnaces the samples are going to be smelted to separate slag and metal. This process is supported by using additives. The metal and slag samples will be analyzed after milling, machining, or drilling, depending on the following analytical process in the laboratory. The sampling area will be equipped with the following equipment:

- Two 2 m^3 Heating Cabinets;
- Three 500-kilogram (kg) Induction Crucible Furnaces;
- A 50 kg Induction Crucible Furnace;
- A 0.5 m^3 Smelting with Induction Furnace;
- A 1000 kg/hour Pan Mill;
- Mills, drilling and machining equipment.

Material	Amount (tpy)	Process Location
Shredded Material	606.3	Induction Furnace
Printed Circuit Boards	22.6	Induction Furnace
ICW	1102.3	Induction Furnace w/Smelting

The emissions from these units will consist of volatile organic compounds (VOC) and carbon monoxide (CO). The emission factors for VOC and CO used for calculating emissions from the TBRCs were also used for the calculation of emissions in the representative sampling area. The emissions of VOC from this process are estimated to be 0.043 tons per year (tpy) and the CO emissions are 0.37 tpy. Emission calculations are provided in Appendix C of Application No. 28364.

Aurubis proposes to startup material receiving, shredding and the aforementioned sampling furnaces approximately 6-9 months prior to the startup of the secondary smelting operations for the purposes of qualify scrap materials and training employees. The above-mentioned operations will route emission through a temporary baghouse in the interim until the secondary baghouse (Baghouse 3) is operational.

Pyro Metallurgical Process

Upon the completion of the material preprocessing and handling steps, different pyro metallurgical processes are operated to recover the valuable metals from input materials. Four TBRCs, a LTAF and a slag holding furnace are used along the process chain. The first aggregates of the pyro metallurgical process are the TBRCs.

All four TBRCs are built identically. Each pair of TBRCs are operated in parallel but in different process phases. The four TBRCs will be controlled by baghouses and equipped with scrubbers (Baghouse 1 and Scrubber 1 for TBRCs 1&2 and Baghouse 5 and Scrubber 2 for TBRCs 3&4).

After processing the input materials in the TBRCs the different products are further treated in the following furnaces:

- The slag out of the smelting phase of the TBRC is treated in the Slag Holding Furnace (SHF).
- The slag out of the converting phase of the TBRC is further treated in the LTAF (Lead-Tin Alloy Furnace) process. The LTAF slag is treated in the SHF as well.
- The product blister copper is tapped at the end of the TBRC process; the product lead-tin-alloy is the product out of the LTAF/LTS (Ladle Treatment Stand) process.
- All other metal content intermediate materials will be recharged into the TBRC.

The four TBRC reactors are used to process all raw materials. The reactor vessels are comprised of a bottom, a cylindrical main part and a conical upper part. The vessel is open at the top of the conical upper part for charging and skimming products. Each TBRC reactor is operated in three successive process steps:

- Material smelting,
- Converting process, and
- Refining process

A TBRC batch production has duration of roughly 16 hours. The initial smelting takes roughly seven hours while converting takes roughly 2.5 hours. All raw materials and fluxes provided for the process are continuously charged in the smelting phase. The converting process is charged continuously with some fluxes and shredded material. The TBRCs are operated alternatingly in terms of smelting and converting. Process scheduling is established to ensure the second TBRC will be converting while the first TBRC is smelting.

Slag Holding Furnace

The slag holding furnace (SHF) is a cylindrical drum furnace, similar to the LTAF vessel. The SHF consists of a cylindrical shell with two side end covers. One side end cover is equipped with a tap hole. After the tap hole, a relined launder is attached to drain the tapped melt straight into a metal ladle. The SHF is equipped with a central opening mouth for charging different kinds of liquid slag by crane and ladle comparable to the LTAF charging. Emissions from the SHF process will be routed to ventilated hoods and vented to a baghouse (Baghouse 4). The slag is kept at the targeted temperature of roughly 1,250°C.

Metals entrained in the slag phase are settled at the bottom due to differences in their physical density. A metal phase with significant copper concentration is collected at the bottom of the SHF for a couple of days and multiple batches of the TBRCs and LTAF batches. A SHF batch is processed roughly four hours. Finally, the slag is skimmed through the opening by rotation of the furnace and guided by a launder into the granulation unit.

Molten slag is guided by a launder from the SHF into the granulation process. A compressed air jet blows the slag into the granulation chamber. The slag is dispersed into droplets solidifying quickly and heat transfer results in solid granulated slag particles settling in the granulation chamber. The granulation chamber is ventilated to Baghouse (BH04). Also, the heat balance of the granulation chamber’s capacity to discharge the heat from the slag as granulation is done roughly in one hour for one furnace batch. Cooled air is injected and ventilated again from the granulation chamber. The cooling air used has been ventilated at the copper casting and cooling unit. The injected cooling air, granulation air and all emissions are further treated in a Baghouse 4. Slag granulation takes roughly one hour and will occur with an interval of four hours. The granulation chamber can store the slag from multiple batches. For handling of the granulated slag, a door can be opened for a front loader to move the slag. The slag is a product available for the market in granulated form and is conveyed by front loader to the adjacent slag pile for further storage and sale. The Slag pile is located outside in the product handling area ready for shipping.

Lead-Tin Alloy Furnace

The LTAF is a cylindrical drum furnace closed with two side covers. One side cover is equipped with a natural gas burner to keep the process at the needed temperature. The second side cover is equipped with a tap hole. The LTAF furnace process gas is ventilated, and all emissions are captured in a baghouse (Baghouse 2). The furnace is operated in three successive process steps reactively reducing the focus elements from the slag into a metal phase. In all three steps the furnace is rotated for a couple of degrees from one side to the other, stirring and moving the melt continuously. The metal phase (raw lead tin-alloy) will be tapped into a small ladle, in which the metal is further treated in the Ladle Treatment Stand (LTS) to become a lead-tin alloy. This alloy will be casted in ingots for transportation and treatment in Aurubis facilities.

Blister Copper Ingots

Blister copper is tapped into ladles on a ladle car in front of the TBRC’s. The ladle is then taken to the copper casting chair on the opposite side of the melt shop. The ladle is positioned in the casting chair, which is equipped with ventilated hoods. The process unit is called the Copper Casting Unit (CCU). All emissions occurring by casting the blister are captured in a baghouse (BH04). The ladle is tilted by the electric cylinder to pour the blister copper melt into an adjacent ingot casting machine. The ingot caster is equipped with molds taking up roughly 200 kg of blister copper each. Continuous casting of one TBRC batch blister takes roughly one hour. The melt is first poured into a buffer tundish and further into a pouring tundish where the molds are filled precisely from the last tundish. The casting molds are chain driven and continuously returned. The upper side of the caster comprises a cooling unit using water spray to cool down the molds from top and downside as well. The blister copper solidifies until the end of the upper chain is reached. Solidified blister copper ingots fall from of the molds when turned upside down for returning. The molds returning to the pouring tundish on the downside of the caster are preheated again with natural gas burners. Finally, they can be refilled again dry and preheated for continuous casting. The blister copper blocks are automatically conveyed further into a stacking and labeling unit, then strapped automatically and finally provided in stacks for further transport by forklifts. Forklifts are used to take the material outside into the products storage area ready for shipping

<u>Purpose of Application</u>

Permit Application No. 28364 was received by the Division on April 18, 2022 for the construction and operation of a plant to recycle copper containing scrap. The application was accepted into the Expedited Permitting Program on April 22, 2022. A public advisory was issued which expired on May 27, 2022 with several public comments received on the application.

Equipment List

Emission Units		Air Pollution Control Devices	
ID No.	**Name/Description**	**ID No.**	**Description**
TBRC1 TBRC2	Top Blown Rotary Converter – 1&2 and Operational Heaters and Preheaters [81.88 MMBtu/hr] 12 m^3 rotary tilt-able furnace for smelting copper	BH01 SC01 COMB1 SNCR1 QC01	Baghouse Scrubber [6.82 MMBtu/hr] Post Combustor Selective Non-Catalytic Reduction Quench
SBH01	Secondary Baghouse controls emissions leaving Smelting Canopy 01, Secondary Hoods TBRC1 and TBRC2, Sampling and Material handling	BH03	Baghouse
LH	Ladle Heaters		
TBRC3 TBRC4	Top Blown Rotary Converter – 3&4 and Operational Heaters and Preheaters [81.88 MMBtu/hr] 12 m^3 rotary tilt-able furnace for smelting copper	BH05 SC02 COMB2 SNCR2 QC02	Baghouse Scrubber [6.82 MMBtu/hr] Post Combustor Selective Non-Catalytic Reduction Quench
SBH02	Secondary Baghouse controls emissions leaving Smelting Canopy 02, Secondary Hoods TBRC3 and TBRC4,	BH06	Baghouse
LTAF/LTS	5.5 m^3 Lead Tin Alloy Furnace, Heater and Ladle Treatment Stand	BH02	Baghouse
SHF/CCU/DSG	37 m^3 Slag Holding Furnace including Copper Casting Unit and Slag Granulation	BH04	Baghouse
LNDR	Launders		
RMS	Outside Material Storage and Handling	NA	None
FDS01	80 m^3 Flue Dust Silo with Bin Vent for BH01 Flue Dust	BV02	Filter
FDS02	80 m^3 Flue Dust Silo with Bin Vent for BH05 Flue Dust	BV05	Filter
CS01	30 m^3 Carbon Silo with Bin Vent for use in BH01	BV01	Filter
CS02	30 m^3 Carbon Silo with Bin Vent for use in BH05	BV04	Filter
EG01	2,720 hp Diesel Fired Emergency Generator	NA	None
EG02	2,720 hp Diesel Fired Emergency Generator	NA	None
EG03	1,360 hp Diesel Fired Emergency Generator	NA	None
RV01-RV06	6 Roof Ventilations (filtered) to Exchange Air in Bunker Bay of the Melt-shops	NA	None

*proposed within current application

Fuel Burning Equipment

Source Code	Total Input Heat Capacity (MMBtu/hr)	Description	Installation Date	Construction Date
TBRC1 TBRC2	88.70	Top Blown Rotary Converter – 1&2 Operational Heaters [68.24 MMBtu/hr], and Pre-heaters [13.64 MMBtu/hr] Post-Combustor [6.82 MMBtu/hr] Fuel: Natural Gas	TBD	2022/2023
TBRC3 TBRC4	88.70	Top Blown Rotary Converter – 3&4 Operational Heaters [68.24 MMBtu/hr], and Pre-heaters [13.64 MMBtu/hr] Post-Combustor [6.82 MMBtu/hr] Fuel: Natural Gas	TBD	2025/2026
LTAF	13.65	Lead-Tin Alloy Furnace Fuel: Natural Gas	TBD	2022/2023
LH	17.06	Ladle Heater Fuel: Natural Gas	TBD	2022/2023
SHF	14.33	Slag Heating Furnace Fuel: Natural Gas	TBD	2022/2023
Launders	3.75	Launders Fuel: Natural Gas	TBD	2022/2023

Source Code	Total Rating (hp)	Description	Installation Date	Construction Date
EG01	2,720	Diesel Fired Emergency Generator	TBD	2022/2023
EG02	2,720	Diesel Fired Emergency Generator	TBD	2022/2023
EG03	1,360	Diesel Fired Emergency Generator	TBD	2022/2023

Emissions Summary

Potential facility-wide emissions are based upon operating hours of 8,760 hours/year, 500 hours/year for emergency generators EG01, EG02, and EG03, and specific annual hours of operation for sources such as the Slag Holding Furnace, Copper Casting and Dry Slag Granulation. Actual emissions were calculated based upon an operating scenario consisting of 4 weeks of downtime for total operating hours of 8,448 hours/year. Total emissions include stack and fugitive emissions, as well as emissions from sources that can be classified as insignificant sources upon the issuance of the required Title V Permit. The emissions summary will be outlined by pollutant and emission source in the summary.

Particulate Matter (PM/PM_{10}/$PM_{2.5}$)

TBRC

The four TBRCs will be controlled by a baghouse (BH01 for TBRCs 1&2 and BH05 for TBRCs 3&4). The baghouse is designed to meet a grain loading of 0.002 grains/dry standard cubic feet (gr/dscf). Emissions were calculated by multiplying the grain loading factor by the flowrate (dry standard cubic feet [dscf]) for each of the two baghouses, then converting to pounds per hour. Particulate emissions from fuel combustion in the two combustor units will be captured in the TRBCs primary baghouses (Baghouse 1 and Baghouse 2). Particulate emissions from natural gas combustion in the two preheaters (one for TBRC 1&2 and one for TBRC3&4) will be captured by the Secondary baghouses (BH03 [TBRC 1&2] and BH06 [TBRC 3&4])

Building Emissions (Secondary Baghouses)

PM emissions from the Smelting, Shredding and Sampling Building 01 will be controlled by secondary baghouse (BH03). A second baghouse (BH06) will control the Smelting operations in Building 2. The baghouses are designed to meet a grain loading of 0.002 gr/scf. Emissions were calculated by multiplying the grain loading factor by the flowrate, then converting to pounds per hour. Potential annual emissions were based on annual flowrates based on number of hours each emission source could operate in a year.

Lead-Tin Alloy Furnace (LTAF) and LTS

Particulate Matter emissions from the LTAF and LTS were calculated by multiplying the grain loading factor by the flowrate then converting to pounds per hour. Potential annual emissions were based on annual flowrates based on number of hours each emission source could operate in a year. Particulate emissions from fuel combustion in the LTAF will be routed to Baghouse 2 for capture.

Launders

Particulate emissions from the fuel combustion in the Launders will be captured in the Secondary Baghouse (BH03 and BH06) as described in Section 3.1.2.

Slag Holding Furnace (SHF), Copper Casting (CCU) and Dry Slag Granulation

PM Emissions from the Slag Holding Furnace, Copper Casting and Dry Slag Granulation will be captured by a baghouse (BH04). The baghouse is designed to meet a grain loading of 0.002 gr/dscf. Emissions were calculated by multiplying the grain loading factor by the flowrate then converting to pounds per hour.

Emergency Generators (EG01, EG02, and EG03)

Particulate emissions from the emergency generators were calculated based on the emission limits of 0.2 g/kW-hr in NSPS Subpart IIII multiplied by 500 hours/year, the potential hours of operation to remain classified as an emergency generator.

Roof Vents (RV01 through RV06)
Six roof vents will be installed in the bunker bay of each of the melt-shops. The vents will provide cooling to the bunker bay areas. These will have filters to control particulate emissions. Emissions are based on an emission factor measured at a similar facility in Germany of 0.1 mg/m^3.

Raw Material (Scrap) Storage Piles
The Aurubis - Richmond Plant receives scrap, scrap substitutes, carbon, fluxes and other materials by truck. After unloading, the scrap is stored in stockpiles and pre-processed (shredded) and sampled. The scrap and other feedstock materials are then added on the conveyor prior to entering the TBRC. Particulate emissions from these operations were calculated based on AP-42 Chapter 13.2.4.

Slag Handling
Particulate emission from Slag Handling were calculated using AP-42 Chapter 13.2.4. The aerodynamic particle size was determined using an analysis of slag from a similar facility in Germany. The results of this analysis is provided in Application No. 28364.

Slag Storage Wind Erosion
Particulate emissions from the Slag Storage piles due to Wind Erosion were calculated using AP-42 Chapter 13.2.5. The aerodynamic particle size was determined using an analysis of slag from a similar facility in Germany as discussed in Section 3.1.8.1.

Carbon Silos and Flue Dust Silo
Emissions of particulate matter from the two carbon silos and two flue dust silos were calculated using a grain loading of 0.01 gr/dscf. Emissions were calculated by multiplying the grain loading factor by the flowrate, then converting to pounds per hour.

Paved Roads and Front-End Loaders
Particulate emissions from the trucks traveling on paved roads and front-end loaders moving raw materials were calculated based on AP-42 Chapter 13.2.1.

Cooling Tower
The method used in determining emissions from the cooling tower is the "Expanded Resiman-Frisbie" method[1].

[1] Smith, R, Woerner, A, and Hanna, T. "Determining PM10 and PM2.5 Emissions from Wet Cooling Towers", ERM, October 2011

Nitrogen Oxides (NOx)

The primary sources of NOx emissions are a result of the combustion of natural gas in the preheaters and post-combustion chambers, and the combustion of diesel in the three emergency generators.

- Four TBRCs (TBRC 1&2 and TBRC 3&4) with two Combustors;
- LTAF;
- Slag Holding Furnace;
- ;
- Ladle Heaters
- Launders; and
- Three Emergency Generators.

The four TBRCs and the LTAF each have a preheater that use natural gas as a fuel to raise the temperature of the refractory material to the proper operational temperature. There are two post combustion chambers where at the exit of these chambers the control of NOx emissions occurs using SNRC. These combustion chambers also fire natural gas when needed. In order to control NOx emission in the primary off-gas of the TBRCs, post-combustion chambers will use selective non-catalytic reduction (SNCR) with urea injection.

NOx emissions factors used in determining emissions were based on stack test at a similar facility in Germany and a conservative factor of 20% was added. The facility in Germany did not have SNCR, so the calculated emissions were reduced by 65% to reflect the SNCR controls. In addition, the TBRC burners will operate on high oxygen which will further reduce NOx emissions. Ninety percent of the NOx was assumed to be emitted from the TBRCs and ten percent was emitted from the LTAF. The emissions from the LFAF will not be controlled.

NOx emissions from the natural gas combustion in the Slag Holding Furnace, Ladle Heaters and Launders were calculated using a conservative AP-42 Chapter 1.4 emission factor and calculated as:

NOx Emissions (tpy) = NOx emission factor [lb NOx/ MMft^3] x natural gas combusted per year [MMft^3/yr] x 1 ton/2000 lb.

Emergency generators EG01, EG02, and EG03 will be subject to the limit in NSPS Subpart IIII. Since the limit is for NOx + NMHC combined, the NOx and VOC emissions were calculated using a ratio of 67.8% NOx to 32.2% VOC. This ratio is based upon the linear relationship of NOx to NMHC from Table 1 of 40 CFR 1039.101 for Tier 4 emission limits of 0.19 g/kW-hr for VOC and 0.40 g/kW-hr for NOx.

Carbon Monoxide (CO)

Similar to NOx, emissions of carbon monoxide are a byproduct of fuel combustion, and CO emissions were calculated for the following sources:

- Four TBRCs with Two Combustors;
- LTAF;
- Slag Holding Furnace;
- Ladle Heaters;
- Launders; and

- Three Emergency Generators.

In the four TBRCs, CO is produced due to the incomplete combustion in an oxygen deficient environment. Emissions of CO from the TBRCs will be reduced by the post combustors.

CO emission factors were based on stack test at a similar facility in Germany were doubled to account for plastic content at the Augusta facility and a conservative factor of 20% was added. The facility in Germany that was tested did not operate any post combustors as opposed to the ones planned for operation at the proposed Augusta facility, which will further reduce CO emissions.

Emissions of CO from the natural fuel combustion in the LATF/LTS, Slag Holding Furnace, Ladle Heaters and Launders was calculated using AP-42 Chapter 1.4.

CO emissions (tpy) = CO emission factor [lb CO/MMft^3]x natural gas combusted per year [MMft^3/yr] x 1 ton/2000 lb.

The emergency generators are subject to NSPS IIII. Emission factors used are from 40 CFR 1039 , Appendix I, Table 3, Emission Standards for Tier 3 engines >560 kW of 3.5 grams/kW-hr.

Volatile Organic Compounds (VOC)

VOC emissions generated in the TBRCs were based on emission data provided by the Original Equipment Manufacturer (OEM) with a conservative factor of 20% added and emissions will be reduced in the post-combustors.

- Four TBRCs with Two Combustors;
- LTAF;
- Slag Holding Furnace;
- ;
- Ladle Heaters;
- Launders; and
- Three Emergency Generators.

The VOC emissions from the natural gas combustion in the LATF/LTS, Slag Holding Furnace, Ladle Heaters and Launders were calculated using AP-42 Chapter 1.4’s emission factor.

VOC Emissions (tpy) = VOC emission factor [lb VOC/MMft^3]x natural gas combusted per year [MMft^3/yr] x 1 ton/2000 lb.

The emergency generators will be subject to NSPS Subpart IIII. Since the limit is for NOx + NMHC combined, the NOx and VOC emissions were calculated using a ratio of 67.8% NOx to 32.2% VOC. This ratio is based upon the linear relationship of NOx to NMHC from Table 1 of 40 CFR 1039.101 for Tier 4 emission limits of 0.19 g/kW-hr for VOC and 0.40 g/kW-hr for NOx.

Sulfur Dioxide (SO_2)

Emissions of SO_2 result from the use of a conditioning agent in the wet off-gas cleaning part of the facility in addition to SO_2 being emitted from the combustion of fuel in both the fuel burning equipment and emergency generators.

- Four TBRCs with two Combustors;
- LTAF/LTS
- Slag Holding Furnace;
- Ladle Heaters;
- Launders; and
- Three Emergency Generators.

SO_2 emissions results from conditioning agent used in the wet off gas cleaning part of the facility were based on data provided by the OEM with a margin factor of safety of 20% added.

The SO_2 emissions from the LATF/LTS, Slag Holding Furnace, Ladle Heaters and Launders were calculated using an AP-42 Chapter 1.4 emission factor.

SO_2 Emissions (tpy) = SO_2 emission factor [lb SO_2/$MMft^3$]x natural gas combusted per year [$MMft^3$/yr] x 1 ton/2000 lb.

SO_2 emissions from the emergency generators were calculated based on the emission factors in AP-42 Chapter 3.4 assuming a 15 ppm sulfur limit.

Hazardous Air Pollutants (HAP)

Explanation of calculations will be divided into two categories: metal HAP and inorganic HAP.

Metal

The emission of copper, aluminum, calcium, nickel, silicon, tin, and zinc from the process were estimated based an analysis of the material at various stages of the process from a similar facility in Germany or data from process modeling.

Emissions of cadmium, antimony, chromium, cobalt, lead, manganese, and mercury were based on emission testing at a similar facility in Germany with a margin of safety factor of 20% added to the emissions.

Activated carbon is injected into the baghouses on the TBRCs to reduce potential mercury emissions. Individual HAP emission calculations of the metal-HAP emissions can be found in Appendix C of Permit Application 28364.

Inorganic

Hydrogen Bromide (HBr), Hydrogen Chloride (HCl) and Hydrogen Fluoride (HF) are generated in the TBRCs and classified as HAP. Potential emissions of these acid gases were calculated based on stack testing conducted at a similar operation in Germany. The factors for HF and HCl were doubled to account for the plastics in the raw material stream and an additional 20% margin of safety factor was added to the factors for all three compounds. The facility in Germany did not have a scrubber therefore an additional control of 90% was assumed for HCl and HF.

Dioxin/Furan (D/F)

Polycyclic organic compounds including dioxins and furans are included in the federal HAP list. Dioxins (polychlorinated dibenzo-p-dioxins (PCDD's), and furans (polychlorinated dibenzofurans (PCDFs)) are formed during the combustion of chlorinated compounds in the presence of hydrocarbons. The exact mechanisms for creation of D/F have been demonstrated to be temperature dependent. Temperatures between 200° and 450° Celsius (C) are most conducive to forming PCDD/PCDFs, with maximum formation occurring at around 350°C. If temperature falls outside this range in temperature, the amount of PCDD/PCDFs formed is minimized. Dioxins have shown to be decomposed at a temperature of 700 °C.

Techniques for controlling dioxin and furan formation and reducing emissions has been based upon a system of post combustion, quick off-gas cooling, and effective collection which has been applied across industries. According to the Waste Incineration Directive, all incineration plants should be designed, equipped, built, and operated in such a way that the gas resulting from the process is heated (after the last injection of combustion air, in a controlled and homogeneous fashion, and even under the most unfavorable conditions) to a temperature of 850 °C for 2 sec. McKay[2] recommended achieving a temperature above 1000 °C for at least 2 sec in high-turbulence (Reynolds number >50,000) conditions with approximately 3–6% excess of oxygen.

Recognizing and reacting to the need for improved emission control of dioxins and furans, BadischeStahlwerke (BSW) significantly reduced emissions during EAF steel making by a combination of post combustion, quick off-gas cooling (HTQ) and effective dust collection system. The achievement of this concept has brought BSW to comply with stringent German limiting value for dioxins and furans of 0.1 nanogram TE per normal cubic meter (ng TE/Nm^3)[3].

Therefore, in order to prevent dioxins from forming, Aurubis proposes a system of controlling dioxin and furan emissions based on the installation of post-combustors which are used that hold a temperature of 1,000 °C for over two seconds followed by a quick cooling of the off gas in a quench.

Aurubis has calculated the D/F TEQ based on stack testing conducted at a similar facility in Germany. The factor was doubled to account for plastic content at the Augusta facility and a margin of safety of 20% was added. Activated carbon will be injected into the ductwork downstream from the TBRCs and post combustors and water quench that quickly drop the temperature below D/F formation temperatures, but prior to the baghouses will be used for the control of organic compounds including D/F.

[2] McKay, G. Dioxin Characterization, Formation and Minimization during Municipal Solid Waste (MSW) Incineration: a Review; Chem. Eng. J. 2002, 86, 343-368.
[3] (2002). Dioxins and furans - Reduction solution with bse HTQ (High Temperature Quenching). SEAISI Quarterly (Southeast Asia Iron and Steel Institute). 31. 18-22.

Facility-Wide Emissions
(in tons per year)

Pollutant	Potential Emissions	Actual Emissions
PM	65.97	60.91
PM_{10}	64.35	59.41
$PM_{2.5}$	63.96	59.05
NOx	81.19	74.97
SO_2	21.27	19.64
CO	67.32	62.16
VOC	10.11	9.33
Max. Individual HAP **(Hexane)**	0.49	0.46
Total HAP	2.01	1.86
Total GHG (if applicable)	38,273	35,337

<u>Regulatory Applicability</u>

<u>40 CFR 52.21 - Prevention of Significant Deterioration of Air Quality.</u>

The requirements of this section apply to the construction of any new major stationary source (as defined in paragraph (b)(1) of this section) or any project at an existing major stationary source in an area designated as attainment or unclassifiable under sections 107(d)(1)(A)(ii) or (iii) of the Act.

Paragraph (b)(1) defines a major stationary source as:

"Any of the following stationary sources of air pollutants which emits, or has the potential to emit, 100 tons per year or more of any regulated NSR pollutant: Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, coal cleaning plants (with thermal dryers), kraft pulp mills, Portland cement plants, primary zinc smelters, iron and steel mill plants, primary aluminum ore reduction plants (with thermal dryers), primary copper smelters, municipal incinerators capable of charging more than 50 tons of refuse per day, hydrofluoric, sulfuric, and nitric acid plants, petroleum refineries, lime plants, phosphate rock processing plants, coke oven batteries, sulfur recovery plants, carbon black plants (furnace process), primary lead smelters, fuel conversion plants, sintering plants, ***secondary metal production plants****, chemical process plants (which does not include ethanol production facilities that produce ethanol by natural fermentation included in NAICS codes 325193 or 312140), fossil-fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour heat input,*

petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels, taconite ore processing plants, glass fiber processing plants, and charcoal production plants;"

Aurubis Richmond proposes to construct and operate a secondary copper recycling and secondary copper smelter which is one of the 28 listed source categories listed in paragraph (b)(1) of 40 CFR 52.21 where emissions or potential emissions of any regulated NSR pollutant equal to 100 tons per year or more classifies the source as a major stationary source. However, potential emissions of any NSR regulated pollutant does not exceed 100 tons per year, therefore Aurubis is not considered a major stationary source.

40 CFR 70- State Operating Permit Programs
The requirements of this section define a Part 70 source as:

A State program with whole or partial approval under this part must provide for permitting of the following sources:

(1) Any major source;

(2) Any source, including an area source, subject to a standard, limitation, or other requirement under section 111 of the Act;

(3) Any source, including an area source, subject to a standard or other requirement under section 112 of the Act, except that a source is not required to obtain a permit solely because it is subject to regulations or requirements under section 112(r) of this Act;

(4) Any affected source; and

(5) Any source in a source category designated by the Administrator pursuant to this section.

Aurubis Richmond proposes to construct and operate a secondary copper recycling and secondary copper smelter which is part of a source category designated under 40 CFR 63.11153(d). Therefore, Aurubis will apply for a Title V Permit (Part 70) within a year of the start of the smelting operations.

40 CFR 60 Subpart CCCC--Standards of Performance for Commercial and Industrial Solid Waste Incineration Units (CISWI)

This regulation applies to incineration units that meet all of the following:

- Incinerator units constructed after June 4, 2010, or units reconstructed or modified after August 7, 2013;
- The unit in question is defined as a Commercial or Industrial Solid Waste Incineration Unit;
- The unit is not otherwise exempt under §60.2020.

Waste material combusted by Aurubis is for the primary purpose of recovering metals in a secondary smelter and is exempt from this regulation under 60.2020(g), which exempts materials recovery units that combust waste for the primary purpose of recovering metals such as primary and secondary smelters. Therefore, Aurubis is not subject to 40 CFR 60 Subpart CCCC, Subpart AAAA, or Subpart DDDD as it pertains to CISWI units.

<u>40 CFR 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines</u>

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

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

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

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

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

Aurubis proposes to install three emergency generator engines classified as a CI ICE. Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder, that are not fire pump engines, must comply with the emission standards for new non-road CI engines in §60.4208, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.

Aurubis plans to comply with the requirements of Subpart IIII by purchasing an EPA certified engine and will meet the fuel requirements of 40 CFR 80.510(b) for non-road engines. The emergency engines may be operated for a maximum of 100 hours per calendar year for the purposes of non-emergency situations, maintenance checks and readiness testing. Potential emissions from the engine are calculated based on 500 hours of operation per year.

<u>40 CFR 63, Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) MACT</u>

The provisions of this subpart are applicable to stationary reciprocating internal combustion engines (RICE) located at area and major sources of HAP that are new, existing, or reconstructed are subject to this subpart.

For stationary RICE located at an area source of HAP emissions, the stationary RICE is considered existing if construction was commenced prior to June 12, 2006. Any stationary RICE constructed after this time is considered new under MACT Subpart ZZZZ.

New engines comply with Subpart ZZZZ by demonstrating compliance under either NSPS Subpart IIII, or JJJJ.

Aurubis proposes to comply with the requirements of the RICE MACT by complying with the applicable requirements of NSPS Subpart IIII.

40 CFR 63 Subpart FFFFFF – National Emission Standards for Hazardous Air Pollutants for Secondary Copper Smelting Area Sources

(a) You are subject to this subpart if you own or operate a new secondary copper smelter that is an area source of hazardous air pollutant (HAP) emissions.

(b) This subpart applies to each new affected source. The affected source is each secondary copper smelter. Your secondary copper smelter is a new affected source if you commenced constructed or reconstruction of the affected source on or after October 6, 2006.

(c) This subpart does not apply to research and development facilities, as defined in section 112(c)(7) of the CAA.

(d) If you own or operate an area source subject to this subpart, you must obtain a permit under 40 CFR Part 70 or 40 CFR Part 71.

The Aurubis facility is subject to 40 CFR 63, Subpart FFFFFF. The rule requires Aurubis to operate a capture and control system for particulate matter (PM) emissions from any process operation that melts copper scrap, alloys, or other metals or that processes molten material. Emissions of PM from the control device must not exceed 0.002 grains per dry standard cubic meter.

In order to comply with the aforementioned PM limit of 0.002 grains per dry standard cubic meter, Aurubis must also install, operate, and maintain a bag leak detection system on all baghouses used to comply with the PM emissions limit. Aurubis is also required to develop and submit to the Division for approval a site-specific monitoring plan for each bag leak detection system, as specified in the rule.

Each bag leak detection system must:

- Be certified by the manufacturer to be capable of detecting PM emissions at concentrations of 1 milligram per actual cubic meter (0.00044 grains per actual cubic foot) or less.

- Provide output of relative PM loadings. Aurubis must continuously record the output from the bag leak detection system using electronic or other means (e.g., using a strip chart recorder or a data logger.)

- Be equipped with an alarm system that will sound when the system detects an increase in relative particulate loading over the alarm set point established according to the rule and the alarm must be located such that it can be heard by the appropriate plant personnel.

- In the initial adjustment of the bag leak detection system, Aurubis must establish, at a minimum, the baseline output by adjusting the sensitivity (range) and the averaging period of the device, the alarm set points, and the alarm delay time.

- Following initial adjustment, any adjustments to the averaging period, alarm set point, or alarm delay time must be approved by the Division.

- Once per quarter, Aurubis may adjust the sensitivity of the bag leak detection system to account for seasonal effects, including temperature and humidity, according to the procedures specified in the rule.

- Aurubis must install the bag leak detection sensor downstream of the baghouse and upstream of the scrubbers.

- Where multiple detectors are required, the system's instrumentation and alarm may be shared among detectors.

Aurubis must operate and maintain the bag leak detection system according to the site-specific monitoring plan at all times.

For each bag leak detection system, Aurubis must initiate procedures to determine the cause of every alarm within 1 hour of the alarm. Aurubis must alleviate the cause of the alarm within 3 hours of the alarm by taking whatever corrective action(s) are necessary.

Aurubis must maintain records of the information specified in the rule. Aurubis must conduct a performance test to demonstrate initial compliance with the PM emissions limit within 180 days after startup and report the results in your notification of compliance status. Aurubis must also conduct subsequent performance tests to demonstrate compliance with the PM emissions limit at least once every 5 years.

Aurubis is also required to prepare and operate in accordance to a site-specific monitoring plan according to 40 CFR 63 Subpart FFFFFF for the selection, inspection, and pretreatment of copper scrap to minimize, to the extent practicable, the amount of oil and plastics in the scrap that is charged to the TBRCs. Aurubis is required to do the following:

- Take corrective action as specified in the rule; and
- Record information as specified.

Georgia Rule 391-3-1-.02(2)(b) Emission Limitations and Standards for Visible Emissions

This regulation limits opacity to less than forty (40) percent, except as may be provided in other more restrictive or specific rules or subdivisions of Georgia Rule 391-3-1-.02(2).

This limitation applies to direct sources of emissions such as stationary structures, equipment, machinery, stacks, flues, pipes, exhausts, vents, tubes, chimneys, or similar structures. This regulation is applicable to the Top Blown Rotary Converters including Preheaters, the Lead Tin Alloy Furnace/Ladle Treatment Stand (Source Codes TBRC1, TRBC2, TBRC3,TRBC4, and LTAF/LTS), Ladle Heater (Source Code LH), Slag Holding Furnace/Copper Casting Unit/Dry Slag Granulation (Source Codes SHF/CCU/DSG), Launders (Source Code LNDR), Baghouses (Source Codes BH01 through BH06), Roof Vents (Source Codes RV01 through RV06), and the Carbon and Flue Dust Silos (Source Codes CS01, CS02, FDS01, and FDS02), and other supporting equipment with the capability of emitting particulates.

Georgia Rule 391-3-1-.02(2)(e) Emission Limitations and Standards for Particulate Emissions from Manufacturing Processes

This regulation limits particulate emissions from manufacturing processes as follows:

$E = 4.1\ P^{0.67}$; for process input weight rate up to and including 30 tons per hour.

$E = 55\ P^{0.11} - 40$; for process input weight rate above 30 tons per hour.

This regulation is applicable to the Top Blown Rotary Converters including Preheaters, the Lead Tin Alloy Furnace/Ladle Treatment Stand (Source Codes TBRC1, TRBC2, TBRC3,TRBC4, and LTAF/LTS), Ladle Heater (Source Code LH), Slag Holding Furnace/Copper Casting Unit/Dry Slag Granulation (Source Codes SHF/CCU/DSG), Launders (Source Code LNDR), Baghouses (Source Codes BH01 through BH06), Roof Vents (Source Codes RV01 through RV06), and the Carbon and Flue Dust Silos (Source Codes CS01, CS02, FDS01, and FDS02), and other supporting equipment with the capability of emitting particulates.

Georgia Rule 391-3-1-.02(2)(g) Emission Limitations and Standards for Sulfur Dioxide

This regulation requires that all fuel burning sources below 100 million Btu of heat input per hour shall not burn fuel containing more than 2.5 percent sulfur, by weight. This regulation is applicable to the Top Blown Rotary Converters including Preheaters, Lead Tin Alloy Furnace/Ladle Treatment Stand (Source Codes TBRC1, TRBC2, TBRC3, TRBC4 and LTAF/LTS), Ladle Heater (Source Code LH), Slag Holding Furnace/Copper Casting Unit/Dry Slag Granulation (Source Codes SHF/CCU/DSG), Launders (Source Code: LNDR) and Post-Combustors (Emission Control IDs COMB1 and COMB2). Aurubis plans to fire natural gas exclusively in these units to ensure compliance with Georgia Rule (g).

Georgia Rule 391-3-1-.02(2)(n) Emission Limitations and Standards Fugitive Dust

This regulation requires Aurubis to take all reasonable precautions to prevent such dust from becoming airborne for any operation, process, handling, transportation or storage facility which may result in fugitive dust. This regulation also limits opacity from such sources to less than 20 percent. For Aurubis, this limit applies to paved and unpaved access roads and parking areas, and material handling equipment.

Georgia Rule 391-3-1-.03(1) Construction (SIP) Permit

This regulation requires that any person prior to beginning the construction or modification of any facility which may result in an increase in air pollution must obtain a permit for the construction or modification of such facility from the Director upon a determination by the Director that the facility can reasonably be expected to comply with all the provisions of the Clean Air Act and the rules and regulations promulgated thereunder. Aurubis Richmond LLC has applied for a construction permit under this regulation.

Georgia Rule 391-3-1-.03(2) Operating (SIP) Permit

This regulation requires that any person prior to beginning the operating of any facility, which may result in an increase in air pollution, must obtain a permit for the operation of such facility within thirty days after commencement of normal operations. Aurubis Richmond LLC has applied for an operating permit under this regulation.

Permit Conditions

Permit Condition 2.1 limits NOx, CO, and VOC emissions to 99 tons per year or less to avoid being subject to PSD requirements.

Permit Condition 2.2 requires the Permittee to comply with all applicable provisions of 40 CFR 63 Subpart A and Subpart FFFFFF for the operation of the Top Blown Rotary Converters including Preheaters (Source Codes TBRC1, TBRC2, TBRC3, and TRBC4), the Lead Tin Alloy Furnace/Ladle Treatment Stand (Source Codes LTAF/LTS), and the Slag Holding Furnace/Copper Casting Unit/Dry Slag Granulation (Source Codes SHF/CCU/DSG).

Permit Condition 2.3 limits particulate matter (PM) from the baghouses to equal to or less than 0.002 grains/dry standard cubic foot.

Permit Condition 2.4 requires the Permittee to comply with all applicable provisions of 40 CFR 63 Subpart ZZZZ for the operation of the three emergency generators (Source Codes EG01, EG02, and EG03).

Permit Condition 2.5 requires the Permittee to comply with all applicable provisions of 40 CFR 60 Subpart IIII for the operation of the three emergency generators (Source Codes EG01, EG02, and EG03).

Permit Condition 2.6 limits the hours of operation for emergency generators EG01, EG02, and EG03 to 500 hours per year.

Permit Condition 2.7 limits any operation of generators other than emergency operation, maintenance and testing, emergency demand response, and operation in non-emergency situations for 50 hours per year. The condition also limits all emergency generators for any combination of the purposes specified in Permit Condition 2.7 a. and b. for a maximum of 100 hours per calendar year.

Permit Condition 2.8 limits the sulfur content to 15 ppm (0.0015% by weight) and either a minimum cetane index of 40 or maximum aromatic content of 35 volume percent for fuel in the emergency generators (Source Codes EG01, EG02 and EG03).

Permit Condition 2.9 limits visible emissions from the Top Blown Rotary Converters including Preheaters, the Lead Tin Alloy Furnace/Ladle Treatment Stand (Source Codes TBRC1, TRBC2, TBRC3,TRBC4, and LTAF/LTS), Ladle Heater (Source Code LH), Slag Holding Furnace/Copper Casting Unit/Dry Slag Granulation (Source Codes SHF/CCU/DSG), Launders (Source Code LNDR), Baghouses (Source Codes BH01 through BH06), Roof Vents (Source Codes RV01 through RV06), and the Carbon and Flue Dust Silos (Source Codes CS01, CS02, FDS01, and FDS02) to less than 40 percent.

Permit Condition 2.10 requires all process equipment to comply with Georgia Rule (e) for particulate emissions.

Permit Condition 2.11 limits the sulfur content of fuel to 2.5 percent sulfur, by weight, in the Top Blown Rotary Converters including Preheaters, Lead Tin Alloy Furnace/Ladle Treatment Stand (Source Codes TBRC1, TRBC2, TBRC3, TRBC4 and LTAF/LTS), Slag Holding Furnace/Copper Casting Unit/Dry Slag Granulation (Source Codes SHF/CCU/DSG), Launders (Source Code: LNDR) and Post-Combustors (Emission Control IDs COMB1 and COMB2).

Permit Condition 2.12 requires the Permittee to fire natural gas exclusively in the Top Blown Rotary Converters including Preheaters, Lead Tin Alloy Furnace/Ladle Treatment Stand (Source Codes TBRC1, TBRC2, TBRC3, TBRC4, LTAF/LTS), Slag Holding Furnace/Copper Casting Unit/Dry Slag Granulation (Source Codes SHF/CCU/DSG), Launders (Source Code LNDR) and Post-Combustors (Emission Control IDs COMB1 and COMB2).

Permit Condition 2.13 requires the Permittee to operate the emission units in Attachment A with associated air pollution control device to control particulate matter emissions at all times emission units are operating except during periods of startup, shutdown, and malfunction.

Permit Condition 3.1 incorporates Georgia Rule (n), which requires the facility to minimize fugitive dust emissions.

Permit Condition 4.1 requires the Permittee to conduct routine maintenance on all air pollution control equipment.

Permit Condition 4.2 establishes the operating parameters for the post-combustors.

Permit Condition 4.3 requires the Permittee to install, operate, and maintain a bag leak detection system on all baghouses used to comply with the PM limit specified in Condition 2.3.

Permit Condition 4.4 requires the Permittee to operate the activated carbon injection system for Baghouses BH01 and BH05 when raw material being fed to the systems requires carbon injection.

Permit Condition 4.5 requires the Permittee to operate the bin vents when their respective silos are being filled.

Permit Condition 4.6 requires the Permittee to demonstrate compliance with applicable standards of 40 CFR 60 Subpart IIII for the emergency generators by purchasing an engine certified to the emission standards in 40 CFR 60.4205(b).

Permit Condition 4.7 requires the Permittee to operate and maintain the emergency generators according to the manufacturer's emission-related written specifications/instructions over the entire life of the engine.

Permit Condition 5.1 explains general requirements for the operation of a continuous monitoring system.

Permit Condition 5.2 outlines the requirements of the installation, calibration, maintenance, and operation of monitoring devices for the measurement of pollutants and parameters on the emission sources and control devices.

Permit Condition 5.3 requires the Permittee to install and operate a capture system that collects the gases and fumes from the vessel and from the transfer of molten material and convey the collected gas stream to a control device in accordance with 40 CFR 63 Subpart FFFFFF.

Permit Condition 5.4 requires the Permittee to prepare and operate at all times according to a written plan for the selection, inspection, and pretreatment of copper scrap. The written plan must be available on-site at all times for inspection.

Permit Condition 5.5 requires the Permittee to verify that each shipment of distillate fuel oil received for combustion in the emergency generators complies with the requirements of Permit Condition 2.8.

Permit Condition 6.1 contains standard requirements for performance testing.

Permit Condition 6.2 requires the Permittee to conduct performance testing for PM according to 40 CFR 63.11155(e) for each baghouse to demonstrate initial compliance with the PM emissions limit within 180 days after startup and report the results in the notification of compliance status. Subsequent PM testing must be performed within 5 years from the date of the previous performance test.

Permit Condition 6.3 requires the Permittee to conduct performance testing for hydrogen chloride (HCl), hydrogen fluoride (HF) and the metal hazardous air pollutants (HAPs): antimony, arsenic, cadmium, chromium, cobalt, manganese, nickel, lead, and mercury emissions within 180 days after startup of the Top Blown Rotary Converters.

Permit Condition 6.4 requires the Permittee to conduct performance testing for CO and VOC emissions to determine emission factors in units of pounds per ton of input (lb/ton) in the Top Blown Rotary Converters (Source Codes TBRC1, TBRC2 and/or TBRC3, TBRC4) within 180 days after startup. Subsequent tests must be performed within 60 months of the date of the previous test.

Permit Condition 6.5 requires the Permittee to determine the 3-hour average temperature in the Post-Combustors' (Emission Control IDs COMB1 and COMB2) combustion chamber using the device required by Condition 5.2.b.

Permit Condition 6.6 requires the Permittee to install, calibrate, maintain, and operate a continuous emissions rate monitoring system (CERMS) to measure NOx emissions. The Permittee is also required to conduct a relative accuracy test audit (RATA) on the NOx CERMS required by Condition 5.2.a on the Top Blown Rotary Converters and the Lead Tin Alloy Furnace/Ladle Treatment Stand within 180 days after startup.

Permit Condition 7.1 requires the Permittee to submit written notification to the Division within 15 days of initial startup.

Permit Condition 7.2 requires the Permittee to submit a notification of compliance status required by 40 CFR 63.9(h). The notification must include the information specified in 40 CFR 63.11157 (b)(1) through (b)(5) within 60-days of completion of the initial emission test under Condition 6.2.

Permit Condition 7.3 requires the Permittee to develop and submit to the Division for approval a Site-specific Monitoring Plan for each installed Bag Leak Detection System. The Permittee must comply with the Monitoring Plan at all times and must contain the items outlined in the Permit Condition.

Permit Condition 7.4 requires the Permittee to initiate procedures to determine the cause of every alarm within 1 hour of the alarm, except as provided in Condition 7.3.f. The Permittee must also alleviate the cause of the alarm within 3 hours of the alarm by taking necessary corrective actions.

Permit Condition 7.5 outlines the information the Permittee must maintain for each bag leak detection system.

Permit Condition 7.6 requires the Permittee to maintain files shall in a permanent form suitable for inspection for a period of at least five (5) years following the date of all measurements, reports, maintenance and records.

Permit Condition 7.7 requires the Permittee to maintain records of the process input weight (in tons) of each Top Blown Rotary Converter to calculate the monthly process input weight (in tons) for the TBRCs. All the calculations shall be kept as part of the record. The Permittee must also maintain records of the hours of operation for the emergency generators. Emergency generator records must also note emergency and any non-emergency hours of operation and the reason for the non-emergency operation.

Permit Condition 7.8 requires the Permittee to maintain fuel oil receipts obtained from fuel supplier certifying that the distillate fuel oil fired in the emergency generators meets the sulfur limit specified in 40 CFR Part 60 Subpart IIII.

Permit Condition 7.9 outlines the procedures for determining the monthly total emissions (in tons) of NOx, CO, and VOC emitted from the entire facility.

Permit Condition 7.10 requires the Permittee to use the monthly records required in Condition 7.9 to calculate the twelve-month rolling total of NOx, CO and VOC emissions from the entire facility for each calendar month.

Permit Condition 7.11 requires the Permittee to submit a report to the Division for each semiannual reporting period in which deviations have occurred.

Permit Condition 7.12 requires the Permittee to shall submit a written report for each semiannual period deviations as defined in Permit Condition 7.11 occurred.

Permit Condition 8.1 explains the Division’s authority to determine additional control of emissions.

Permit Condition No. 8.2 requires that a Title V permit application be submitted with 12 months of initial startup of the secondary smelting operation.

Permit Condition No. 8.3 requires the Permittee to pay an annual permit fee to the Division.

Toxic Impact Assessment

A toxic impact assessment in accordance with Georgia’s “Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions” was conducted by Aurubis and reviewed by the Division. Maximum Ground Level Concentrations (MGLCs) were computed using the SCREEN3 dispersion model for the toxic compounds having the highest potential impact with respect to their Acceptable Ambient Concentrations (AACs).

The resulting potential annual TAP emissions were compared against the Minimum Emission Rate (MER) required for modeling contained in the Georgia Air Toxics Guideline document. For those pollutants emitted at rates above the MER, air dispersion modeling was conducted to determine whether or not the modeled ground level concentration was below the Acceptable Ambient Concentrations (ACC). Below is a listing of the TAP emissions compared to the MER and indication of the TAPs that were required to be modeled.

Air Toxic Compound		Facility-wide PTE (lb/yr)	Minimum Emission Rate (MER) (lb/yr)	Modelling Required (yes/no)
CAS No.	Substance			
7664-41-7	Ammonia	42,470	24,330	Yes
7440-48-4	Cobalt	21.22	11.7	Yes
7440-50-8	Copper	2,305	117	Yes
7664-39-3	Hydrogen Fluoride	700	284	Yes
7439-92-1	Lead	75.82	5.84	Yes
7439-96-5	Manganese	26.69	12.2	Yes
7440-02-0	Nickel	99.44	89.6	Yes
7440-02-13	Silicon	2,562	1,159	Yes
1314-13-2	Zinc Oxide	71,102	29,000	Yes

Dispersion modeling is used primarily to estimate the likely ambient concentration of the air constituent within the surrounding air. This demonstration supports the permit application for the proposed new installations by Aurubis, fulfilling the requirement to evaluate whether the potential ambient air concentrations of toxic air pollutants (TAP) at locations outside the facility boundary are acceptable.

Air dispersion modeling analysis was performed to evaluate the impact proposed emissions will have on ambient air quality. An air dispersion model incorporates the source-specific parameters such as stack height, exit temperature, flow rate, and spatial location with meteorological conditions and building geometry to approximate the dispersion characteristics of a given stack plume across a study area.

USEPA regulatory model AERMOD version 21112 was used to perform the modeling analysis. AERMOD is the recommended model for air quality analyses per USEPA's Guideline on Air Quality Models (40 CFR Part 51, Appendix W). AERMOD is steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. The modeling was performed with AERMOD View commercial software developed by Lakes Environmental.

Several model options and input parameters are specified in order to customize the dispersion calculations to best approximate actual aerodynamic conditions at the project site. The model options and input parameters used for this analysis project were selected in accordance with EPD guidelines and are discussed in detail including outlining source-specific parameters used in the air dispersion modeling provided in Permit Application 28364.

The MGLC (Maximum Ground Level Concentration) for the five-year data set is compared with the corresponding AAC (Acceptable Ambient Concentration) for each pollutant and averaging period in Table 5-3. Since AERMOD does not report predicted concentrations in time averages less than 1-hour, the 15-minute average values are derived by multiplying 1-hour average results from AERMOD by a factor of 1.32. The use of this multiplying factor is done in accordance with the "Georgia Guideline for Ambient Impact Assessment of TAP." The results indicate that the predicted ambient concentrations for each modeled TAP are less than the AAC values that are considered to be protective of human health and the environment. Aurubis provided a copy of the AERMOD, AERMAP and BPIPPRM input and output files electronically to the Division.

TAP	AAC (µg/m3)	Time Average	Max Model Concentration (µg/m3)	Percent of AAC (%)
Cobalt	0.24	24-hour	2.01E-3	0.84%
Ammonia	100	Annual	0.29	0.29%
Ammonia	2,400	15-min	12.35	0.51%
Copper	2.4	24-hour	0.18	7.67%
Hydrogen Fluoride	245	15-min	0.27	0.11%
Hydrogen Fluoride	5.84	24-hour	0.066	1.14%
Lead	0.12	24-hour	0.016	13.50%
Manganese	500	15 min	0.010	0.0020%
Manganese	0.05	Annual	2.50E-04	0.50%
Nickel	0.794	24-hour	0.011	1.42%
Silicon	23.81	24-hour	0.20	0.83%
Zinc Oxide	1,000	15 min	36.17	3.62%
Zinc Oxide	12.00	24-hour	6.89	57.40%

The Data Modeling Unit (DMU) received the modeling data provided by Aurubis on June 6, 2022 and verified all modeled MGLCs of the TAPs were below the AAC values.

Public Comments Received

The public advisory was issued and expired on May 27, 2022. Several comments from the public were received by the Division and a public hearing has been scheduled for the public notice period. Public comments generally consisted of a form email with similar language to the below comment:

Comments #1-80 (Similar Language with small non substantial differences in email comments)
To Whom It May Concern, I want to voice my opposition to air permit #28364. As a member of the Augusta or surrounding community, I strongly oppose this permit request. The community in South Augusta where Aurubis has asked to release these chemicals is over 80% African-American. According to the EPA's National Air Toxic Assessment, the Augusta area has a 95 to 99 percent cancer risk rate. That ranks Augusta as high as cities like Atlanta and New York. The permit request for a facility on Valencia Way asks the state for permission to release more than 30 hazardous pollutants into the air that the people of Augusta breathe. The list includes things from arsenic to o-xylene that, if permitted, would be released "in and around the facility." I don't want that kind of release in my community. Savannah Riverkeeper opposed this permit, and so do I!

EPD Response:
EPA's NATA data for 2017 (taken from AirToxScreen Mapping Tool 7/25/2022) shows a cancer risk of 40 in one million for the census tracks near the facility which equates to 0.004% cancer risk. While there are hazardous air pollutants that will be emitted from the facility modeling shows that none of the emissions would be above safe levels for the community. Modeling determinations are discussed in more detail in prior sections of this narrative.

Savannah Riverkeepers Comment 1 (All comments submitted 3 times from two email accounts. Comment broken up for response clarity.):

"Savannah Riverkeeper is deeply concerned about the Aurubis, Richmond proposed air permit (#28364) and its effect on our community and nearby waterways. The proposed Aurubis facilities permit request includes a shockingly high number, over 30, of highly dangerous pollutants, from arsenic to o-Xylene, to be released in and around the facility, and the process includes multiple areas of fugitive emissions. While we recognize the need for electronics recycling and reuse, other facilities in our basin offering similar services are not requesting ⅓ the numbers of pollutants and at lower amounts. A facility unable to reduce its waste stream to a more manageable level should not locate in a community where air quality is already a serious concern. Augusta's air quality already ranks 28th worst in the nation (Particle Pollution in Augusta: The "State of the Air " report found that year-round particle pollution levels in Augusta were higher than in last year's report. The area was ranked 28th most polluted for year-round particulate pollution (worse than the ranking of 36th last year). The report also tracked short-term spikes in particle pollution, which can be extremely dangerous and even lethal. Augusta's short-term particle pollution improved in this year's report, which means there were fewer unhealthy days. The area is ranked 54th worst for short-term particle pollution. The "State of the Air" report found that nationwide, more than 4 in 10 people (135 million) lived with polluted air, placing their health and lives at risk. In Augusta, pollution placed residents at risk, including those who are more vulnerable to the effects of air pollution, such as older adults, children, and people with lung disease. The report also shows that nationally, people of color were 61% more likely to live in a county with unhealthy air than white people, and three times more likely to live in a county that failed all three air quality grades. The report also finds that climate change made air quality worse and harder to clean up.

https://www.lung.org/media/press-releases/2021-augusta-ga-state-of-the-air-release

The proposed location of this facility seems to align with the study's findings and threatens to exacerbate the environmental justice issues plaguing the community. Under the Federal Clean Air Act Amendments, air quality violations occur when an 8-hour ozone average exceeds 0.085 parts per million. Data recorded by GA EPD at a monitoring station at Bayvale Elementary School indicates that ozone levels in Augusta have exceeded the 8-hour standard for several years running, in varying numbers of days since the monitoring began in 1997. In 2018 the Georgia Department of Public Health found that 6.1% of male GA citizens suffer from asthma and 11.8% of female GA citizens suffer from asthma or other breathing-related illnesses. The prevalence of these asthma DPH numbers, in 2018, was highest among adults whose annual household income was less than $15,000 which leads us to believe that lower-income citizens and their air quality are impacted the most. In Georgia, child asthma rates are 16.2%, over double the national average and Augusta has been ranked as one of the top 10 Asthma cities in the country - currently ranked as #69 worst city in a 2021 report from the Asthma and Allergy Foundation of America. The location of the facility has clear environmental justice implications with the population surrounding the facility over 80% African American, and the EPA National Air Toxics Assessment cancer rate in the area is 95-99%."

EPD Response:

Richmond County meets all National Ambient Air Quality Standards (NAAQS) including for annual Particulate Matter (PM), short term PM, and ozone. The NAAQS are the established standard for air quality by EPA for the public. This source emits true minor levels of PM but will be permitted as a Title V source because of the source category copper smelter. This will ensure more oversight by EPD, more reporting requirements, and a shorter time between inspections. Aurubis is developing new recycling methods for materials. The different HAPs being emitted by this source are based on a new process that treats different materials not recycled at other area recyclers.

The numbers that Riverkeeper's has pulled are percentiles from another part of Richmond County. According to EPA's 2014 and 2017 NATAs the area surrounding the location of the facility is has a cancer risk of 0.004%. The percentiles and data presented in the NATA are screening tool indicators of areas that require more specialized analysis. The percent range quoted in Riverkeeper's comment are from a different area of Augusta and are much higher than the census tract area the facility is proposed to be built in.

SRK Comment 2

"This area already suffers from relic heavy metal toxicity, which this plant could exacerbate. Much of the relic contamination still sits in the soil and waterways around the area, waiting on taxpayer funds to remediate messes created from other industrial endeavors. The river and surrounding waterways within a short distance of this facility already exceed state standards for mercury contamination and fecal matter. The problem is compounded by the significant population of subsistence fishers engaging in this area year-round. We are very concerned with Aurubis's handling of their feedstock and the accompanying fugitive emissions. Fugitive emissions are unregulated emissions of contaminants the state accepts will migrate offsite. Those emissions should be aggressively minimized. The feedstock should be contained in warehouses and dust should be aggressively mitigated. Stormwater controls should require proper filtering of stormwater to ensure pollutants used on site have been removed from the stormwater before leaving the site. We fear that adding more particulate matter and emissions from the pyrolysis and smelting process will jeopardize air quality that is already compromised in Augusta. Our citizens should not have to tolerate air with higher concentrations of CO, NOx, VOCs, PMs, SO2, Organic and Inorganic HAPs, polycyclic organic compounds, and many other contaminants. Many of the hazardous materials requested to be discharged into the air are known carcinogens. EPAs current air assessment already shows an alarmingly high cancer risk rate for most of Richmond County.

The pollutant loads already in the air of Augusta Richmond County exist because of the current permitters already calling Augusta's river region home. It is also an unfortunate fact that the citizens in Augusta already show higher rates of lung-related health impacts. It is a reasonable assumption that increasing significant air pollutant discharges will not be beneficial to those already suffering from breathing-related issues, or other health-related issues caused by pollutant sources already existing in our community. The projected emission from the facility related to particulate matter is just below the allowable limit for yearly exposure. Allowing Arubis to discharge these high volumes of particulate matter when Augusta's air has continually experienced climbing unsafe particulate matter loads is irresponsible and un-protective of the citizens our state Environmental Agency works to protect. In the unfortunate event that hazardous materials are leaked, spilled, or escaped from this facility, what are the steps and financial coverage set up to ensure that the state and federal governments are not left with the remediation and cleanup bill? This is a facility requesting the ability to handle a large number of hazardous chemicals many of which if incorrectly handled could create legacy groundwater, soil, and surface water contamination our community will have to deal with long after the company is gone. We request information on the bonds, insurance, and funds Aurubis will be required to maintain to ensure the protection of our citizens both from pollution and the economic burden of being left with contaminated land once the company has run its course. This is not a foreign story for our community, however, it is a story we would not like to continue to perpetuate. It is critical that the companies asking to operate in our communities be able to provide clear evidence of their ability to clean up if something does go wrong."

EPD Response:
Fugitive PM emissions are included in the emissions calculations and are a small factor in total PM. State rules limit emissions from fugitive sources and require proper handling of PM to mitigate off site effects. Particulate Matter emissions are under major source thresholds. Allowable annual limits are based on modeling and risk assessments. Information submitted shows the facility is not near allowable annual limits for PM.

SRK Comment 3:

> "Unfortunately, Aurubis has had serious issues handling hazardous waste and managing its stormwater/wastewater in the past. The issues, seemingly of a chronic nature, give us great pause in trusting this company. The recent string of violations tells a story of repeated visits, failures to comply with requirements, and what comes across as leadership within the company not being quick to ensure they are maintaining and operating in a safe manner, nor quickly solving a problem once discovered. This is not only a possible environmental problem, but a possible OSHA issue as well. A quick google search showed numerous articles focused on issues in Buffalo NY: https://www.wkbw.com/news/i-team/the-price-of-water/i-team-aurubis-buffalo-factory-fined-240-000-for-violating-federal-pollution-law To our knowledge, this facility has not applied for wastewater, RCRA pre-treatment, or treatment permits. Air pollution often becomes stormwater pollution, and scrubbers used in air treatment often lead to a direct increase in wastewater pollutant loads. It is impossible to comment meaningfully about a project with so many different permitting actions without understanding the interconnectivity of the permits and their allowable pollutant loads. Groundwater contamination in the areas around the facility is already a known issue, regular extensive monitoring should be required. We have very serious concerns about the waste stream from the facility going into the City of Augusta's wastewater system. The City of Augusta uses a tertiary wetland filtering system and applies its solids on nearby farms. This facility could put both of those systems at risk. To the best of our knowledge, they have not applied for their stormwater permits. Their fugitive emissions and air discharges of over 30 chemicals will likely end up in their stormwater which will drain into the Spirit Creek basin and make its way to the Savannah River. Given the limited flows of the streams on the industrial site, it seems reasonable to assume wastewater will only be pre-treated on-site - feedback on how the Aurubis facility plans to deal with wastewater and stormwater would be greatly appreciated. Valencia Way sits just off Route 56 atop the ridge between Spirit Creek and McBean Creek and still, as one continues into the industrial park, Valencia Way descends into the McBean basin. So, Savannah Riverkeeper's concern here is that stormwater may flow into the Spirit Creek basin, an already heavily impaired waterway."

EPD Response:
EPD employs permit coordination to ensure that information is shared between branches. However, each permit is issued based on the merits of the application for the specific media. Air Permits do not limit or include water or hazardous waste conditions as experts in those branches are best able to ensure compliance with those regulations. Enforcement at a site in another state does not determine the permitting action of this particular source. It is understood that scrubbers used on site to control air pollution would necessarily create wastewater. How that wastewater is treated or discharged is regulated by water permitting.

SRK Comment:

> "Due to the complexity and overall length of the Aurubis, Richmond SIP & Air Quality Permit application (#28364), the Savannah Riverkeeper (SRK) humbly requests EPD deny the permit as written and we request a 90-day extension for the review process to properly review and understand the implications, and future environmental impacts that this industry will be bringing to the city of Augusta and the Savannah River Basin. We would request the time to provide meaningful feedback

on possible improvements to the process if improvements leading to fewer emissions are identified. Air quality experts on our end are reviewing this application and providing feedback and scientific understanding to ensure we are providing the most meaningful feedback possible. We also request an update on all other permits EPD will be requiring on-site. If an extension is granted we will submit our final comments within the allotted time frame."

EPD Response:
EPD did not extend the public advisory period. EPD maintains the public advisory period to ensure early access to the permit application. The Division is holding a public notice period on the draft permit and hosting a public hearing for verbal comments. The public will have an additional public notice period for 37 days to comment on the draft permit. This added period represents greater than the requested extension.

Summary & Recommendations

Therefore, I recommend issuing proposed Air Quality Permit No. 3341-245-0209-E-01-0 to Aurubis Richmond LLC for the construction and operation of a copper recycling facility and secondary copper smelter. The public advisory was issued, and it expired on May 27, 2022. The facility is a PSD/NSR minor source and a true minor source with respect to emissions, however as outlined in 40 CFR 63 Subpart FFFFFF, the Permittee is required to obtain a Part 70 Permit, thus Aurubis Richmond LLC will become a Title V source. Aurubis Richmond LLC will be required to submit a Title V Major Source Operating Permit Application within one year after startup of the copper smelting operations.