## **ENGINEERING ANALYSIS**

#### **PROJECT DESCRIPTION**

On November 22, 2022, the Department received an application from Alabama Graphite Products, LLC (Alabama Graphite), for a new graphite purification and treatment plant to be located on a previously undeveloped (greenfield) site in Kellyton, AL. Revisions to the initial application were also received on March 4, 2022, and April 11, 2022. The plant would produce spherical purified graphite (SPG) and coated spherical purified graphite (CSPG) from purchased graphite concentrate feedstock.

Alabama Graphite is requesting the issuance of Synthetic Minor Operating Permits (SMOPs) with sufficient limitations to avoid classification as a major source of particulate matter and total HAP emissions.

#### **PROCESS DESCRIPTION**

Graphite concentrate feedstock, will be transported to the facility. In the storage area (Area 1100), the graphite concentrate will remain in BigBags (super sacks) within the shipping containers they arrived in until needed. No appreciable particulate matter emissions are expected from this part of the plant.

Super sacks of the feedstock will be brought to the graphite conditioning and roasting area (Area 1200), where the graphite is conditioned with a sodium hydroxide solution and roasted in an indirect-fired 2.61 MMBtu/hr rotary kiln and indirectly cooled in the rotary cooler. PM, VOC, and VHAP emissions from the product-side of the kiln are controlled by a scrubber (SR-13901) which discharges back into the kiln combustion box. The kiln temperature will be less than 900 °F, and for a short enough residence time to prevent any formation of NO<sub>X</sub>. The kiln exhausts through the Purification Building Stack (ST-10922). Area 1200 also contains the conditioned graphite bin, between the conditioning mixer and the roasting kiln, which is controlled by a bin vent filter (1200-BN-12111) for particulate matter control.

Conditioned and roasted graphite from Area 1200 is fed into the baked graphite bin, which contains a bin vent filter for particulate matter control and vents to the scrubber (SR-13901) for additional control. The graphite goes through an alternating series of sodium hydroxide leaching and sulfuric acid leaching in **Area 1300**. After completion of leaching, the solution is transferred to the Caustic Leach Filter for filtering and washing. Emissions from each tank and other equipment in Area 1300 is routed to the Leach Area Scrubber (SR-13901) for control which is then routed to the Purification Building Stack (ST-10922). The acid leach process includes a 4.18 MMBtu/hr hot oil heater.

Filter cake from the final acid leach process is fed to the 2.20 MMBtu/hr dryer in **Area 1400** to remove moisture; emissions from that dryer are controlled by a dust collector (DC-14111), which is then routed to the Purification Building Stack (ST-10922). The dried graphite is stored in the purified graphite product bin. Discharge from the Purified Graphite Product Bin can be directed either to the Purified Graphite Bag Loader or onto the Furnace Feed Tube Conveyor.

Dried Purified Graphite Product is conveyed to two electric thermal processing furnaces in **Area 1500** for further purification. Emissions from the thermal purification process in Area 1500 are controlled by the Thermal Purification Furnace (TPF) Thermal Oxidizer (1500-TO-15321), which is then routed to the TPF Dust Collector (1500-SR-15341) and then to the TPF Scrubber (1500-SR-15361) and finally to the Purification Building Stack (ST-10922). Product is conveyed into the spheronizer bin.

Purified graphite is milled ("micronized") and shaped ("spheronized") into Spherical Purified Graphite (SPG) in **Area 2100** in two parallel process lines. The process lines consist of two micronizing mills controlled by dust collectors (DC-21106 and DC-21206) feeding thirteen spheronizer mills, each controlled by a dust collector. The two lines feed the shaped SPG product into cyclones to separate SPG from fines, and the fines are captured by dust collectors (DC-21183 and DC-21283). In all, there are seventeen dust collectors controlling particulate matter emissions from Area 2100, all venting to a common stack (ST-21902).

In Area 2200, the previously produced spherical purified graphite is mixed with pitch (containing approximately 0.6% Sulfur and 1.0% Nitrogen), dissolved in organic solvent, and fed to the CSPG dryer (0.6MMBtu/hr). The coated and dried graphite is then fed to the Re-bake oven (10.24 MMBtu/hr) for processing. There are two (2) identical parallel coating circuits with duplicate driers, ovens, and mix tanks. Product removed from the bake ovens is then emptied into the Baked CAPG Surge Bin and fed to the CSPG Feather Mill. Product from the CSPG Feather Mill is then conveyed to the CSPG Screen. The milling and screening operations are enclosed systems that are not vented. The oversized product (off-spec) will be collected in the oversized surge bin. Magnetic filters are installed after the CSPG screen to remove any ferrous metal contamination from the CSPG product stream. Non-magnetics from the filters are sent to bagging and packaging.

Process off-gas from Dryer Nos. 1 and 2 will be routed through a closed loop organic solvent recovery system using a condenser. The equipment vents from mixers and tanks, as well as the exhaust stream from the solvent recovery system containing any non-recovered organic solvent, will be controlled by the Coating Area Thermal Oxidizer (2205-TO-22747), and then the Media Absorber Vessel (PV-22951) before reaching the Coating Building Stack (ST-22946). Process off-gas from Oven Nos. 1 and 2 will be controlled by a thermal oxidizer (TO-22943) and then the Media Absorber Vessel (PV-22951) before reaching ST-22946.

Other sources of emissions at the facility include the wastewater treatment **Area 5110**'s 1.79 MMBtu/hr heated lime reactor tank, the lime bin vent in the reagent preparation and distribution **Area 6000**, and utility **Area 7000**'s 9.96 MMBtu/hr caustic recovery steam generator (steam is generated in Area 7000, and the actual caustic recovery occurs in Area 5100). Additionally, there is a 500 BHP emergency fire water pump and a 480 BHP emergency generator, both diesel-fired.

# **EMISSIONS**

Potential emissions are based on pilot test studies, AP-42 emission factors, manufacturer's guarantee emission rates, regulatory emission limits, and 8,760 hours per year of operation. Table 1 below shows the uncontrolled potential emissions for the facility. As shown in the table, PM emissions for the purification stack (ST-109222) and SPG stack (ST-21902) show emissions well over Major Source and PSD thresholds. Therefore, the facility has taken limits of 1.91 TPY and 27.52 TPY respectively for these sources to remain below these thresholds. Table 1 also shows the uncontrolled Total HAPs for the Coated SPG Stack (ST-22946) exceeding the Major Source threshold. The facility has taken a limit of 0.67 TPY to remain a SMOP source. Table 2 shows the controlled facility wide potential emissions with limits in place.

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Source	PM	SO2	NOx	СО	VOC	Total HAPs	CO <sub>2</sub> e
Purification Stack-ST- 109222	335.10	4.01	15.45	17.72	2.09	13.12	2,119.46
1200 Area Kiln	0.02	0.01	1.11	0.94	2.06	1.23	1,338.03
1200 Area Graphite Concentrate Bin	88.74	-	-	-	-	-	-
1300 Leaching and Filtration	0.09	-	-	-	-	-	-
1400 Purification Drying	211.48	-	-	-	-	-	-
1500 Thermal Purification	344.77	4.00	14.34	16.78	0.03	11.90	780.43
SPG Stack- ST-21902	2201.62	-	-	-	-	-	-
Coated SPG Stack-ST- 22946	0.21	2.85	27.07	9.10	39.75	52.49	13,262.16
Natural Gas Combustion Sources	0.21	0.065	10.83	9.10	0.60	0.20	13,014.96
CSPG Process	-	2.78	16.24	-	39.15	52.29	247.20
Other Natural Gas Fired Combustion Emissions (Not Associated with a stack)	0.15	0.05	7.74	6.64	0.43	0.15	9,302.68
6000 Area	22.05	-	-	-	-	-	-
Emergency Generator	0.04	0.25	1.26	0.69	1.26	3.14E-3	138.00
Emergency Fire Water Pump	0.04	0.26	1.32	0.72	1.32	3.28E-3	143.75

# Table 1: Uncontrolled Facility Wide Potential Emissions

Source	PM	SO2	NOx	СО	VOC	Total HAPs	CO <sub>2</sub> e
Purification	1.91	0.05	3.10	1.78	2.09	1.48	2,118.46
Stack-ST-							
109222							
SPG Stack-	27.52	-	-	-	-	-	-
ST-21902							
Coated SPG	0.21	2.85	27.07	9.10	0.69	0.67	13,262.16
Stack-ST-							
22946							
Other	0.15	0.05	7.74	6.50	0.43	0.15	9,302.68
Natural							
Gas Fired							
Combustion							
Emissions							
(Not							
Associated							
with a							
stack)							
6000 Area	0.02	-	-	-	-	-	-
Emergency	0.04	0.25	1.26	0.69	1.26	3.14E-3	138.00
Generator							
Emergency	0.04	0.26	1.32	0.72	1.32	3.28E-3	143.75
Fire Water							
Pump							
Facility	29.88	3.45	40.50	18.79	5.79	2.30	24,965.05
Total							

**Table 2: Controlled Facility Wide Potential Emission** 

### REGULATIONS

#### STATE REGULATIONS

### ADEM Admin. Code r. 335-3-4-.01 "Visible Emission"

Per ADEM Admin. Code r. 335-3-4-.01(1)(a), except for one six-minute period in any sixty-minute period, the facility shall not emit particulate of an opacity greater than twenty percent (20%), as determined by a six-minute average. Per ADEM Admin. Code r. 335-3-4-.01(1)(b), the facility may emit particulate of an opacity not greater than forty percent (40%), as determined be a six-minute average. These operations are subject to the requirements of these regulations.

The facility will be required to conduct a visual check once per week of the stacks associated with all permitted emission sources, except the emergency engines, for the presence of visible emissions. The permits will state that if instantaneous visible emissions in excess of 10% are noted, corrective action shall

be initiated within two (2) hours. If testing is required, Method 9 of 40 CFR Part 60, Appendix A-4 shall be used to demonstrate compliance with these standards.

The facility is required to maintain a record of all observations, corrective actions, and maintenance performed and to submit a report semiannually detailing all instances when the opacity standard was exceeded.

## ADEM Administrative Code Rule 335-3-4-.03 "PM: Fuel Burning Equipment-Class I County"

**Rule 335-3-4-.03(1)** states that no person shall cause or permit the emission of particulate matter from fuelburning equipment in a Class 1 County in excess of the amount shown in Table 4-1 of Rule 335-3-4-.03. Alabama Graphite estimates a maximum rate of 2.61 million Btu/hr (MMBtu/hr) of heat going through the indirect heated rotary kiln, 6.18 MMBtu/hr of indirect heat going through the CSPG stack, 9.96 MMBtu/hr of heat going through the steam generator, 4.18 MMBtu/hr of heat going through the hot oil heater, and 1.79 MMBtu/hr of heat going through the lime reactor tank. Per Table 4-1, the particulate emissions limit for the units would be 0.5 lb/MMBtu.

## ADEM Admin. Code r. 335-3-4-.04, "Process Industries - General"

**Rule 335-3-4-.04(1)** states that no person in a Class 1 County shall emit particulate matter greater than the amount determined by the equations below:

When P<30, E= $3.59P^{0.62}$ When P $\geq$ 30, E= $17.31P^{0.16}$ Where P = Process weight per hour in tons per hour And E = Emissions in pounds per hour

The potential throughput for the processes venting to ST-10922 (Areas 1200, 1300, 1400, and 1500) is 0.94 TPH; therefore, the PM limit from ST-10922 would be 3.46 lb/hr. The potential throughput for the SPG line (Area 2100) is 0.94 TPH; therefore, PM emissions from ST-21902 would also be limited to 3.46 lb/hr. Finally, the potential throughput for the CSPG line (Area 2200) is 0.47 TPH; therefore, PM emissions from ST-22946 would be limited to 2.23 lb/hr. If stack testing is required, Method 5 of 40 CFR Part 60, Appendix A-3 shall be used in the determination of particulate matter emissions.

# ADEM Administrative Code Rule 335-3-5-.01 "SO<sub>x</sub>: Fuel Combustion – Category II County"

**Rule 335-3-5-.01(1)(b)** states that no person shall cause or permit the operation of a fuel burning installation in a Sulfur Dioxide (SO<sub>2</sub>) Category II County in such a manner that sulfur dioxide is emitted in excess of 4.0 lb/MMBtu heat input. These sources are required to burn natural gas only. Therefore, no additional monitoring is required to demonstrate compliance with this rule.

# ADEM Admin. Code r. 335-3-14-.04, "Prevention of Significant Deterioration (PSD) Permitting"

Graphite production is not an industry on the "List of 28" named source categories which are subject to the lower major source threshold (100 TPY). Therefore, the facility is subject to the major source threshold of 250 TPY. Based on the emissions found in Table 2, the facility would not be expected to exceed the 250 TPY threshold for any criteria pollutant. A facility must address PSD regulations for Greenhouse Gases

(CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub>) only if that facility is major for criteria pollutants. Per Rule 335-3-14-.04(2)(a)1(i)&(ii), no PSD review would be necessary for this project.

# ADEM Admin. Code r. 335-3-14-.06, "Determinations for Major Sources in Accordance with Clean Air Act Section 112(g)"

This regulation applies to major sources of hazardous air pollutants (HAPs) constructed after March 27, 1998. Since this facility is not a major source of HAPs, a 112(g) case by case MACT review would not be necessary.

# ADEM Admin. Code r. 335-3-15, "Synthetic Minor Operating Permits (SMOPs)" and 335-3-16, "Major Source Operating Permits (MSOPs)"

After considering the 1.91 TPY and 27.52 TPY PM limits on the Purification Stack and the SPG Stack, respectively, as well as the PTE of the Coated SPG Stack after considering controls, the facility does not have the potential to emit greater than 100 TPY of any single criteria pollutant. The 0.67 TPY limit Alabama Graphite has proposed on Total HAPs from the Coated SPG Stack would restrict the facility to less than 25 TPY of any combination of HAPs, and less than 10 TPY of any individual HAP. Given the above, the facility will be considered a synthetic minor source for both criteria pollutants and HAP.

# **EMISSION MONITORING**

The following monitoring requirements shall be followed for the operations in the Graphite Purification Building:

- An observation of the Purification stack (ST-10922) will be accomplished at least weekly. If visible emissions greater than ten (10%) percent opacity are noted at any time, corrective action shall be initiated within 2 hours to reduce emissions. After corrective action has been performed, the Permittee shall conduct another visual check to ensure that the visible emissions have been eliminated.
- A differential pressure gauge shall be installed across each baghouse associated with these units to determine the pressure differential across the control device. The pressure gauge shall be installed, operated, and maintained according to the following:
  - The pressure gauge shall be located in a position that provides a representative pressure drop across the control device. Pressure drop is measured at the control device inlet and exhaust.
  - Once per week, monitor and record the pressure drop across the control device to determine if it is within the manufacturer's recommended operating range or the range established during the most recent compliance test.
    - Any time the pressure drop is outside of required range, the facility shall take corrective action to determine the cause of the issue.
    - If determined that the control device is operating outside of the required range, this indicates a deviation and triggers an inspection and corrective action.
  - A calibration and accuracy check shall be performed according to the manufacturer's procedures at least annually or following a deviation.
    - A calibration shall also be performed any time the sensor exceeds the established range or a new pressure gauge is installed.

- The Permittee shall comply with the following requirements for each baghouse:
  - Once per month, check hopper, fan, and cleaning cycle for proper operation.
  - Once per month, perform a visual check of all hoods and ductwork.
  - Record any repairs or observed problems.
- A monitoring device that continuously measures and records the combustion chamber temperature of each TO shall be installed, calibrated, maintained, and operated according to the following:
  - The temperature sensor shall be located in a position that provides a representative temperature.
  - The temperature shall be recorded once every hour.
  - The facility shall determine each block three (3) hour average of all recorded readings for each operating day.
    - The facility may not use data recorded during monitoring malfunctions and associated repairs.
    - The three (3) hour block average combustion zone temperature shall be maintained at or above the temperature established during the most recent stack test.
    - The temperature limit may be reestablished during compliance testing at any time pending Departmental approval.
  - A deviation is defined as any time the 3-hour block average combustion zone temperature is less than 50° below the average temperature established during the most recent compliance test.
  - A calibration and accuracy check shall be performed according to the manufacturer's procedures at least annually or following a deviation.
    - An accuracy check shall also be performed any time the sensor exceeds the manufacturer's specified maximum operating temperature range or a new sensor is installed.
  - A visual inspection of the temperature sensor components shall be performed at least semiannually or following a deviation.
- A pH a meter shall be installed to monitor the scrubber solution for each scrubber. The pH meter shall be installed, operated, and maintained according to the following:
  - The pH meter shall be located in a position that provides a representative pH of the scrubbing solution.
  - Daily pH scrubbant readings shall be checked and recorded.
    - A pH within the chemical manufacturer's recommended range or the range established during the most recent compliance test shall be maintained.
    - A deviation is defined as any pH reading outside the established range.
  - A calibration and accuracy check shall be performed according to the manufacturer's procedures at least annually or following a deviation.
    - A calibration shall also be performed any time the meter exceeds the established range or a new meter is installed.
- A monitoring device that measures the liquid flow rate for the scrubbers shall be installed and operated according to the following:
  - The flow rate sensor shall be located in a position to maintain an adequate level in the packedbed scrubbers and the air washer/spray tower.
  - The flow rate shall be continuously monitored and recorded once per operating day.

- The liquid flow rate shall not drop below the average flow rate established during the most recent compliance test.
  - If the flow rate drops below the established level, corrective action shall be initiated to bring the flow rate within an acceptable range.
  - If the flow rate drops below the established level for more than one (1) hour, a deviation should be reported.
- A calibration and accuracy check shall be performed according to the manufacturer's procedures at least annually.

The facility will be required to conduct performance testing on the Purification stack ST-10922 at least once every 36 months, to include the following requirements:

- The initial stack test for ST-10922 shall be conducted within 180 days of startup of the plant.
- The facility shall submit a protocol to the Department at least 10 working days in advance of the proposed test.
- Method 5 of 40 CFR Part 60, Appendix A-3, shall be used in the determination of PM.
- The results of the test shall be reported to the Department within 45 days after completion of the test.

The following monitoring requirements shall be followed for the operations in the SPG Building:

- The Permittee shall perform periodic inspections of each control device to verify proper operation. The following activities shall be performed:
  - Once per week, monitor and record pressure drop across each baghouse to determine if it is within the manufacturer's recommended pressure range or the range established during the most recent compliance test.
    - At any time the pressure drop is outside of the required range, this indicates an excursion and triggers an inspection and corrective action.
    - Pressure drop is measured at the baghouse inlet and exhaust.
  - Once per week, perform a check of visible emissions from the SPG stack (ST-21902).
    - If visible emission greater than ten (10%) percent opacity are noted during the above-referenced visual checks, corrective action shall be initiated within 2 hours to reduce emissions.
    - After corrective action has been performed, the Permittee shall conduct another visual check to ensure that the visible emissions have been eliminated.
    - Observations are made at the stack exhaust while the units are operating.
  - For each baghouse:
    - Once per month, check hopper, fan, and cleaning cycle for proper operation.
    - Once per month, perform a visual check of all hoods and ductwork.
    - Record any repairs or observed problems.

The facility will be required to conduct performance testing on the SPG stack ST-21902 at least once every 36 months, to include the following requirements:

- The initial stack test for ST-21902 shall be conducted within 180 days of startup of the plant.
- The facility shall submit a protocol to the Department at least 10 working days in advance of the proposed test.
- Method 5 of 40 CFR Part 60, Appendix A-3, shall be used in the determination of PM.

• The results of the test shall be reported to the Department within 45 days after completion of the test.

The following monitoring requirements shall be followed for the operations in the Coating Building:

- An observation of the CSPG stack (ST-22946) will be accomplished at least weekly. If visible emissions greater than ten (10%) percent opacity are noted at any time, corrective action shall be initiated within 2 hours to reduce emissions. After corrective action has been performed, the permittee shall conduct another visual check to ensure that the visible emissions have been eliminated.
- A monitoring device that continuously measures and records the combustion chamber temperature of each TO shall be installed, calibrated, maintained, and operated according to the following:
  - The temperature sensor shall be located in a position that provides a representative temperature.
  - The temperature shall be recorded once every hour.
  - The facility shall determine each block three (3) hour average of all recorded readings for each operating day.
    - The facility may not use data recorded during monitoring malfunctions and associated repairs.
    - The three (3) hour block average combustion zone temperature shall be maintained at or above the temperature established during the most recent stack test.
    - The temperature limit may be reestablished during compliance testing at any time pending Departmental approval.
  - $\circ$  A deviation is defined as any time the 3-hour block average combustion zone temperature is less than 50° below the average temperature established during the most recent compliance test.
  - A calibration and accuracy check shall be performed according to the manufacturer's procedures at least annually or following a deviation.
    - An accuracy check shall also be performed any time the sensor exceeds the manufacturer's specified maximum operating temperature range or a new sensor is installed.
  - A visual inspection of the temperature sensor components shall be performed at least semiannually or following a deviation.
- A pressure gauge shall be installed across the Media Absorber Vessel to determine the pressure differential across the control device. The pressure gauge shall be installed, operated, and maintained according to the following:
  - The pressure gauge shall be located in a position that provides a representative pressure drop across the control device. Pressure drop is measured at the control device inlet and exhaust.
  - Once per week, monitor and record the pressure drop across the control device to determine if it is within the manufacturer's recommended operating range or the range established during the most recent compliance test.
    - Any time the pressure drop is outside of required range, the facility shall take corrective action to determine the cause of the issue.
    - If determined that the control device is operating outside of the required range, this indicates a deviation and triggers an inspection and corrective action.

- A calibration and accuracy check shall be performed according to the manufacturer's procedures at least annually or following a deviation.
  - A calibration shall also be performed any time the sensor exceeds the established range or a new pressure gauge is installed.

The facility will be required to conduct performance testing on the CSPG stack ST-22946 at least once every 36 months, to include the following requirements:

- The initial stack test for ST-22946 shall be conducted within 180 days of startup of the plant.
- The facility shall submit a protocol to the Department at least 10 working days in advance of the proposed test.
- Method 5 of 40 CFR Part 60, Appendix A-3, shall be used in the determination of PM.
- Method 18 of 40 CFR Part 60, Appendix A-6, or Method 320 of 40 CFR Part 63, Appendix A, shall be used in the determination of Total HAPs.
- The results of the test shall be reported to the Department within 45 days after completion of the test.

# **RECORDKEEPING & REPORTING**

The facility will be required to maintain the following records in a form suitable for inspection for a period of at least five (5) years:

- The facility shall maintain a record of the twelve (12) month rolling total of PM, VOC, SO<sub>2</sub>, NO<sub>x</sub>, and HAP emissions, updated on a monthly basis.
- The facility shall maintain records of all monitoring including, visible emission observations and pressure differential checks for all baghouses, all problems observed, and corrective actions taken.
- Records shall be maintained of the three (3) hour average combustion zone temperature, each incidence when corrective action was required, and documentation of each accuracy check and each component visual inspection.
- Records shall be maintained of the pressure differential readings for the scrubbers, each incidence when corrective action was required, and documentation of each accuracy check.
- Records shall be maintained of the scrubbant pH readings for the scrubbers, a record of each incidence when corrective action was required, and documentation of each accuracy check.
- Records shall be maintained of the liquid flow rates for the scrubbers and a record of each incidence when corrective action was required.
- A record of the monthly and twelve (12) month rolling total of fuel combusted at the facility shall be maintained.
- A record of each performance test reports shall be maintained.

# Class I Area

The nearest Class I Area to the plant, the Bradwell Bay Area, is greater than 100 kilometers away, and the emissions from the proposed facility are not expected to have a significant impact on the Class I area.

### **FEDERAL REGULATIONS**

40 CFR 60 "New Source Performance Standards" Subpart A, "General Provisions"

This subpart is applicable provided that the facility is subject to one of the applicable subparts found under 40 CFR 60, "*New Source Performance Standards*".

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

This subpart is applicable to stationary compression ignition internal combustion engines as specified in §60.4200(a). The Emergency Fire Water Pump and the Emergency Generator are stationary compression ignition internal combustion engines that use diesel fuel and were constructed after 2006; therefore, the emergency engines are subject to this subpart.

Emission & Operational Standards

Each engine shall not operate more than 500 hrs/year.

Per 40 CFR 60.4202(a)(2) and 40 CFR 60 Subpart IIII Table 4, nitrogen oxide (NO<sub>X</sub>) + nonmethane hydrocarbon (NMHC) emissions from the engines shall not exceed 4.0 g/kW-hr.

Per 40 CFR §60.4202(a)(2) and 40 CFR 60 Subpart IIII Table 4, carbon monoxide (CO) emissions from the engines shall not exceed 3.5 g/kW-hr.

Per 40 CFR §60.4202(a)(2) 40 CFR 60 Subpart IIII Table 4, particulate matter (PM) emissions from the engines shall not exceed 0.2 g/kW-hr.

Per 40 CFR §60.4207(b), the engines must use diesel fuel that meets the requirements of 40 CFR §1039.305.

Compliance and Performance Test Methods and Procedures

Method 5 of 40 CFR Part 60, Appendix A-3 shall be used in the determination of PM emissions.

Method 7E of 40 CFR Part 60, Appendix A-4 shall be used in the determination of NO<sub>X</sub> emissions.

Method 9 of 40 CFR Part 60, Appendix A-4 shall be used in the determination of opacity of stack emissions.

Method 10 of 40 CFR Part 60, Appendix A-4 shall be used in the determination of CO emissions.

#### Monitoring Requirements

Per 40 CFR §60.4209(a), the Permittee shall install a non-resettable hour meter on each unit.

Per 40 CFR §60.4211, the engines must be certified according to the emission standards in Subpart IIII for the same model year and maximum engine power. Each unit must be installed and configured according to the manufacturer's emission-related specifications.

Per 40 CFR §60.4211(f), the following must be maintained for each engine to retain its emergency status: The engine may be operated for the purpose of maintenance checks and readiness testing for a period not to exceed 100 hours per year. There is no time limit on the use of the engine in emergency situations. The engine may operate up to 50 hours per year in non-emergency situations. The 50 hours for non-emergency situations shall count towards the 100 hours allowed for maintenance checks and readiness. The 50 hours for non-emergency situations shall not be used for peak shaving or generating income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity. Any operation of the emergency generator engine other than for emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year is prohibited.

### Recordkeeping & Reporting Requirements

Per 40 CFR §60.4214(b), the Permittee shall maintain a record of the hours of operation of each engine that is recorded through the non-resettable hour meter and document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. If the engines are used for demand response operation, the facility must keep records of the notification of the emergency situation, and the time the engine was operated as part of demand response.

Per 40 CFR 60.4214(d), if a unit is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in 60.4211(f)(3)(i), the Permittee must submit an annual report according to the requirements of 60.4214(d)(1) through (3).

### 40 CFR 63 Subpart A, "General Provisions"

No subparts within this part are applicable to the proposed facility.

# **ENVIRONMENTAL JUSTICE**

ADEM utilized the EJSCREEN screening tool to perform an analysis of the area. Please refer to Appendix A.

### RECOMMENDATIONS

This analysis indicates that the proposed emission sources would meet the requirements of all federal and state rules and regulations if operated properly. Based on the analysis above, I recommend that Alabama Graphite be issued Synthetic Minor Operating Permit Nos. 306-0017-X001 through -X004.

X001:

Graphite Purification Building: 1200 Area Kiln, 1200 Area Graphite Concentrate Bin, 1300 Area Leaching and Filtration with Leach Area Scrubber, 1400 Area Purification Drying with Purification Dryer Product Collector, and 1500 Area Thermal Purification with TPF No. 1, TPF No. 2, TPF Thermal Oxidizer, TPF Dust Collection and TPF Scrubber

X002:	SPG Building: 2100 Area Spherical Purified Graphite (SPG) and SPG products with 17 Product and Dust Collector Bag Filters
X003:	Coating Building: 2200 Area Coated Spherical Purified Graphite (CSPG) and CSPG Products with Two (2) Dryers, Two (2) ovens, Oven Off- gas Burner, Thermal Oxidizer, and Media Absorber Vessel
X004:	Emergency Fire Water Pump Emergency Generator

April 12, 2022

Date

Haley K. Crumpton Industrial Minerals Section Energy Branch Air Division ADEM Appendix A EJSCREEN





#### 1 mile Ring Centered at 32.968968,-86.031951, ALABAMA, EPA Region 4

#### **Approximate Population: 315**

Input Area (sq. miles): 3.14

#### **Kellyton Graphite Processing Plant**

Selected Variables	State Porcontilo	EPA Region	USA Percentile
Environmental Justice Indexes	Fercentile	Fercentile	reicentile
EJ Index for Particulate Matter 2.5	77	71	72
EJ Index for Ozone	77	70	71
EJ Index for 2017 Diesel Particulate Matter*	70	63	64
EJ Index for 2017 Air Toxics Cancer Risk*	79	73	76
EJ Index for 2017 Air Toxics Respiratory HI*	78	73	76
EJ Index for Traffic Proximity	76	68	66
EJ Index for Lead Paint	86	86	81
EJ Index for Superfund Proximity	74	66	66
EJ Index for RMP Facility Proximity	72	64	64
EJ Index for Hazardous Waste Proximity	71	66	64
EJ Index for Underground Storage Tanks	71	64	67
EJ Index for Wastewater Discharge	62	60	61



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.





1 mile Ring Centered at 32.968968,-86.031951, ALABAMA, EPA Region 4

Approximate Population: 315 Input Area (sq. miles): 3.14 Kellyton Graphite Processing Plant



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

Esri, HERE, Garmin, Maxar





1 mile Ring Centered at 32.968968,-86.031951, ALABAMA, EPA Region 4

#### **Approximate Population: 315**

Input Area (sq. miles): 3.14

Kellyton Graphite Processing Plant

Selected Variables		State	%ile in State	EPA Region	%ile in EPA	USA Avg	%ile in
		Avg.	Jiate	Avg.	Region	Avg.	UJA
Pollution and Sources							
Particulate Matter 2.5 (µg/m <sup>3</sup> )	8.87	8.9	46	8.18	76	8.74	57
Ozone (ppb)	37.3	39.1	30	37.9	43	42.6	18
2017 Diesel Particulate Matter <sup>*</sup> (µg/m <sup>3</sup> )	0.0876	0.216	8	0.261	<50th	0.295	<50th
2017 Air Toxics Cancer Risk <sup>*</sup> (lifetime risk per million)	40	34	99	31	95-100th	29	95-100th
2017 Air Toxics Respiratory HI*	0.5	0.47	91	0.4	95-100th	0.36	95-100th
Traffic Proximity (daily traffic count/distance to road)	92	230	53	430	42	710	32
Lead Paint (% Pre-1960 Housing)	0.32	0.18	84	0.15	86	0.28	65
Superfund Proximity (site count/km distance)	0.02	0.054	27	0.083	31	0.13	17
RMP Facility Proximity (facility count/km distance)	0.1	0.41	31	0.6	21	0.75	16
Hazardous Waste Proximity (facility count/km distance)	0.13	0.83	29	0.62	34	2.2	21
Underground Storage Tanks (count/km <sup>2</sup> )	0.25	1.7	33	3.5	27	3.9	29
Wastewater Discharge (toxicity-weighted concentration/m distance)		0.42	N/A	0.45	N/A	12	N/A
Socioeconomic Indicators							
Demographic Index	53%	36%	78	37%	76	36%	76
People of Color	58%	34%	79	39%	73	40%	70
Low Income	48%	37%	71	35%	73	31%	78
Unemployment Rate	4%	6%	46	6%	46	5%	48
Linguistically Isolated	0%	1%	70	3%	51	5%	45
Less Than High School Education	24%	14%	84	13%	86	12%	85
Under Age 5	4%	6%	29	6%	30	6%	28
Over Age 64	11%	17%	22	17%	28	16%	33

\*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJScreen is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJScreen documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJScreen outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.





#### 3 miles Ring Centered at 32.968968,-86.031951, ALABAMA, EPA Region 4

#### **Approximate Population: 1,895**

Input Area (sq. miles): 28.27

#### Kellyton Graphite Processing Plant

Selected Variables	State	EPA Region	USA
Selected valiables	Percentile	Percentile	Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	79	73	74
EJ Index for Ozone	78	72	72
EJ Index for 2017 Diesel Particulate Matter*	73	65	66
EJ Index for 2017 Air Toxics Cancer Risk*	81	75	78
EJ Index for 2017 Air Toxics Respiratory HI*	79	75	77
EJ Index for Traffic Proximity	76	68	67
EJ Index for Lead Paint	86	86	81
EJ Index for Superfund Proximity	75	67	66
EJ Index for RMP Facility Proximity	74	65	65
EJ Index for Hazardous Waste Proximity	73	69	65
EJ Index for Underground Storage Tanks	76	68	70
EJ Index for Wastewater Discharge	64	63	63



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.





3 miles Ring Centered at 32.968968,-86.031951, ALABAMA, EPA Region 4

Approximate Population: 1,895 Input Area (sq. miles): 28.27 Kellyton Graphite Processing Plant



÷	Kellyton	Graphite	Processing	Plant

1:72,224 0.75 1.5 3 m 1 2 4 km

Esri, HERE, Garmin, Earthstar Geographics

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0





3 miles Ring Centered at 32.968968,-86.031951, ALABAMA, EPA Region 4

#### **Approximate Population: 1,895**

Input Area (sq. miles): 28.27

Kellyton Graphite Processing Plant

Selected Variables		State Avg.	%ile in State	EPA Region	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources				A18.	Region		
Particulate Matter 2.5 (µg/m <sup>3</sup> )	8.87	8.9	46	8.18	76	8.74	57
Ozone (ppb)	37.2	39.1	29	37.9	43	42.6	18
2017 Diesel Particulate Matter <sup>*</sup> (µg/m <sup>3</sup> )	0.101	0.216	14	0.261	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	40	34	99	31	95-100th	29	95-100th
2017 Air Toxics Respiratory HI*	0.5	0.47	91	0.4	95-100th	0.36	95-100th
Traffic Proximity (daily traffic count/distance to road)	77	230	48	430	39	710	29
Lead Paint (% Pre-1960 Housing)	0.27	0.18	79	0.15	82	0.28	61
Superfund Proximity (site count/km distance)	0.02	0.054	28	0.083	32	0.13	17
RMP Facility Proximity (facility count/km distance)	0.11	0.41	35	0.6	24	0.75	18
Hazardous Waste Proximity (facility count/km distance)	0.15	0.83	31	0.62	39	2.2	24
Underground Storage Tanks (count/km <sup>2</sup> )	0.54	1.7	48	3.5	38	3.9	37
Wastewater Discharge (toxicity-weighted concentration/m distance)		0.42	12	0.45	13	12	9
Socioeconomic Indicators							
Demographic Index	55%	36%	80	37%	77	36%	78
People of Color	59%	34%	79	39%	74	40%	71
Low Income	50%	37%	74	35%	77	31%	81
Unemployment Rate	3%	6%	36	6%	35	5%	37
Linguistically Isolated	0%	1%	71	3%	51	5%	45
Less Than High School Education	23%	14%	82	13%	85	12%	84
Under Age 5	6%	6%	53	6%	53	6%	51
Over Age 64	16%	17%	50	17%	55	16%	58

\*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

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#### 5 miles Ring Centered at 32.968968,-86.031951, ALABAMA, EPA Region 4

#### **Approximate Population: 8,092**

Input Area (sq. miles): 78.53

#### Kellyton Graphite Processing Plant

Selected Variables	State	EPA Region	USA
Selected Valiables	Percentile	Percentile	Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	80	73	75
EJ Index for Ozone	79	72	73
EJ Index for 2017 Diesel Particulate Matter*	75	66	67
EJ Index for 2017 Air Toxics Cancer Risk*	82	76	78
EJ Index for 2017 Air Toxics Respiratory HI*	80	75	78
EJ Index for Traffic Proximity	79	71	69
EJ Index for Lead Paint	86	86	80
EJ Index for Superfund Proximity	75	67	66
EJ Index for RMP Facility Proximity	77	68	67
EJ Index for Hazardous Waste Proximity	75	72	67
EJ Index for Underground Storage Tanks	85	76	77
EJ Index for Wastewater Discharge	64	62	63



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.





5 miles Ring Centered at 32.968968,-86.031951, ALABAMA, EPA Region 4

Approximate Population: 8,092 Input Area (sq. miles): 78.53 Kellyton Graphite Processing Plant



April 27, 2022	1:144,448
Kellyton Graphite Processing Plant	0 1.5 3 6 mi
	Esri, HERE, Garmin, Earthstar Geographics

Sites reporting to EPA						
Superfund NPL	0					
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0					





5 miles Ring Centered at 32.968968,-86.031951, ALABAMA, EPA Region 4

#### **Approximate Population: 8,092**

Input Area (sq. miles): 78.53

Kellyton Graphite Processing Plant

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA		
Pollution and Sources									
Particulate Matter 2.5 (µg/m <sup>3</sup> )	8.86	8.9	46	8.18	76	8.74	57		
Ozone (ppb)	37.1	39.1	27	37.9	42	42.6	17		
2017 Diesel Particulate Matter <sup>*</sup> (µg/m <sup>3</sup> )	0.111	0.216	19	0.261	<50th	0.295	<50th		
2017 Air Toxics Cancer Risk* (lifetime risk per million)	40	34	99	31	95-100th	29	95-100th		
2017 Air Toxics Respiratory HI*	0.5	0.47	91	0.4	95-100th	0.36	95-100th		
Traffic Proximity (daily traffic count/distance to road)	110	230	57	430	46	710	35		
Lead Paint (% Pre-1960 Housing)	0.24	0.18	76	0.15	80	0.28	58		
Superfund Proximity (site count/km distance)	0.019	0.054	25	0.083	30	0.13	16		
RMP Facility Proximity (facility count/km distance)	0.16	0.41	49	0.6	37	0.75	29		
Hazardous Waste Proximity (facility count/km distance)	0.23	0.83	41	0.62	53	2.2	33		
Underground Storage Tanks (count/km <sup>2</sup> )	2.6	1.7	79	3.5	67	3.9	64		
Wastewater Discharge (toxicity-weighted concentration/m distance)	4E-07	0.42	N/A	0.45	N/A	12	N/A		
Socioeconomic Indicators									
Demographic Index	55%	36%	80	37%	78	36%	78		
People of Color	57%	34%	79	39%	72	40%	70		
Low Income	53%	37%	78	35%	80	31%	83		
Unemployment Rate	6%	6%	61	6%	62	5%	65		
Linguistically Isolated	1%	1%	73	3%	54	5%	47		
Less Than High School Education	23%	14%	82	13%	84	12%	83		
Under Age 5	7%	6%	69	6%	70	6%	68		
Over Age 64	18%	17%	63	17%	65	16%	68		

\*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

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