GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

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NARRATIVE

TO: Cynthia Dorrough

FROM: Renee Browne

DATE: May 18, 2022

Facility Name:	**Schnitzer Southeast Holdings, LLC**
AIRS No.:	08900392
Location:	Lithonia, GA (Dekalb County)
Application #:	28330 and 28398
Date of Application:	March 17, 2022 and May 5, 2022

Background Information

Schnitzer Southeast Holdings, LLC (referred hereafter as "Schnitzer Southeast Holdings") is located at 6781 Chapman Road, Lithonia, Georgia 30058. The facility was constructed in 2014, and currently consists of a wire chop line (Source Code: WC01) and associated baghouse (Source Code: BH01), a metal shredder (Source Code: SR02) and color sorter (Source Code: CS01). The wire chop line chops copper and aluminum wires into small pieces and separates the wire casing and insulation from the metal. The chopped wire passes through the shredder, two granulators and a series of screens/separators that will filter out the smaller pieces of plastic and fiberglass that may contain trace pieces of metal. Finer scraps collected from the screens/separators are collected in drums for disposal. The chop line has a cyclone and a baghouse connected in series to remove light plastic and fiberglass pieces and deposit them into a bin for disposal. The baghouse is located outside of the facility and the emissions associated with this process are from PM, PM_{10}, VOC, and HAPs. Schnitzer Southeast Holdings is classified as a PSD minor source because potential emissions of regulated pollutants are below 250 tpy and it is not one of the 28 named source categories under PSD. The cyclone and baghouse attached to the chop line is inherent to the process and the equipment will not be able to operate without the presence of the cyclone and baghouse.

Prior to Application No. 28330, the facility also operated a dry shredder with a max output of 50 tons/hr (Previously Source Code: SR01) to shred automobiles and large scrap metal. The shredded scrap would then be conveyed to a series of magnets, shakers/screens and transfer points, and ultimately separated into ferrous, non-ferrous and waste which are separated into bunkers for each material type. The facility replaced the previous shredder (Previously Source Code: SR01) with an electrically powered shredder (Source Code: SR02) that had a max output of 120 tons/hr. Application No. 28330 dated March 17, 2022, proposes to replace the motor thus increasing the capacity of the shredder to 180 tons/hr. Schnitzer Southeast Holdings also has a color sorter (CS01) for expedited sorting of non-ferrous scrap metal. The color sorter (Source Code: CS01) has a potential throughput of 1.5 tons/hr.

Purpose of Application

Application No. 28330 was received by the Division on March 18, 2022. Application No. 28398 for a name and ownership change from Encore Recycling, LLC to Schnitzer Southeast Holdings, LLC was received by the Division on May 5, 2022.

The facility is proposing to update the emission factors for existing Shredder SR02 using data from recent emission tests conducted at a similar facility, but with a significantly larger shredder than Schnitzer Southeast Holdings's. The emission factors are being updated for PM, PM_{10}, $PM_{2.5}$, VOCs, and HAPs. In addition, the facility is proposing to install a new motor on the Shredder, increasing the throughput to a maximum of 180 tons/hr. No changes are being made to the Wire Chop Line or Color Sorter.

With these new emission factors and modifications, the facility will have the potential to emit VOCs and HAPs above the Title V Major Source thresholds and VOCs above the PSD Major Source threshold. Permit Application No. 28330 proposes a Synthetic Minor Permit to limit facility-wide emissions below the Title V Major Source thresholds by imposing a federally enforceable throughput limit on the Shredder. The proposed throughput limit is 275,000 tons per year restricted to a maximum of 50% automobiles.

In addition, in order to demonstrate compliance with Georgia Air Quality Rules for Toxic Air Pollutants, Application No. 28330, the facility is also proposing the following:

"The total tons of automobiles and light iron shredded per day shall be limited according to the following:

$$X + \frac{Y}{14.8} \leq 900$$

Where:

X = tons of automobiles shredded per day
Y = tons of light iron shredded per day
14.8 = ratio of the benzene emission factor for shredding automobiles to the benzene emission factor for shredding light iron"

A public advisory was issued for Permit Application No. 28330 on March 24, 2022 and ended on April 22, 2022. No comments were received.

Updated Equipment List

Emission Units			Associated Control Devices	
Source Code	Description	Installation Date	Source Code	Description
WC01	Wire Chop Line	2014	BH01*	Cyclone/Baghouse
SR02	Metal Shredder (Wendt 80105); New motor and 180 tons/hr throughput	2019/2022 (motor)	--	--
CS01	Color Sorter (Combisense [CRGB-EMB][S-1200][B])	2019	--	--

* BH01 is inherent to the process and is not considered a control device, but process equipment.

Emissions Summary

Facility-Wide Emissions
(in tons per year)

Pollutant	Potential Emissions			Actual Emissions		
	Before Mod.	After Mod.	Emissions Change	Before Mod.	After Mod.	Emissions Change
PM	2.711	210.4	+207.7	0.9737	37.15	+36.18
PM_{10}	0.2626	91.62	+91.4	0.1708	16.09	+15.92
$PM_{2.5}$	6.89e-2	0.1031	+3.42e-2	4.7e-2	4.86e-2	+1.6e-3
NOx	-	-	-	-	-	-
SO_2	-	-	-	-	-	-
CO	-	-	-	-	-	-
VOC	-	662.3	+662.3	-	93.84	+93.84
Max. Individual HAP	-	38.55	+38.55	-	6.724	+6.724
Total HAP	-	102.8	+102.8	-	14,33	+14.33
Total GHG (if applicable)	-	-	-	-	-	-

(1) Individual HAP emissions are the highest emissions between shredding all light iron or shredding all automobiles. Worst-case Total HAPs is the highest Total HAPs from either shredding all light iron or shredding all automobiles; it is not the sum of all the worst-case HAPs.
(2) Emissions are based upon the controlled emissions through the baghouse as it is not practical to operate the system without the baghouse in place.

Emission Factors

Updated emission factors for the existing Shredder SR02 are obtained from source testing data at the Schnitzer Steel Industries (SSI) facility in Oakland, CA provided in the document *Recommended Test Methods and Emission Factors for Metal Shredding Operations Conducted at Schnitzer Steel Industries' Facilities (October 2019)* and included in Section 7 of the Application No. 28330. The VOC emission factors for fugitive emissions from a shredder without an enclosure or VOC controls are used. Separate emission factors are provided for shredding Auto Bodies (automobiles) and Light Iron (scrap metals and metal containing consumer products).

The PM emission factor is for fugitive emissions from a shredder without an enclosure utilizing a water spray control system. The same emission factor is used for all shredded materials. Since no credible size speciation data for particulates are available for metal shredding facilities, data from AP-42 Chapter 11.19.2 (crushed stone processing) is used.

According to AP-42, PM_{10} for tertiary crushing (uncontrolled) is calculated to be 44% of PM. No data is available for $PM_{2.5}$, but PM $_{2.5}$ emissions can be considered negligible given the mechanical processes that create the particulate matter.

Updated HAP emission factors are also provided in the SSI test results. Separate emission factors are used for shredding Auto Bodies and Light Iron where available.

The Shredder's conveyor transfer points for shredded materials are also a source of fugitive particulate emissions. There are 10 conveyors, not counting the in-feed line to the mill. No specific emission factors for scrap transfer could be found. Based on data from other facilities, AP-42, Chapter 11.19.2 – Crushed Stone Processing is typically utilized for determination of emissions. These emission factors are expected to be conservative as crushed stone processing typically generates greater fine particulates than scrap steel. The emission factors from Table 11.19.2-2 for wetted material conveyor transfer points for PM, PM10, and PM2.5 are 0.00014 lb/ton, 0.000046 lb/ton, and 0.000013 lb/ton, respectively. The Shredder's maximum potential throughput is 1,576,800 tons per year (based on capacity of 180 tons/hour and 8,760 hours/year). Permit Application No. 28330 proposes a throughput limit of 275,000 tons per year on the Shredder restricted to a maximum of 50% automobiles in order to stay below Title V Major Source thresholds for VOCs and HAPs.

Prior to this project, emission factors for metal shredders were not available, and the best available emission factors were AP-42 Chapter 11.19 emission factors for the Crushed Stone Process. The only emissions from the shredding operations were determined to be PM, PM_{10}, and $PM_{2.5}$, and the facility operated under a True Minor Permit.

Regulatory Applicability

Federal Regulations

Part 70, Chapter I, Title 40 of the Code of Federal Regulations (40 CFR Part 70) – State Operating Permits Programs

This regulation contains the provisions for establishing a federal permitting program for "major sources" (Title V) of emissions. The major source threshold for hazardous air pollutants (HAP) emission is 25 tons per year for all hazardous air pollutants and 10 tons per year for individual hazardous air pollutants. Dekalb County is an attainment county in which the major source threshold for NOx and VOC emissions is 100 tons per year.

The facility currently operates under Permit No. 5093-089-0392-B-01-0 and Amendment No. 5093-089-0392-B-01-1. After the proposed modifications, the facility will have the potential to emit VOCs and HAPs above the Title V Major Source thresholds. Permit Application No. 28330 proposes a Synthetic Minor Permit to limit facility-wide emissions below the Title V Major Source thresholds by imposing a federally enforceable throughput limit on the Shredder.

State Regulations

Georgia Rule 391-3-1-.02(2)(tt)- Emission of VOCs from Major Sources
This rule prohibits the emission of VOCs from any source to exceed 25 tons per year from sources located in Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding and Rockdale counties unless such source has been approved by the Director as meeting the appropriate requirement for all reasonably available control technology (RACT) in controlling the emissions of VOCs. Potential VOC emissions does result in a major source status for the facility; therefore the facility is subject to Georgia Rule 391-3-1-.02(2)(tt).

Since the facility is located in Dekalb county and will have VOC emissions exceeding 25 tpy, the facility is required to conduct a Reasonably Available Control Technology (RACT) demonstration. A RACT demonstration for the Shredder is provided in Section 6 of Permit Application No. 28330.

VOC RACT (Reasonably Available Control Technology) Analysis-Applicant

Introduction

Schnitzer Southeast Holdings is proposing to limit annual shredder infeed to 275,000 tons per year (TPY) and the resulting VOC emissions to 93.5 TPY. The facility is located in DeKalb County, which was previously designated as an ozone non-attainment area with a major source threshold of 25 TPY until 2018 when the greater-Atlanta ozone non-attainment area was re-designated as an attainment area and the VOC major source threshold was increased to 100 TPY. GAEPD Rule 391-3-1.02(2)(tt) - *VOC Emissions at Major Sources* continues to apply to facilities in DeKalb County with potential VOC emissions in excess of 25 TPY and requires that a Reasonably Available Control Technology (RACT) analysis be conducted. The RACT analysis must identify the technologies and management practices available to reduce VOC emissions, eliminate infeasible options, determine the cost effectiveness of technically feasible options, evaluate energy, economic and environmental impacts, and propose the level of control determined to represent RACT.

Georgia Rule (tt) defines RACT as "the utilization and/or implementation of water based or low solvent coatings, VOC control equipment such as incineration, carbon adsorption, refrigeration or other like means as determined by the Director to represent reasonably available control technology for the source category in question." The following is the RACT analysis.

RACT Review for VOC

Metal shredders have the potential to emit VOCs from the shredding of recyclable materials including automobiles and appliances. As described in a recent EPA Enforcement Alert, emission test data confirm that VOCs are emitted from metal shredders and the hourly rate varies depending on the size of the shredder and the type of material being shred (automobiles, appliances, light iron, etc.). Emission rates are generally lower when the facility removes fluids before shredding (known as "depolluting"). The process of grinding and shredding scrap metal generates heat which causes residual fluids and other non-metal materials to be emitted to the air. The type of permit and level of control required depends on the size of the shredder, potential annual emissions, and whether the shredder is located in an area that meets the National Ambient Air Quality Standard (NAAQS) for ozone (i.e., an "attainment area"). Very large shredders located in non-attainment areas with uncontrolled emissions that exceed major source thresholds are required to achieve Best Available Control Technology (BACT), which is generally more stringent that RACT. Smaller shredders located in attainment areas with potential VOC emissions below the major source threshold are not typically required to achieve BACT.

A search of the RACT/BACT/LAER Clearinghouse (RBLC), using process codes 29.900 and 81.380, identifies only three metal shredding facilities, one in Massachusetts and two in Indiana. Both shredders have an infeed capacity of 300 TPH. The Massachusetts facility is located in an ozone transport region and the Indiana facility is located in an attainment area. A Regenerative Thermal Oxidizer (RTO) system was required at the Massachusetts facility including a drop out box, venturi scrubber upstream of the RTO, and an acid gas scrubber downstream of the RTO.

VOC controls were determined to be infeasible for the Indiana facilities. The Indiana facilities operate with an annual throughput and VOC limit below 100 TPY and employs best management practices including draining fluids prior to shredding and inspecting incoming loads to confirm that fluids have been properly drained.

There are several other metal shredders permitted in the US with VOC emission controls that do not appear in the RBLC, including shredders in California, Minnesota, and Illinois. The shredders at these facilities have infeed capacities ranging from 300-500 TPH. The emission control systems at these facilities were required as part of enforcement actions and also include upstream and downstream controls necessary to operate the RTO effectively.

<u>Step 1: Identify Available Control Technologies</u>

The technologies available to control VOC emission include destructive technologies and recovery technologies. Thermal oxidizers are used to destroy VOC emissions while adsorption and condensation are used to recover VOCs. Best management practices, such as draining fluids, and establishing annual throughput limits are also used to control VOC emissions.

The following technologies and techniques were evaluated as part of the RACT analysis:

1. Thermal oxidation
2. Adsorption
3. Condensation
4. Emission Limits (Annual, Hourly)
5. Good Management Practices

<u>Step 2: Eliminate Infeasible Technologies</u>

1. Thermal Oxidation

There are three basic types of thermal oxidizers: direct-fired, catalytic, and regenerative (RTO)/recuperative. Direct-fired thermal oxidizers typically burn natural gas in a burner to heat the exhaust up to the temperature required to fully oxidize the VOCs, generally between 1600 °F and 1900 °F. Direct-fired thermal oxidizers are typically used on streams with a high inlet VOC inlet concentration (1,500 ppm+) where the heat of combustion produced from oxidizing the VOCs is sufficient to sustain adequate operating temperatures without large quantities of auxiliary fuel. Metal shredder exhaust does not contain high enough inlet VOC concentrations to operate without auxiliary fuel. Direct-fire thermal oxidizers <u>were therefore eliminated from further consideration</u>.

Regenerative and recuperative thermal oxidizers incorporate heat recovery to reduce fuel consumption. RTOs utilize multiple heat recovery beds filled with ceramic heat exchange media to preheat the VOC-laden air stream prior to entering the combustion chamber. The air stream enters the first heat exchange bed, passes through the media and is preheated prior to the combustion chamber. After passing through the combustion chamber, the clean air stream enters a second heat exchange bed transferring heat to the ceramic media. The flow through the heat exchange beds switches at regular intervals to retain the heat of combustion and preheat the VOC laden air stream. Recuperative thermal oxidizers utilize air-to-air heat exchangers rather than ceramic media to recover the heat but generally recover less heat than regenerative oxidizers. RTOs are technically feasible and are the only VOC control device technology used in practice on metal shredders. Recuperative oxidizers are technically feasible but recover less heat than RTOs (with similar cost) and therefore were eliminated from further consideration.

Catalytic oxidizers utilize a catalyst, typically a noble metal such as palladium or platinum or metal oxide, to reduce the temperature required to oxidize the VOCs. Catalytic oxidizers typically operate in the 650-1000 °F range. Catalytic oxidation is not technically feasible on a metal shredder because the shredder exhaust contains halogenated compounds which can foul or poison the catalyst and was eliminated from further consideration.

2. Adsorption

Adsorption involves passing a VOC-laden stream through a bed of solid adsorbent media. VOC molecules from the gas stream contact the surface of the media where they are held by physical attraction. When the media becomes saturated, it must either be replaced or regenerated. There are many different types of adsorbent materials including carbon, synthetic zeolites, silica gel, activated alumina, each having different affinities for adsorbing VOCs. The adsorptive capacity of the selected adsorbent material depends on the concentration, molecular weight, diffusivity, polarity, and boiling point of the organic compound to be removed. Selection of the appropriate adsorbent depends on the range of pore sizes relative to the molecular size of the VOC to be adsorbed. Shredder exhaust contains a mixture of many different compounds with different molecular sizes and other physical characteristics. Shredder exhaust also contains moisture which reduces VOC adsorption and halogenated solvents which can damage the adsorbent. Adsorption is not technically feasible on a metal shredder because the shredder exhaust contains moisture and a mixture of different organic compounds. Adsorption also has not been demonstrated in practice on metal shredders and was eliminated from further consideration.

3. Condensation

Condensation can be used to convert gaseous emissions to their liquid form by either reducing the temperature below a gaseous pollutant's dew point or decreasing pressure. Condensation is typically used for high temperature, high concentration exhaust streams with relatively low volumes of air to selectively recover a single VOC for reuse. The control efficiency of condensation varies depending on the temperature of the exhaust stream and the inlet VOC concentration. A pilot study conducted by a California recycling facility in 2007 indicated removal efficiencies ranging from 23% to 45%, depending on the type and amount of infeed material and the exhaust flow rate. The custom system reduced the exhaust temperature from 100 °F to 40 °F and generated a solvent-laden wastewater that requires proper disposal. Condensation has not been demonstrated in practice on metal shredders and was eliminated from further consideration.

4. Emission Limits

Schnitzer Southeast Holdings is proposing to limit the annual shredder infeed to 275,000 tons per year (TPY) and the resulting VOC emissions to 93.5 TPY.

5. Best Management Practices

Incoming material is inspected in accordance with Schnitzer Southeast Holding's Scrap Acceptance Policy and materials are de-polluted prior to shredding. The facility will also track monthly and rolling 12-month emissions to demonstrate that VOC emissions are less than 93.5 TPY by tracking shredder throughput.

Ranking Remaining Control Technologies

As described above, the only technology considered technically feasible and in practice for VOC control on metal shredders is an RTO. RTOs can achieve a destruction efficiency of 99%. The capture efficiency of the enclosure, which includes openings for the infeed and exit conveyors, is assumed to be approximately 95%. The resulting overall control efficiency is 94%.

Energy, Environmental and Economic Impacts

Energy & Environmental

The RTO will consume natural gas and electricity. The consumption of the RTO was calculated using the EPA Manual and calculation spreadsheet provided by EPA (dated 2018). Energy impacts are important considerations as the nation looks to move away from fossil fuels as part of global efforts to address climate change. Based on EPA spreadsheet calculations, the annual natural gas consumption is estimated to be 7.4 million cubic feet (mmcf) per year and the estimated electricity consumption to power the system fan is estimated to be over 2.3 million kWh per year.

Combustion of natural gas will generate secondary impacts, including NOx, CO, and greenhouse gas (GHG) emissions. Based on the estimated annual energy consumption, the estimated nitrogen oxides (NOx), carbon monoxide (CO) and GHG emissions are as follows: 0.37 TPY NOx, 0.31 TPY CO and 444 TPY CO2e.

Cost Effectiveness

In order to install an RTO on a metal shredder, an enclosure must be constructed around the shredder to contain and collect the emissions. The enclosure must have an opening for the infeed conveyor to deliver the recyclable material to the shredder and an opening at the exit to convey the shredded material to the downstream system. Access doors must also be provided for maintenance but are typically kept closed during shredder operation. The surface area of the openings must be minimized, and sufficient air flow provided in order to maximize capture efficiency. That said, 100% capture is not feasible given the size of the shredder enclosure and the need for openings at the infeed and exit. For the purposes of this analysis, the enclosure is assumed to achieve 95% capture efficiency.

Prior to entering the RTO, the collected emissions must first be routed to a pre-cleaning step, such as a drop out box or cyclone, to remove fibers and large particles, and then to a particulate matter (PM) control device, such as a venturi scrubber, baghouse, or roll filter media, to remove the remaining PM. If PM enters the RTO, it will plug the ceramic heat exchange media. An acid gas scrubber must be provided after the RTO to control acid gases that form in the RTO from the combustion of halogenated compounds. A supervisory control and data acquisition (SCADA) system is required to coordinate and manage proper operation of the various emission control devices. The system must be operated and maintained by trained personnel.

An economic analysis was performed to determine the total capital cost and annual cost per ton of VOC removed for an emission control system. Costs were based on the EPA OAQPS Control Cost Manual (Manual) and EPA spreadsheet calculations for a 60,000 CFM system. The purchased equipment cost entered into the EPA spreadsheet is based on actual costs for another similar project and includes the cost of the RTO, enclosure, fan, variable frequency drive (VFD), power distribution center, compressed air system, venturi scrubber upstream of the RTO, and acid gas scrubber downstream of the RTO.

The facility notes that the EPA spreadsheet calculations underestimate several costs, based on actual cost data from larger shredder facilities with emission control systems. In particular, the estimated natural gas consumption is low. The actual VOC content of the exhaust stream fluctuates depending on the infeed material, requiring additional natural gas to maintain temperature when the VOC content in the exhaust stream is low. The calculations also assume that the RTO is running 2,080 hours per year. However, the RTO would likely run even when the shredder is down at a reduced air flow rate to maintain a minimum temperature and minimize cold starts (natural gas would still be consumed during these periods). The operation and maintenance labor costs are also quite low. A full time, qualified employee is required to operate and maintain such a complex emission control system. In addition, operational costs associated with the upstream and downstream scrubbers, such as water consumption, wastewater discharges, and filtration costs, were not included in this cost analysis.

A summary of the capital and operating costs is provided Table 1 below. The EPA cost spreadsheet is provided in the Appendix of Section 6 of Permit Application No. 28330. The cost analysis indicates that the cost per ton of VOC removed is $31,385, which is not considered economically feasible for a non-major source in an ozone attainment area.

Table 1: RACT Cost Summary

Description	Cost
Total Purchased Equipment Cost	$14,233,493
Total Direct Installation Costs	$4,270,048
Total Indirect Installation Costs	$3,985,378
Contingency Cost	$2,248,892
Total Capital Investment	**$24,737,811**
Direct Annual Costs	$61,583
Indirect Annual Costs	$2,698,325
Total Annual Cost	**$2,759,908**
VOC Destroyed	87.94
Cost Effectiveness ($/ton removed)	**$31,385**

Step 5: Select RACT

RACT for VOC emissions from the Schnitzer Southeast Holdings metal shredder is determined to be achieved by limiting shredder infeed to less than 275,000 TPY and thus VOC emissions to less than 93.5 TPY and employing best management practices, including implementation of the Scrap Acceptance Policy, shredding only depolluted materials, and tracking of monthly and rolling 12-month VOC emissions by tracking of monthly shredder infeed and rolling 12-month shredder infeed.

VOC RACT (Reasonably Available Control Technology) Analysis - EPD Review

On May 11, 2022, a search of the RACT/BACT/LAER Clearinghouse (RBLC), using process codes 29.900 and 81.380, identifies only three metal shredding facilities, one in Massachusetts (Prolerized New England Co., LLC) and two in Indiana (both named Omnisource, LLC). Two of the shredders have an infeed capacity of 300 TPH and one has an infeed capacity of 200 TPH. The Massachusetts facility is located in an ozone transport region and the Indiana facilities are located in attainment areas. A Regenerative Thermal Oxidizer (RTO) system was required at the Massachusetts facility including a drop out box, venturi scrubber upstream of the RTO, and an acid gas scrubber downstream of the RTO.

The Massachusetts facility application was submitted as a result of a Consent Judgment in the Matter of Commonwealth v. Metal Recycling, LLC, et al. (Suffolk Superior Court) Superior Court Civil Action No. 15-2880 entered on September 24, 2015. The Permittee proposed to capture and control emissions generated during the existing shredding process. The process has a 98% control efficiency for VOCs.

VOC controls were determined to be infeasible for the Indiana facilities. The Indiana facilities operates with an annual throughput and thus VOC limit below 100 TPY and employs best management practices including draining fluids prior to shredding and inspecting incoming loads to confirm that fluids have been properly drained.

On May 12, 2022, I spoke with Nathan Bell, Technical Environmental Specialist, Permits Branch, IDEM, Office of Air Quality. He gave some background on the two Indiana facilities, with RBLC ID Nos. IN-0151 and IN-0152.

2205 South Holt Road, Indianapolis, Indiana 46241 (RBLC entry for IN-0151)

The vehicle/metal 300 ton/hr shredding plant was constructed in 2006. In 2010, OmniSource provided a higher VOC emission factor **(0.25 lbs VOC/ton**) for the existing vehicle/metal shredding plant, based on VOC stack test data from a sister facility in Jackson, Michigan. As a result of the higher VOC emission factor, the existing vehicle/metal shredding plant became subject to Indiana State VOC BACT Rule (326 IAC 8-1-6). The 2012 permit which contained the BACT requirements was a Federally Enforceable State Operating Permit (FESOP) Renewal with New Source Review (NSR). The 2012 permit was **not** for a new greenfield source. The RBLC Permit Type should have been entered as a modified facility (modified existing process at existing facility).

1143 Fairview Avenue, Fort Wayne, IN 46803 (RBLC entry for IN-0152)

This "source" consists of 2 existing plants that were combined into one (1) single "source" in 2012. Plant 1 is a metal chips recovery plant, located at 1143 Fairview Avenue, Fort Wayne, IN 46803 and Plant 2 is a vehicle/metal 200 ton/hr shredding plant, located at 3601 Maumee Avenue, Fort Wayne, IN 46803. The vehicle/metal shredding plant was constructed in 1992. In 2010, OmniSource provided a higher VOC emission factor (**0.25 lbs VOC/ton**) for the existing vehicle/metal shredding plant, based on VOC stack test data from a sister facility in Jackson, Michigan. As a result of the higher VOC emission factor, the existing vehicle/metal shredding plant became subject to Indiana State VOC BACT Rule (326 IAC 8-1-6). The 2012 permit which contained the BACT requirements was a Federally Enforceable State Operating Permit (FESOP) Renewal with New Source Review (NSR). The 2012 permit was **not** for a new greenfield source. The RBLC Permit Type should have been entered as a modified facility (modified existing process at existing facility).

The Schnitzer Southeast Holdings, LLC facility uses a VOC emission factor of 0.84 **lb VOC/ton** for automobiles and **0.525 lb VOC/ton** for light iron from the document *Recommended Test Methods and Emission Factors for Metal Shredding Operations Conducted at Schnitzer Steel Industries' Facilities (October 2019)* and included in Section 7 of Application No. 28330.

As mentioned above, an economic analysis was performed for this project, to determine the total capital cost and annual cost per ton of VOC removed for an emission control system. Costs were based on the EPA OAQPS Control Cost Manual (Manual) and EPA spreadsheet calculations for a 60,000 CFM system. The purchased equipment cost entered into the EPA spreadsheet is based on actual costs for another similar project and includes the cost of the RTO, enclosure, fan, variable frequency drive (VFD), power distribution center, compressed air system, venturi scrubber upstream of the RTO, and acid gas scrubber downstream of the RTO.

EPD Review - Conclusion – VOC Control

Upon review of the project's cost-effectiveness calculations, the cost effectiveness is $31,385 lbs/ton which is considered excessive, compared to the maximum rate of $10,000 lbs/ton (as a rule of thumb used on previous EPD PSD permits), which is considered reasonable. The resulting VOC RACT will be similar to the Indiana facilities mentioned above. As such, RACT for VOC emissions from the Schnitzer Southeast Holdings metal shredder is determined to be achieved by limiting shredder infeed to less than 275,000 TPY and thus VOC emissions to less than 93.5 TPY, and employing best management practices, including implementation of a Scrap Acceptance Policy, inspections and shredding of only depolluted materials, and tracking of monthly and rolling 12-month VOC emissions by tracking of monthly shredder infeed and rolling 12-month shredder infeed.

Georgia Rule 391-3-1-.02(2)(yy)- Emission of Nitrogen Oxides from Major Sources

This rule prohibits the emission of nitrogen oxides from any source to exceed 25 tons per year from sources located in Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding and Rockdale counties unless such source has been approved by the Director as meeting the appropriate requirement for all reasonably available control technology (RACT) in controlling the emissions of nitrogen dioxides. Potential NOx emissions does not result in a major source status for the facility; therefore the facility is not subject to Georgia Rule 391-3-1-.02(2)(yy).

Permit Conditions

Permit Condition 2.1 limits visible emissions from all process equipment to less than 40 percent opacity.

Permit Condition 2.2 requires the Permittee to operate the baghouse at all times the wire chop line is in operation.

Permit Condition 2.3 limits PM emissions from any source to the allowable rate calculated from the equations listed in Georgia Rule 391-3-1-.02(2)(e).

Permit Condition 2.4 limits the throughput of shredded automobiles per twelve consecutive months to 137,500 tons.

Permit Condition 2.5 limits the throughput of shredded automobiles and light iron per twelve consecutive months to 275,000 tons.

Permit Condition 2.6 subjects the facility to Georgia Rule 391-3-1-.02(2)(tt) - VOC Emissions from Major Sources.

Permit Condition 2.7 state the facility's VOC RACT requirements.

Permit Condition 2.8 contains the following limit:

The total tons of automobiles and light iron shredded per day shall be limited according to the following:

$$X + \frac{Y}{14.8} \leq 900$$

Where:

X = tons of automobiles shredded per day
Y = tons of light iron shredded per day
14.8 = ratio of the benzene emission factor for shredding automobiles to the benzene emission factor for shredding light iron"

Permit Condition 3.1 requires the Permittee to take all reasonable precautions with any operation, process, handling, transportation or storage facilities to prevent fugitive emissions or air contaminants.

Permit Condition 4.1 requires the Permittee to perform maintenance on all air pollution control equipment. Maintenance records shall be in a format suitable for inspection and submittal to the Division.

Permit Condition 4.2 requires the Permittee to maintain an inventory of filter bags such that an adequate supply of bags is available to replace any defective bags.

Permit Condition 5.1 requires the Permittee to perform daily check for visible emissions from the baghouse and inspect the emission units for mechanical problems or malfunction.

Permit Condition 5.2 requires the Permittee to monitor the pressure drop across the baghouse.

Permit Condition 5.3 requires the Permittee to establish a Preventive Maintenance Plan for the baghouse.

Permit Condition 6.1 provides guidelines for performance and compliance testing.

Permit Condition 7.1 requires the Permittee to record and maintain daily operating records for the wire chop line.

Permit Condition 7.2 requires the Permittee to record and maintain daily operating records for the metal shredder.

Permit Condition 7.3 states the color sorter (Source Code: CS01) record keeping requirements.

Permit Condition 7.4 states the shredder throughput recordkeeping requirements.

Permit Conditions 7.5 and 7.6 state the VOC RACT recordkeeping requirements.

Permit Condition 7.7 requires monthly shredder throughput recordkeeping requirements.

Permit Condition 7.8 requires twelve consecutive month shredder throughput recordkeeping requirements.

Permit Condition 7.9 requires reporting of permit exceedances for Permit Condition Nos. 2.4 and 2.5.

Permit Condition 7.10 requires the facility provide initial notification of the shredder startup after installation of the new motor.

Permit Condition 8.1 grants the Division the right to amend the provisions of the Permit in the event additional control of emissions from the facility is required.

Permit Condition 8.2 requires the facility to pay annual permit fees.

Toxic Impact Assessment

Georgia Toxic Air Pollutant Modeling Analysis

Georgia EPD regulates the emissions of toxic air pollutant (TAP) emissions through a program covered by the provisions of *Georgia Rules for Air Quality Control*, 391-3-1-.02(2)(a)3.(ii). A TAP is defined as any substance that may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. Procedures governing the Georgia EPD's review of TAP emissions as part of air permit reviews are contained in the agency's "*Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions (Revised)*."

Selection of Toxic Air Pollutants for Modeling

For projects with quantifiable increases in TAP emissions, an air dispersion modeling analysis is generally performed to demonstrate that off-property impacts are less than the established Acceptable Ambient Concentration (AAC) values. The TAP evaluated are restricted to those that may increase due to the proposed project. Thus, the TAP analysis would generally be an assessment of off-property impacts due to facility-wide emissions of any TAP emitted by a facility. To conduct a facility-wide TAP impact evaluation for any pollutant that could conceivably be emitted by the facility is impractical. A literature review would suggest that at least one molecule of hundreds of organic and inorganic chemical compounds could be emitted from the metal shredder.

For each TAP identified for further analysis, both the short-term and long-term AAC were calculated following the procedures given in Georgia EPD's *Guideline*. Figure 8-3 of Georgia EPD's *Guideline* contains a flow chart of the process for determining long-term and short-term ambient thresholds.

Determination of Toxic Air Pollutant Impact

The Georgia EPD *Guideline* recommends a tiered approach to model TAP impacts, beginning with screening analyses using SCREEN3, followed by refined modeling, if necessary, with ISCST3 or ISCLT3. For the refined modeling completed, the infrastructure setup for the SIA analyses was relied upon with appropriate sources added for the TAP modeling. Note that per the Georgia EPD's *Guideline*, downwash was not considered in the TAP assessment.

Shredder SR02 is the only source of TAPs. According to the data in *Recommended Test Methods and Emission Factors for Metal Shredding Operations Conducted at Schnitzer Steel Industries' Facilities (October 2019)*, the Shredder is a source of 37 different TAPs. As part of the screening analysis, Screen3 (version 6.04) was used to model the TAP with the highest emission rate. The model results were then compared to the short-term and long-term AACs of all 37 pollutants. Refined modeling was then conducted for the pollutants that had either a short-term or long-term AAC exceedance.

Initial Screening Analysis Technique

Generally, an initial screening analysis is performed in which the total TAP emission rate is modeled from the stack with the lowest effective release height to obtain the maximum ground level concentration (MGLC). Note the MGLC could occur within the facility boundary for this evaluation method. The individual MGLC is obtained and compared to the smallest AAC. Due to the likelihood that this screening would result in the need for further analysis for most TAP, the analyses were initiated with the secondary screening technique.

The impacts of facility-wide TAP emissions were evaluated to demonstrate compliance according to the Georgia Air Toxics Guideline. Ten TAPs were included in the analysis: acetaldehyde, benzene, 1,3-butadiene, cadmium, chromium (VI), hexachloroethane (PCA), lead, methyl acetate, and methylene chloride (DCM). The annual, 24-hour, and 15-minute AACs of the ten TAPs were reviewed based on U.S. EPA IRIS reference concentration (RfC), OSHA Permissible Exposure (PEL), ACGIH Threshold Limit Values (TLV) including STEL (short term exposure limit) or ceiling limit, and NIOSH Recommended Levels (RELs) according to the Georgia Air Toxics Guideline. The modeled MGLCs were calculated using the AERMOD dispersion model (v21112) for annual, 24-hour, and 1-hour averaging periods.

Table 2 summarizes the AAC levels and MGLCs of the ten TAPs. The maximum 15-minute impact is based on the maximum 1-hour modeled impact multiplied by a factor of 1.32. As shown in Table 2, the modeled MGLCs for all of the TAPs **except benzene** are below their respective AAC levels.

Table 2. TAP MGLC Assessment

TAP	Averaging Period	AAC (μg/m³)	Max Modeled Conc. (μg/m³)	Receptor UTM Zone: 16	
				Easting (meter)	Northing (meter)
Acetaldehyde	Annual	4.55	0.039	767,585.6	3,736,122
	15-minute	4,500	19.62	767,585.6	3,736,122
Benzene	Annual	0.13	**0.50**	767,585.6	3,736,122
	15-minute	1,600	234.66	767,585.6	3,736,122
1,3-Butadiene	Annual	0.03	0.015	767,585.6	3,736,122
	15-minute	1,100	4.20	767,585.6	3,736,122
Cadmium	Annual	0.00556	0.00024	767,585.6	3,736,122
	15-minute	30	4.20	767,585.6	3,736,122
Chromium (VI)	Annual	0.000083	0.00001	767,585.6	3,736,122
	15-minute	10	0.0027	767,585.6	3,736,122
Hexachloroethane (PCA)	Annual	25	5.21	767,585.6	3,736,122
Lead	24-hour	0.12	0.069	767,585.6	3,736,122
Methyl Acetate	24-hour	476	7.49	767,585.6	3,736,122
	15-minute	75,750	47.05	767,585.6	3,736,122
Methylene Chloride (DCM)	Annual	21.3	0.11	767,585.6	3,736,122
	15-minute	43,460	46.46	767,585.6	3,736,122

Since the benzene MGLC is above the annual AAC, further modeling (i.e. a risk assessment) was required and the results are below in Table 3.

The AERMOD (version 21112) dispersion model was used to conduct the refined analysis. This analysis was conducted using the following considerations:

a. Meteorological Data – The AERMOD model was executed for five (5) years of meteorological data for 2016-2020 for the Hartsfield-Jackson Atlanta International Airport surface station and Peachtree City Falcon Field Airport upper air station. Meteorological data was provided by the Georgia EPD via their website(https://epd.georgia.gov/air-protection-branch-technical-guidance-0/air-quality-modeling/georgia-aermet-meteorological-data).

b. Receptor Grid – A refined receptor grid of 100 meters spacing was defined for the model roughly centered around the property line and extending outward from the facility 2 km in all directions.

c. Discrete Receptors – Discrete receptors were input into the model to simulate the property line. Spacing between the points is 50 meters. The model calculates the concentrations for these points and lists these concentrations in a discrete receptor table. For the site-specific risk analysis for annual formaldehyde and acrolein concentrations, additional discrete receptors were placed on the nearest residences to the facility.

d. Digitized Terrain Data – The 1/3 arc-second Digital Elevation Model (DEM) files were used to extract the receptor and building terrain elevations using AERMAP. Digitized Terrain Data for use with AERMAP was obtained from the USGS National Map website (https://viewer.nationalmap.gov/basic/) and converted from ArcGrid files to GeoTIFF files using the built-in Terrain Files Converter in BEEST. The NED was processed through the AERMAP processor using the standard options and a Base Datum (NADA) of WGS84. The UTM coordinates utilized in the model are based on the WGS84 datum utilized by Google Earth.

e. Urban/Rural Classification – The procedure to determine whether to use urban or rural dispersion coefficients is found in the EPA's Guideline on Air Quality Models (Revised), dated July 1986, EPA-450/2-78-027R. This document lists two (2) methods that can be used to determine the proper classification. These methods include:

1. Land Use Procedure – If more than 50% of the land within a 3-kilometer radius of the facility in question is of land use types heavy or medium industrial, commercial, or multi-family residential then the Urban mode should be selected. Otherwise, use the Rural mode.

2. Population Density Procedure – If the population density within a 3-kilometer radius of the facility is greater than 750 people per square kilometer, then the urban mode should be selected. Otherwise, the Rural mode should be selected.

Both methods above were evaluated for the area surrounding Schnitzer Southeast Holdings, LLC (Lithonia, GA). Aerial photographs and USGS Topographic Maps were used to evaluate the area surrounding the facility. This area would be primarily classified as Rural. This was further supported by information obtained from the U.S. Census Bureau. Therefore, the Rural mode was used in evaluation of the AERMOD model.

Table 3. TAP Risk Assessment

TAP	Averaging Period	AAC (µg/m^3)	Modeled Conc. (µg/m^3) **	Receptor UTM Zone: 16 Easting (meter)	Receptor UTM Zone: 16 Northing (meter)	Receptor ID
Benzene	Annual	0.13	0.0498	768,114	3,736,029	R1
			0.0120	768,767	3,736,795	R2
			0.0148	766,465	3,735,931	R3
			0.00295	767,580	3,734,679	R4
			0.00833	766,551	3,737,466	R5
			0.00793	767738	3,738,057	R6
	24-hour	3.548*	3.48	767,450	3,736,128	B1
			2.31	767,496	3,735,981	B2
			2.51	767,786	3,735,851	B3
			1.98	767,905	3,735,991	B4
			1.72	768,034	3,736,178	B5
			1.88	768,100	3,736,333	B6
			2.71	767,762	3,736,352	B7
			3.52	767,539	3,736,326	B8

* SSPP approved applicant's case-by-case request to use a 24-hour AAC for benzene that was derived from 1 ppm (29 CFR 1910.1028 as referred in OSHA Annotated Table Z-1[1].)

** The modeled 24-hour concentration (12.35 µg/m^3) with 24-hour continuous emissions was adjusted using the following equation from the Georgia TAPs guideline because the permitted operation condition is 5 hours a day (when processing 100% automobiles): $Ce=Cc(y)^{0.8}(2.97\times10^{-3})$ where y is minutes of emissions per 24 hours.

For the risk assessment, all TAPs were below the AACs at residential and/or business areas.

The DMU Modeling Review Report is attached in Appendix A.

Summary & Recommendations

Based upon the above considerations, I recommend Permit No. 5093-089-0392-S-02-0 be issued to Schnitzer Southeast Holdings, LLC located at 6781 Chapman Road, Lithonia, Georgia in Dekalb County. It has been determined that Schnitzer Southeast Holdings, LLC is classified as a synthetic minor source facility. This facility has been assigned to EPD's Mountain District Office (Atlanta) for compliance and inspections.

[1] Permissible Exposure Limits – OSHA Annotated Table Z-1 | Occupational Safety and Health Administration

APPENDIX A

EPD'S PSD Dispersion Modeling and Air Toxics Review

DMU Modeling Review Report - TAP

General Information

Application#	28330
Applicant	Schnitzer Southeast Holdings, LLC, Lithonia
Application Date	03/17/2022
Draft Permit Date	04/19/2022
Modeling Review Request Date	04/30/2022
Assigned SSPP PM1	James Eason
Assigned Permit Engineer	Renee Browne
Date of Review Report Submission	05/11/2022
Assigned DMU Modeler	Olliander Beucler
Approved by DMU PM1	5/12/2022
List of Reviewed Pollutants	TAPs: acetaldehyde, benzene, 1,3-butadiene, cadmium, chromium (VI), hexachloroethane (PCA), lead, methyl acetate, and methylene chloride (DCM).

Review Summary

MGLCs of All TAPs below AACs?	☐ Yes	☒ No
If risk assessment is done, are all TAPs below AACs at residential and/or business areas?	☒ Yes	☐ No

Modeling Results

Table 1. TAP MGLC Assessment

TAP	Averaging Period	AAC (µg/m³)	Max Modeled Conc. (µg/m³)	Receptor UTM Zone: 16	
				Easting (meter)	Northing (meter)
Acetaldehyde	Annual	4.55	0.039	767,585.6	3,736,122
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	15-minute	43,460	46.46	767,585.6	3,736,122

Table 2. TAP Risk Assessment

TAP	Averaging Period	AAC ($\mu g/m^3$)	Modeled Conc. ($\mu g/m^3$) **	Receptor UTM Zone: 16			Receptor ID
				Easting (meter)	Northing (meter)		
Benzene	Annual	0.13	0.0498	768,114	3,736,029		R1
			0.0120	768,767	3,736,795		R2
			0.0148	766,465	3,735,931		R3
			0.00295	767,580	3,734,679		R4
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			0.00793	767738	3,738,057		R6
	24-hour	3.548*	3.48	767,450	3,736,128		B1
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			2.71	767,762	3,736,352		B7
			3.52	767,539	3,736,326		B8

* SSPP approved applicant's case-by-case request to use a 24-hour AAC for benzene that was derived from 1 ppm (29 CFR 1910.1028 as referred in OSHA Annotated Table Z-1[2].)

** The modeled 24-hour concentration (12.35 $\mu g/m^3$) with 24-hour continuous emissions was adjusted using the following equation from the Georgia TAPs guideline because the permitted operation condition is 5 hours a day (when processing 100% automobiles): $Ce=Cc(y)^{0.8}(2.97\times10^{-3})$ where y is minutes of emissions per 24 hours.

[2] Permissible Exposure Limits – OSHA Annotated Table Z-1 | Occupational Safety and Health Administration

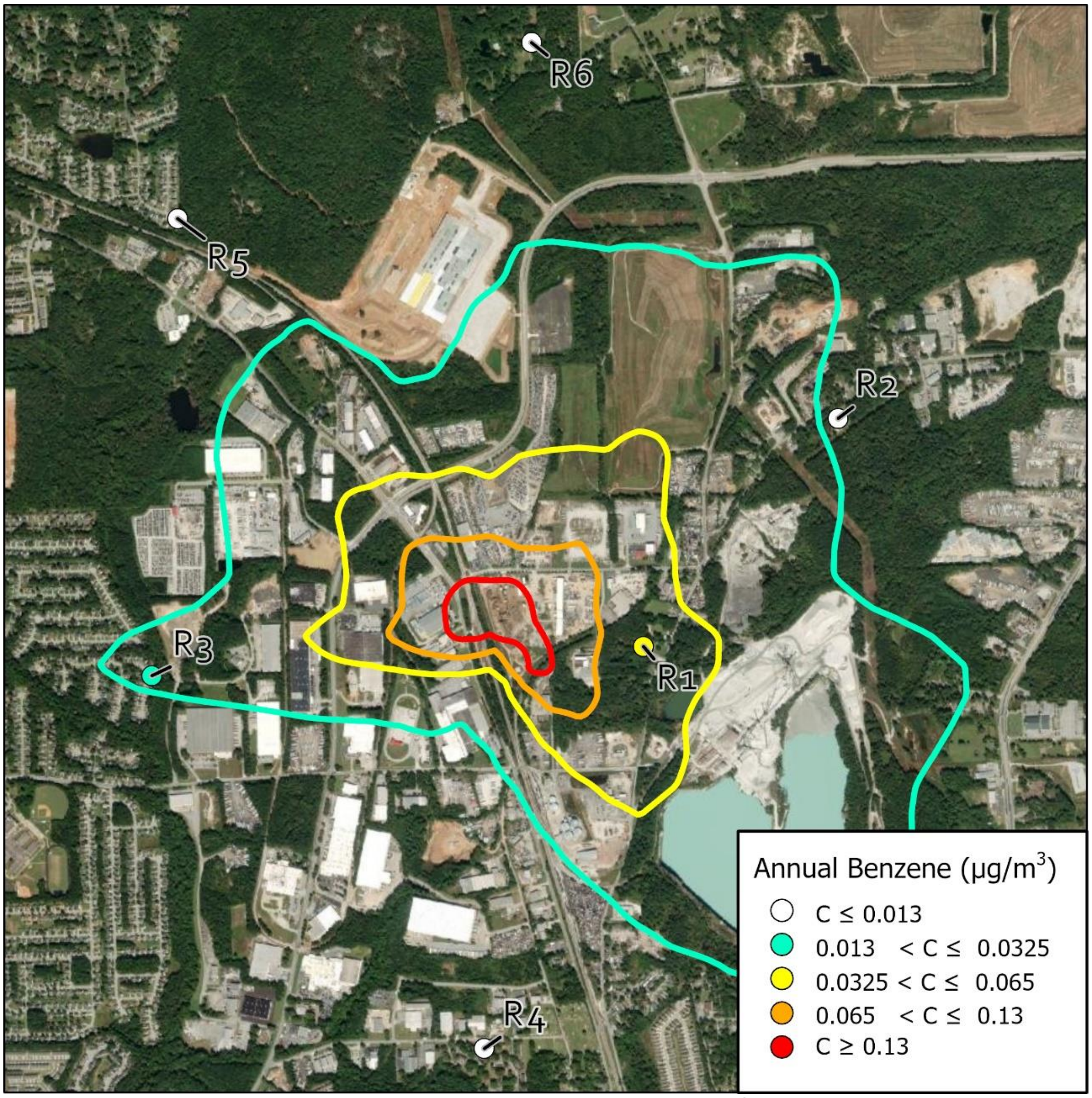

Figure 1. Modeled average annual ground-level concentrations (in $\mu g/m^3$) of benzene across 5 years (2016-2020) overlaid on a satellite map with the 6 closest residential areas ("R1" through "R6" in Table 2). The red line indicates the annual AAC for benzene (0.13 $\mu g/m^3$).

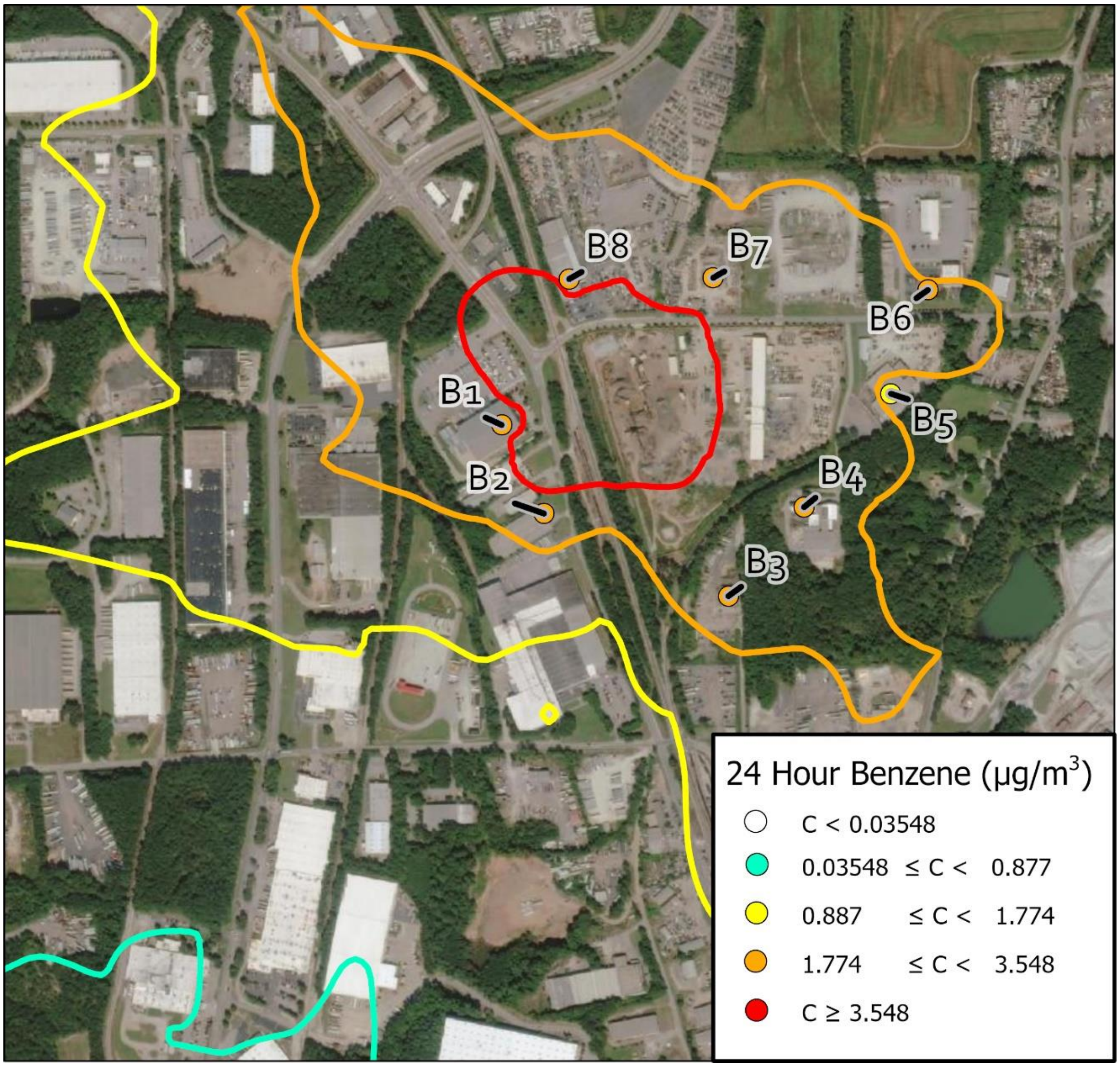

Figure 2. Modeled maximum 24-hour ground-level concentrations (in μg/m^3) of benzene across 5 years (2016-2020) overlaid on a satellite map with the 8 closest residential areas ("B1" through "B8" in Table 2). The red line indicates the 24-hour AAC for benzene (3.548 μg/m^3). The modeled 24-hour concentrations with 24-hour continuous emissions were adjusted using the following equation from the Georgia TAPs guideline because the permitted operation condition is 5 hours a day (when processing 100% automobiles): $Ce=Cc(y)^{0.8}(2.97\times10^{-3})$ where y is minutes of emissions per 24 hours.