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NARRATIVE

TO: James Eason

FROM: Bradley Belflower

DATE: March 28, 2022

Facility Name:	**Igneo (Georgia), LLC**
AIRS No.:	051-00282
Location:	Savannah, GA (Chatham County)
Application No.:	28290
Date of Application:	February 8, 2022

Background Information

Igneo (Georgia), LLC was issued Permit No. 5093-051-0275-S-01-0 on September 24, 2021, for the construction and operation of a new electronics recovery facility in the SeaPoint Industrial Complex in Savannah, Chatham County, Georgia. Igneo has decided to relocate the proposed facility to the Savannah Chatham Manufacturing Center (760 Old River Road) also in Savannah, Chatham County, Georgia. The originally permitted facility and the proposed facility are identical is size and design.

Chatham County is an area designated as attainment or unclassifiable for the NAAQS. Operation of the facility will have the primary categorization of SIC Code 5093 – Scrap and Waste Materials, which is not one of the 28 listed source categories with a PTE of 100 tpy or more of a regulated pollutant, including fugitive emissions to be classified as a major source under PSD regulations. The company has requested practically enforceable emission limitations such that the facility will not be considered a major source as defined by 40 CFR Part 70.2.

The facility will receive electronic scrap (E-scrap) primarily in the form of small electronic appliances, printed circuit boards, computer parts, and similar material. Note that the facility will not receive whole recycled devices such as computers and printers. Whole devices will be processed in a separate facility to remove the input for this facility. The E-scrap will be shredded and fed into pyrolysis ovens. The shredding and conveying operations will be controlled with water fogging and fabric filtration which will be vented inside the building. The pyrolysis ovens will be operated in an oxygen starved condition to prevent actual combustion from taking place. The off-gas exhaust from the pyrolysis ovens will be controlled via thermal oxidizer, selective non-catalytic reduction (SNCR) with urea injection, proprietary compound injection for the conversion of elemental bromine (Br2) to bromic acid (HBr), sodium bicarbonate, activated carbon injection to control acid gases, and baghouse to capture the injected additives and particulate matter. Particulate matter captured by the baghouse will be pneumatically conveyed to a storage silo, equipped with a bin vent dust collector. Sodium bicarbonate and activated carbon will also be stored in silos equipped with bin vent dust collectors. The recovered metal is conveyed out of the pyrolysis oven, cooled, and packaged in super sacks. The conveyors are all enclosed to avoid dusting. With the exception of the pyrolysis oven exhaust and the silo vents, all of these operations are performed indoors with no exhaust points to the atmosphere. The output from the pyrolysis

ovens will be the input to other facilities that will recover metals from the electronics. Metal that can be recovered from E-scrap include copper, silver, gold, and palladium. The facility estimates that it will recover approximately 50 percent of its input for further processing. The facility proposes to limit NOx, CO, VOC, and PM emissions from the pyrolysis ovens in order to be a synthetic minor (SM) source with respect to Title V.

Igneo proposes to build the facility in three phases, the first phase will consist of the installation of the E-scrap shredding operation with an initial facility handling capacity of 100,000 metric tons per year. The second phase of the project will be the installation of the first of two pyrolysis ovens, with a processing rate of 100,000 metric tons per year of E-scrap. The third phase of the project will be installation of a second shredding line and pyrolysis oven bringing the throughput of the facility to 200,000 metric tons per year of E-scrap. Each of the pyrolysis lines will be equipped with its own pollution control system and stack. These stacks and the silo bin vents represent the only process emissions not exhausted indoors.

Purpose of Application

Expedited Application No. 28290 was received on February 8, 2022, for the construction and operation of a new electronic pyrolysis and recovery facility. A Public Advisory expired on March 25, 2022. No comments were received. As described above, this permit (Application No. 28290) is a relocation of a previously permitted facility (Application No. 27867). Savannah Riverkeeper submitted comments on the previously submitted application. These comments and company provided responses are included in this narrative.

Updated Equipment List

Emission Unit		Control Device	
Source Code	**Description**	**Source Code**	**Description**
PL01	Pyrolysis Line No. 1	TO01 SR01 BH01	Thermal Oxidizer Urea Injection (SNCR) Baghouse/Dry Scrubber
PL02	Pyrolysis Line No. 2	TO02 SR02 BH02	Thermal Oxidizer Urea Injection (SNCR) Baghouse/Dry Scrubber
AS01	Pyrolysis Ovens Baghouse Dust Silo No. 1	BH03	Bin Vent Baghouse
AS02	Pyrolysis Ovens Baghouse Dust Silo No. 2	BH04	Bin Vent Baghouse
AC01	Activated Carbon Storage Silo	BH05	Bin Vent Baghouse
BC01	Sodium Bicarbonate Storage Silo No. 1	BH06	Bin Vent Baghouse
BC02	Sodium Bicarbonate Storage Silo No. 2	BH07	Bin Vent Baghouse
EG01	Emergency Generator		

Emissions Summary

Emissions are calculated in Appendix B of Application 28290 and are summarized below. Note that these calculations use emission factors developed from operating parameters from a similar facility located in France and assume the use of urea injection, a thermal oxidizer, and a dry scrubber/baghouse. Potential emissions have been adjusted using the emission limits in Conditions 2.4, 2.5 and 2.6.

Facility-Wide Emissions
(in tons per year)

Pollutant	Potential Emissions	Actual Emissions
$PM/PM_{10}/PM_{2.5}$	97.59	35.23
NOx	99	72.31
SO_2	99	1.07
CO	99	33.25
VOC	99	4.04
Max. Individual HAP	4.12	4.12
Total HAP	6.72	6.72

Regulatory Applicability

391-3-1-.02(2)(b) – "Visible Emissions"

Rule (b) limits the opacity of visible emissions from any air contaminant source that is subject to some other emission limitation under 391-3-1-.02(2). The opacity of visible emissions from regulated sources may not exceed 40 percent under this general visible emission standard.

391-3-1-.2(2)(c) – "Incinerators"

Rule (c) limits emissions from incinerators. Incinerators are defined in 391-3-1-.01(hh) to be "devices intended or used for the reduction or destruction of solid, liquid, or gaseous waste by burning." The pyrolysis lines are intended for material recovery and not waste reduction. This rule, therefore, does not apply.

391-3-1-.02(2)(e) – Particulate Emission from Manufacturing Processes

Rule (e) limits particulate matter from manufacturing processes based on process input rate. The pyrolysis lines are subject to this rule.

391-3-1-.02(2)(g) – "Sulfur Dioxide"

Rule (g) applies to all "fuel burning" sources. The pyrolysis lines and the emergency generator are fuel burning sources subject to this rule. The fuel sulfur content limit for fuels burned is 2.5 percent by weight, in accordance with Rule (g)2.

40 CFR 60 Subpart IIII – "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines"

Subpart IIII regulates the compression ignition engines (on the emergency generators) constructed after July 11, 2005 and manufactured after April 1, 2006. The emergency generators is subject to this rule. The company must operate the engines as emergency-use only and comply with the emission standards and opacity requirement under NSPS Subpart IIII by purchasing certified engines.

40 CFR Part 63 Subpart ZZZZ – "National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines"

Subpart ZZZZ regulates emissions from reciprocating internal combustion engines at major and area sources of HAPs. This facility is an area source of HAP emissions. In accordance with 40 CFR 63.6590(c), compliance with Subpart ZZZZ for the new engines will be shown by showing compliance with 40 CFR 60 Subpart IIII.

40 CFR 60 Subpart LL – "Standards of Performance for Metallic Mineral Processing Plants"

This rule does not apply because the facility does not process ore.

40 CFR 60 Subpart AAAA – "Standards Of Performance For Small Municipal Waste Combustion Units For Which Construction Is Commenced After August 30, 1999 Or For Which Modification Or Reconstruction Is Commenced After June 6, 2001

This rule does not apply because the facility does not burn municipal solid waste.

40 CFR 60 Subpart CCCC – "Standards of Performance for Commercial and Industrial Solid Waste Incineration Units"

This rule does not apply because the purpose of the facility is material recovery and not waste reduction.

Subpart EEEE – "Standards of Performance for Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006"

This rule does not apply because the purpose of the facility is material recovery and not waste reduction.

40 CFR 63 Subpart RRR – "National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production"

This rule does not apply because the facility does not meet the definition of Secondary Aluminum Production.

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

This rule does not apply because the pyrolysis ovens do not melt metal and are, therefore, not smelters.

40 CFR 63 Subpart TTTTTT – "National Emission Standards for Hazardous Air Pollutants for Secondary Nonferrous Metals Processing Area Sources"

This rule does not apply because the facility will not melt metals.

40 CFR 63 Subpart YYYYYY – "National Emission Standards for Hazardous Air Pollutants for Area Sources: Ferroalloys Production Facilities"

This rule does not apply because the facility does not meet the definition of ferroalloy production facility.

40 CFR 63 Subpart ZZZZZZ – "National Emission Standards for Hazardous Air Pollutants: Area Source Standards for Aluminum, Copper, and Other Nonferrous Foundries"

This rule does not apply because the pyrolysis ovens will not melt metal.

Permit Conditions

Condition 2.1 includes the limit due to Georgia Rule (b).

Condition 2.2 includes the limit due to Georgia Rule (e).

Condition 2.3 includes the limit due to Georgia Rule (g).

Condition 2.4 restricts the fuel used in the Pyrolysis Lines and Thermal Oxidizers to Natural gas to avoid applicability of Title V permitting.

Condition 2.5 limits facility-wide NOx, CO, VOC, and SO2 emissions to 99 tons per year so that the facility is a SM source.

Condition 2.6 limits PM emissions from each pyrolysis line to 10.50 lb/hr so that the facility is a SM source. Per Appendix B of the application, PM10 emissions from emission units at the facility other than the pyrolysis lines are 5.61 tons per year. Potential emissions of PM10 from the entire facility will, therefore, be:

$$PM10 = 5.61 + 2 * 10.50 *8760 / 2000 = 97.59 \text{ tpy}$$

Condition 2.7 states that the emergency generator is subject to NSPS IIII.

Condition 2.8 states that the emergency generator is subject to MACT ZZZZ.

Condition 2.9 limits non-emergency operation of the emergency generator to 100 hours per year per NSPS IIII.

Condition 2.10 includes fuel specifications for the fuel burned by the emergency generator per NSPS IIII.

Condition 4.2 requires the thermal oxidizers to run any time that the respective pyrolysis lines are operating. This requirement is due to the thermal oxidizers being used to CO and VOC emissions below SM limits.

Condition 4.3 requires the sorbent injection systems to run any time that the respective pyrolysis lines are operating. This requirement is due to the injection systems controlling HAP emissions.

Condition 4.4 requires operation of the emergency generator according to manufacturer's specifications per NSPS IIII.

Condition 4.5 requires the emergency generator be operated and maintained according to manufacturer's specifications.

Condition 5.2 requires a pollutant and parameter monitoring on the pyrolysis ovens. The pollutants and parameters required to be monitored are NOx, CO, thermal oxidizer combustion temperature, dry scrubber injection rates for each substance injected (i.e., activated carbon, etc.), pressure drop across the baghouse, weight fed to each pyrolysis line, baghouse temperature, and hours of the emergency generator.

Condition 5.3 requires emergency generator fuel monitoring to ensure that the fuel meets the requirements of Condition 2.9.

Condition 6.2 requires testing for PM and certain HAPs (HCl, HF, antimony, arsenic, cadmium, chromium, cobalt, manganese, nickel, lead, and mercury. Initial testing is required 180 days after startup. Subsequent testing for PM is required every 60 months.

Condition 6.3 requires testing for VOC and SO2 to establish emission factors from the pyrolysis lines. Initial testing is required 180 days after startup. Subsequent testing is required every 60 months.

Condition 6.4 requires RATAs for NOx and CO. Initial testing is required 180 days after startup. Subsequent testing is required every 60 months.

Condition 6.5 requires temperature in the thermal oxidizer be determined during any performance test for VOC and CO.

Condition 7.3 requires records of input rate to the pyrolysis lines and operating hours of the emergency generator. These records are used in Condition 7.5 to calculated monthly total NOx, CO, VOC, and SO2 emissions from the entire facility.

Condition 7.4 required records of emergency generator fuel analysis (from Condition 5.3) be kept for 5 years.

Condition 7.5 contains equations for calculating NOx, CO, VOC, and SO2 from the entire facility for each calendar month. The equations use data from the NOx and CO CEMS, weight input into each pyrolysis line, emission factors developed for each line, and hours of operation of the emergency generator.

Condition 7.6 requires calculation of the 12-month month total NOx, CO, VOC, and SO2 emissions from the calendar month records required by Condition 7.5.

Conditions 7.7 and 7.8 require reports of deviations on a semiannual basis.

Toxic Impact Assessment

A Toxic Impact Assessment was conducted by the Permittee and included in Section 5 of Application No. 28290. The SCREEN3 model was used and the output files are included in Appendix D of Application No. 28290. The results of the TIA are summarized as follows.

Toxic Air Pollutant	Percent of Acceptable Ambient Concentration		
	15-minute	24-hour	Annual
Arsenic	0.19%		7.11%
Cadmium	0.09%		28.0%
Chromium		0.15%	
Cobalt		0.66%	
Copper		1.19%	
Hydrogen Bromide		0.30%	2.53%
Hydrogen Chloride	0.09%		0.18%
Hydrogen Fluoride	0.07%		0.85%
Lead		44.3%	
Manganese	0.01%		8.66%
Nickel		2.43%	

Responses to Public Comments

As noted earlier, these comments were received from Savannah Riverkeeper for Application No. 27867 and included as reference. The comments and responses from the facility are included below. Note that the original name in Application No. 27867 was WSCR Technologies (Georgia), LLC.

Question/Comment	Company Response
The application mentions an example pyrolysis facility in France. In what French city is that facility located? The question is asked because we believe the location in France could be observed and data collected to ascertain the environmental and human health impacts of these facilities which we believe is viable information for the approval or denial of these potential pollutants. Are there greater numbers of sick people in the area surrounding this French facility or recognizable environmental impacts in say a 10-mile radius or 20 or 50?	The France operation is located in the city of Isbergues. As described in the air permit application, WSCR utilized operating data and emissions from the existing facility to extrapolate the anticipated emissions for the Savannah operation. The application conservatively estimated emissions for the US facility and associated air toxics model results. The proposed emissions controls are also conservatively designed to meet the Federal and State emissions limits, that are established for protection of environment and human health impacts.
We recommend to the GAEPD that these facilities (especially the pyrolysis facility in France) be researched for environmental impact and the impact of human health on a local level before approval of this facility's application.	The unit operations utilized by WSCR are not dissimilar to other permitted activities in the United States or Georgia in particular. The regulatory requirements for air emissions from these unit operations have been long established by both USEPA and GA EPD and therefore do not warrant an extraordinary review.

Question/Comment	Company Response
How many jobs will this new facility bring to the area and what are the salary opportunity ranges with this employment?	WSCR will be making a public announcement in the near future outlining the full economic benefits for Savannah.
Will the construction and the eventual completion of this facility interrupt an already stressed infrastructure in this area with large dump trucks and tractor-trailers, etc.? How will the WSCRT mitigate traffic problems/increase?	WSCR does not anticipate construction traffic will stress the roadways; construction planning will include consideration of site access. Please note that the proposed phased construction will lessen impact than if built all at once. Additionally, the transport of raw materials and products between WSCR and the port is minor compared to the overall trailer traffic to/ from the Port of Savannah.
What emergency plans are laid out in case of flood or a severe storm event to protect us from these hazardous materials being released into the environment? What happens with emissions if the thermal oxidizers are down, out of power, or damaged?	Although not a consideration for the air permit application review, severe weather evacuation events will require a shutdown of operations. Likewise, planned or unplanned outage of air pollution control equipment will subsequently require the overall process train to be shut down, so as to maintain compliance with emissions limitations.
Will there be a recognizable smell, visible gas silos, or smog involved with the pyrolysis process that may negatively impact tourist attractions to Savannah, which is one of the biggest draws to the city?	GA EPD specifically regulates visible emissions (VE) from WSCR, as with other industrial facilities, and the facility will operate in compliance with these requirements. Based on the operations in France and emissions estimates for the Savannah operation, the facility will not emit objectionable odors. The facility will be located within the Seapoint Industrial Complex, which is a zoned industrial area of Savannah. Although not a consideration for the air permitting process, WSCR does not anticipate any adverse impact to tourism.
What would the WSCRT argue be to the thoughts that facilities like these are contributing to carbon and other greenhouse gas emissions? ...That they are contributing to the crisis of Global Warming.	The recovery of material by WSCR has a far less impact on greenhouse gas emissions than the mining and refining of virgin materials. In fact, WSCR analysis indicates that the operation is a net reduction in carbon.

Question/Comment	Company Response
It seems that this facility's Air Pollution Control is very state of the art and designed to limit the amounts of harmful materials released into the atmosphere. Does the release in the atmosphere of Hydrogen Chloride, Sulfur Dioxide, Carbon Monoxide, Nitrogen Oxide, Bromine - hydrogen bromide, Dioxin, and a great list of other chemicals, particulate matter, and materials sound safe to anyone reading this? - Regardless of the levels in which it is released. As the crow flies (please forgive the figure of speech), not more than a mile or mile and a half away are communities and other businesses. Homes, where the residents of Savannah live and raise their children. Should these communities be concerned about the potential impact of HCL gas being released in the number of thousands of pounds each year from this facility? The fact is this facility is set up to release more than HCL(g) into the Savannah Air, and the question stands should surrounding communities be concerned about this facility moving into the neighborhood.	WSCR has submitted a detailed application, based on the extensive data from the operating facility in France, and as noted, includes "state of the art" emissions controls. The facility will be operated in compliance with GA EPD emissions limitations. Air toxics modeling is required by GA EPD; the conservative results show that the emissions are not anticipated to have an adverse impact on the environment or the community
What are the implications for environmental impact in the ways of air and water quality with this and other facilities like these? How will EPD monitor air quality while this facility is operating? Water quality? Could these hazardous materials eventually settle into the marsh and other wetlands in the Savannah area and impact wildlife and water and soil quality? We know it can travel because it's airborne, correct, so depending on the wind direction on that day, these hazardous air pollutants could potentially be dispersed along a wide range of land and water.	The purpose of air emissions limitations and air toxics screening is to prevent adverse impact to the environment, taking into account such factors as wind direction, property boundaries, etc. WSCR will be required to monitor and report air emissions to prove compliance with the permit limitations on a frequency that will be established in the issued air permit.
The question is: In the event that these hazardous materials are measurably and observably impacting the Savannah area ecosystems, environment, and human health, what preparations or reparations are being made by WSCRT and GAEPD to right this situation?	To be clear, WSCR will not be receiving hazardous materials for processing. In addition, WSCR is committed to maintain full compliance with the air permit conditions. WSCR has been operating the France facility since 2014, and this operating experience supports confidence in the future performance of the Savannah facility.

Summary & Recommendations

I recommend that Permit 5093-051-0282-S-01-0 be issued to Igneo (Georgia), LLC for the construction and operation of an electronics pyrolysis and recovery facility. A Public Advisory expired on March 25, 2022. No comments were received. The facility will be a synthetic minor source and will be assigned to the SSCP for compliance purposes.