

THE ENVIRONMENTAL & HEALTH CONDITIONS SURROUNDING DRAX AMITE, GLOSTER, MISSISSIPPI

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I. EXECUTIVE SUMMARY

Background:

The Drax Amite wood pellet plant in Gloster, Mississippi, has operated since 2016. The Environmental Equity Information Institute (E2I2) and GridEquity analyzed publicly available data to understand the environmental and health impacts that may be associated with Drax Amite air emissions to the local Gloster community.

Key Findings:

- Drax Amite reported to the EPA emissions of both hazardous air pollutants (HAPs) and Volatile Organic Compounds (VOCs) including formaldehyde, methanol, hydrochloric acid, lead, and acetaldehyde. These chemicals are linked to serious health effects including cancer, breathing problems, and harm to the brain, nervous system, and children's development.
- **Gloster is at Higher Risk:** Compared to nearby Mendenhall, a comparable town, Gloster faces greater air quality risks. EJScreen data ranks Gloster in the 82nd percentile in the state for ozone exposure risks and 48th percentile in the state for toxic releases to air exposure risks, higher than Mendenhall (21st and 41st percentiles). On the ozone measure, Gloster faces greater exposure risks than the state capital, Jackson (71st percentile).
- **Community Disadvantage:** Gloster has higher poverty, unemployment, and uninsured rates, and lower incomes and educational attainment compared to Mendenhall. These social conditions increase both exposure to pollution and vulnerability to its effects.
- **Health Concerns:** On average, Gloster residents face more health-related challenges than residents of Mendenhall. Surveys show many Gloster households report frequent coughing (55%), eye irritation (75%), nose irritation (66%), sinus problems (88%), and throat irritation (64%). Noise from plant operations also adds stress and health risks. Compared to Mendenhall and the state capital, Jackson, Gloster has a higher health vulnerability index.
- **Incomplete Health Data:** Available data is old and does not accurately capture local health conditions in rural census tracts.
- **Incomplete Emissions Data:** Emissions reporting to the EPA's TRI program is limited. The EPA does not require all chemicals to be reported, and reporting only happens when emissions are over 10,000lbs (5 tons) per year. This means the true scale of emissions and risks may be undercounted.
- **Drax Permit Request Proposed Emissions:** Drax are proposing to emit 245 tons per year of uncontrolled VOCs and 40 tons of uncontrolled HAPs. In contrast, in 2023, Drax Amite reported to the EPA that the facility emitted just 3 tons of HAPs and no VOC emissions.

Recommendations:

- **Community Health Study:** In collaboration with local community groups, conduct a comprehensive, community-based participatory health assessment in Gloster to track illnesses that may be associated with Drax Amite emissions.

- **Continuous Air Monitoring:** Conduct real-time, continuous, local monitoring of individual HAPs, VOCs, and criterion pollutants and make data available to the community in plain language formats.
- **Full Emissions Reporting:** Drax should disclose emissions from all parts of the manufacturing process, including pellet coolers and post-dryer units.

Conclusion:

Gloster residents already face economic and health disadvantages. Expanding operations at Drax Amite without stronger protections may put this community at even greater risk. Transparent data, local monitoring, and community health assessments are essential to protect public health and the environment.

II. INTRODUCTION

The Dogwood Alliance issued a request for information to conduct a comprehensive assessment of the environmental and health impacts of the Drax Amite wood pellet production facility in Gloster, MS (also known as Amite Bio Energy LLC). Dogwood Alliance sought specialized expertise to evaluate potential impacts as Drax Amite seeks to expand operations and gain reclassification as a major source of air Emissions.

GridEquity, a community-responsive 501(c)(3) that addresses environmental and energy justice issues through bottom-up, grassroots support for individuals, nonprofits, and communities, partnered with the Environmental Equity Institute (E2I2), a 30-year-old environmental 501(c)(3) nonprofit organization based in Atlanta, Georgia. E2I2 provides environmental and public health data analysis and technical support to communities and other nonprofit organizations throughout the Southeastern United States. Dogwood selected this partnership to conduct the analysis.

III. METHODOLOGY

Our guiding research question for this report is: what emissions does Drax Amite release into the air and what are the environmental and health conditions in the surrounding community of Gloster, MS, including known health impacts associated with these emissions? To answer this question, we analyzed the following data sources.

- **The Environmental Justice Screening and Mapping Tool (EJScreen) (Version 2.3, 2024):** EJScreen is an online mapping tool from the Environmental Protection Agency (EPA) that shows where environmental issues and social factors, like income and health, intersect across the United States. It helps communities, researchers, and policymakers identify areas that may face higher environmental and health risks. Although the EPA removed public access to EJScreen in February 2025, E2I2 maintains a copy of version 2.3 released in July 2024 on its servers. The EPA collected data for version 2.3 between 2020 and 2024, depending on the variable.
- **2020 Census and 2023 American Community Survey (ACS):** The U.S. Census Bureau implements the ACS every year to provide current estimates on indicators such as education, income, and housing.
- **CDC Places/ Behavioral Risk Factor Surveillance System (BRFSS) data (2021-2022):** CDC Places maintains a public database providing health data at the county, city, and census tract levels using data from BRFSS survey response. BRFSS is the largest telephone health survey in the U.S., running since 1984. BRFSS collects data continuously throughout the year on health behaviors, chronic conditions, and preventive service use.

- **Toxics Release Inventory (TRI) reporting program (2016-2023):** The EPA runs the TRI Reporting Program. Certain factories and facilities must report yearly the amount of emissions they release or manage into the air, water, or land. Facilities must report data if they meet certain criteria related to their size and the type and amount of chemicals released. The goal of the TRI Reporting Program is to give communities transparent information about local chemical use and pollution so people can understand and track environmental risks.
- **EPA Air Toxics Screening Assessment (AirToxScreen) 2020:** AirToxScreen is a national screening tool that estimates health risks from breathing outdoor air toxics. It uses emissions data, air modeling, and population information to help identify areas where people may face higher health risks from emission exposure. EPA released the latest AirToxScreen update in May 2024, using 2020 emissions data.
- **Pharos Chemical & Material Library:** Healthy Building Network (now operating under Habitable) developed Pharos, a database that provides hazard, use, and exposure information on tens of thousands of chemicals, materials, and building products.
- **Health Vulnerability Model (2024):** Produced by Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) The Health Vulnerability Model integrates environmental, health, and social data to identify communities facing elevated health risks. It combines measured pollution levels, disease prevalence, and social determinants of health (such as income, housing, and access to care) to quantify population vulnerability. Using these datasets, the model highlights areas where overlapping burdens increase susceptibility to environmental and health stressors, guiding interventions to reduce inequities and improve resilience.

We also reviewed data from the following reports:

- Brown University Community Noise Lab air quality report for Q2 2025 (see <https://communitynoiselab.org/>)
- Bell, R., R. Benderson, E. Brown, R. Harding, K. Martin. 2024. *Pellet Mill Community Impact Survey*. Southern Environmental Law Center.
- Walker, E.D., N. Franzen Lee, C. Nica, A. Barnes, B. Graham, and K. Martin. 2024. “Amplifying concerns: An exploration of community noise levels in rural communities impacts by wood pellet production.” *Environmental Challenges* 17:10124
- P. Anderson, and K. Powell. 2018. *Dirty Deception: How the Wood Biomass Industry Skirts the Clean Air Act*. Environmental Integrity Project.
- Drax Amite permit applications and associated communication to the Mississippi Department of Environmental Quality (MDEQ).

We chose Mendenhall as a comparison community for our data analysis to align with ongoing data collection by Brown University. On the EJScreen and Health Vulnerability Module data, we

included data for the state capital, Jackson, as a third point of comparison. We analyzed data in Excel and ArcGIS.

IV. FINDINGS

A. Community Profiles

Table A1 in the Appendix provides comparative demographic data about Gloster, Mendenhall, and the state of Mississippi. Gloster has a population of 1,189 and Mendenhall is slightly larger at 2,397. Both towns are in the south of Mississippi and are a little over 100 miles from each other. Whereas, Mendenhall is only 33 miles from Jackson, Mississippi, Gloster is a rural community far from a major city.

Only 24% of people in Gloster identify as White, with 75% identifying as Black or African American. In contrast, 54% of people in Mendenhall identify as White, and 44% as Black or African American. Only 36.5% of the state of Mississippi identifies as Black or African American. Gloster is economically disadvantaged compared to Mendenhall, with 32% of the population living below the federal poverty level, compared to 29% of Mendenhall's population. With a median household income of \$22,500—\$17,000 below Mendenhall and just half the state average of \$54,203—Gloster faces significant economic hardship. Nearly one-third of households live below the federal poverty level, almost twice the statewide rate of 18%.

Compared to Gloster, Mendenhall has a larger proportion of residents with education credentials greater than a high school diploma. Gloster has an unemployment rate double Mendenhall and the state (10.1% versus 5.4% and 4.8%) and a higher uninsured rate than Mendenhall (10.5% versus 8.8%). Therefore, overall, Gloster presents demographic statistics associated with greater socioeconomic disadvantage compared to both Mendenhall and the state overall.

Figure 1 below shows Gloster and Mendenhall's locations with a 3-mile boundary that we used for EJScreen data analysis.

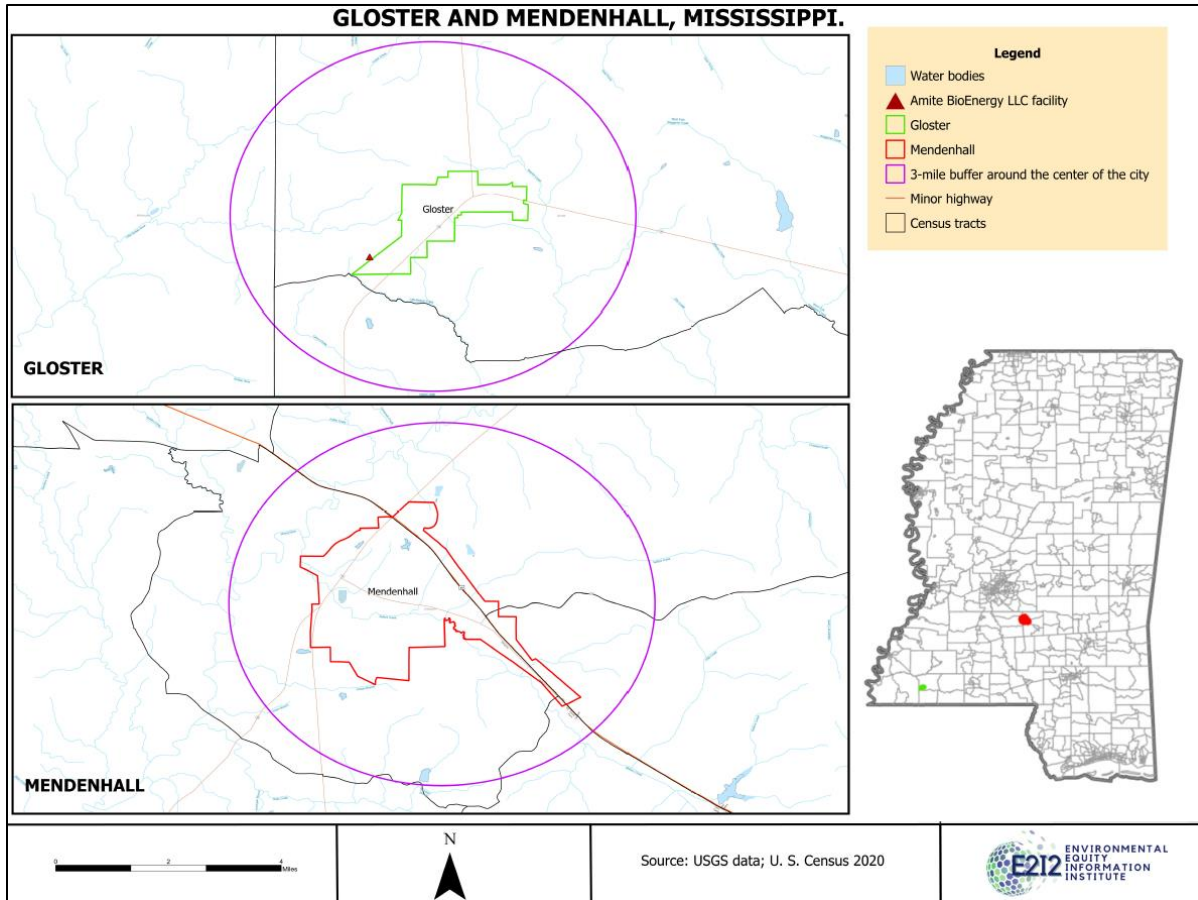


Figure 1: Gloster and Mendenhall analysis boundaries

B. Emissions to Air

i. Toxic Release Inventory (TRI) Reporting Program

According to the data submitted by Drax Amite to the EPA’s TRI Reporting Program, since 2016 Drax Amite has released four hazardous air pollutants (HAPs) into the air including lead, formaldehyde, methanol, and hydrochloric acid. Drax Amite also reports emitting acetaldehyde, which the EPA does not consider a HAP. HAPs are 188 specific chemicals that the EPA considers most harmful to human health and are known to cause cancer, birth defects, and other serious health problems. HAPs are volatile organic compounds (VOCs), but not all VOCs are HAPs. VOCs are gases released into the air from a range of sources. Some VOCs are harmless, but others can form smog or be toxic.

Table 1 (also see Figures A1-A5 in the Appendix) shows that reported total air emissions from Drax Amite peaked in 2021 at 55,905 cumulative pounds (lbs) followed by 52,220lbs in 2022. The total reported air emissions in 2023 were significantly lower at 6,676lbs with data only reported for formaldehyde. Typically, facilities are required to report on cumulative annual emissions of over 10,000lbs.

Chemicals	2016	2017	2018	2019	2020	2021	2022	2023
Lead compounds	171	353	186	0	0	2	2	23
Formaldehyde	0	0	0	19202	14634	13671	12256	6653
Acetaldehyde	0	0	0	7085	10424	7342	6695	0
Methanol	0	0	0	6990	10330	34890	31598	0
Hydrochloric acid	0	0	0	0	0	0	1669	0
Total (lbs)	171	353	186	33,277	35,388	55,903	52,220	6,676
Total (tons)	0.11	0.16	0.08	15.10	16.10	25.36	23.79	3.03

The Drax Amite *Permit Review Summary* (October 9th 2024, page 3) outlines Drax’s plans for expansion of operations. The summary states that the facility has the potential to emit 891 tons (1,782,000lbs) of uncontrolled VOC emissions per year and 44 tons (88,000lbs) of HAPs per year. After installing controls, if the expansion is approved, Drax Amite estimates it will release 245 tons of uncontrolled VOCs and 40 tons of uncontrolled HAPs. This represents a 1233% increase in HAPs emissions from the amount reported to the TRI in 2023 (3.03 tons).¹ Not all chemicals must be reported to the TRI. The TRI only requires reporting on chemicals specifically listed by the EPA (currently about 770). Many HAPs and VOCs are not on that list, and as such, facilities do not have to report them. Further, facilities only need report if they manufacture, process, or otherwise use a listed chemical above certain thresholds (often 10,000 or 25,000 pounds per year). These reporting requirements make it difficult for the public to understand the total amount of emissions released and what their cumulative impact may be.

Using the Pharos Chemical and Material Library, we reviewed the likelihood of health impacts associated with exposure to the HAPs reported to the TRI (Table 1). Table 2 shows that the known HAPs Drax currently reports to the TRI Reporting Program are associated with a high to very high likelihood for serious health impacts including cancer, eye irritation, neurotoxicity, skin irritation, and reproductive and developmental toxicity. Pharos does not assess the cumulative impacts from exposure to multiple harmful chemicals.

According to the EPA, short-term exposure to acetaldehyde results in negative health effects including irritation of the eyes, skin, and respiratory tract. Acetaldehyde is a probable human carcinogen.²

¹ We calculated this using the equation: (40 tons minus 3 tons)/3*100

² EPA. 2000. Acetaldehyde. <https://www.epa.gov/sites/default/files/2016-09/documents/acetaldehyde.pdf>

Table 2. Likelihood of health impacts from Drax Amite chemicals (Pharos)		
Chemical	Health Impact	Likelihood
Formaldehyde	Cancer	Very High
	Eye irritation	Very High
	Neurotoxicity	Very High
	Skin irritation	Very High
	Developmental toxicity	Medium
Hydrochloric Acid	Eye irritation	Very High
	Skin irritation	Very High
	Reproductive toxicity	Medium
	Developmental toxicity	Medium
	Respiratory sensitization	Medium
	Cancer	Low
	Neurotoxicity	Low
Lead Compounds	Skin sensitization	Low
	Cancer	Very High
	Reproductive toxicity	High
	Neurotoxicity (single exposure)	High
Methanol	Developmental toxicity	High/Medium
	Reproductive toxicity	High
	Developmental toxicity	High
	Skin irritation	High
	Eye irritation	High
	Neurotoxicity	Medium
	Skin sensitization	Low
Cancer	Low	

ii. EJScreen

To assess the potential risk of exposure to the Gloster community from Drax Amite emissions, we compared environmental justice (EJ) indexes to those for Mendenhall and Jackson, Mississippi. EJ indexes consider two pieces of information: 1) the amount of chemicals emitted in the air and 2) community demographics including race and income. By combining these data points, the indexes highlight where air emissions are high and where vulnerable populations live, helping identify communities that may face greater health risks from poor air quality. EJScreen reports the EJ indexes as a state or national percentile.

Of the 13 EJ index indicators only the EJ Ozone Index and EJ Toxic Release to Air Index are higher for Gloster compared to Mendenhall. We present the state percentiles in Figure 2 below,

which rank Gloster, Mendenhall, and Jackson comparative to each other and to the rest of the communities in the state. A higher percentile means, the community experiences greater impacts.

Ozone is an important indicator to assess because dust and emissions from the production of wood pellets release criterion pollutants, which add to local ozone levels. The ozone estimates use 2020 data, a year when ozone emissions declined due to reductions in travel and business operations from temporary COVID-19 lockdowns.³ Toxic release to air is an estimate of the toxicity of TRI listed chemicals in the air and uses 2021 data. We used a 3-mile radius (see Figure 1) from the center of Gloster and Mendenhall to calculate their EJ index percentiles. For Jackson, we averaged the EJ index data across the city's census tracts.

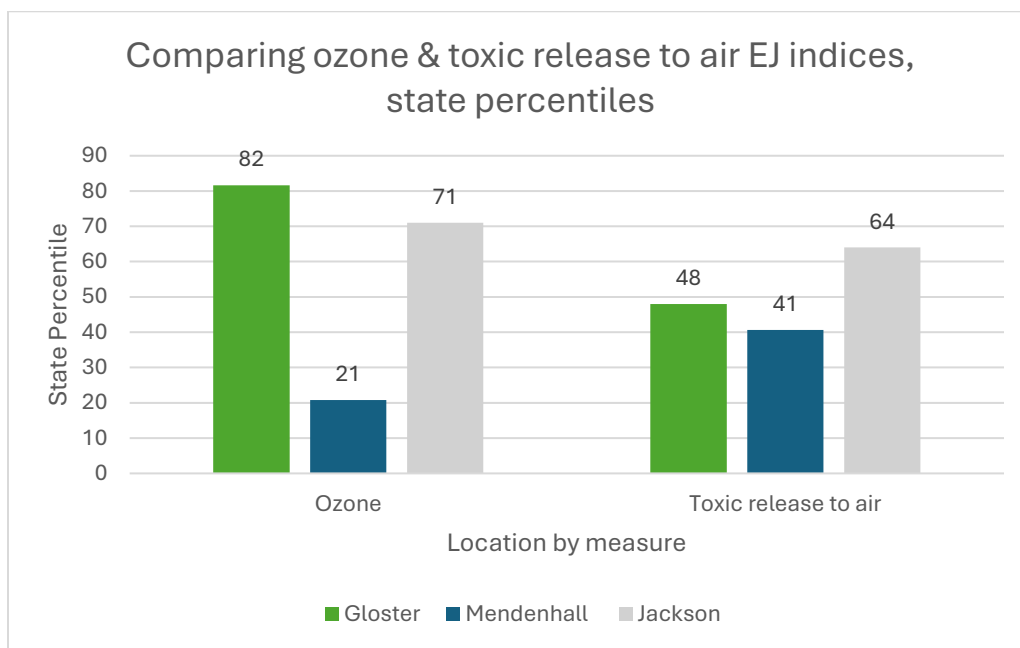


Figure 2. EJ Index for ozone and toxic release to air

The ozone EJ index shows that Gloster is in the 82nd percentile in the state, meaning only about 18 locations in Mississippi have higher levels. In contrast, Mendenhall ranks only 21st in the state. Gloster's ozone ranking is also higher than Jackson's percentile ranking (71st). The toxic release to air EJ index for Gloster is slightly higher than Mendenhall. Gloster ranks in the 48th percentile in the state and Mendenhall, the 41st percentile.

Data limitations: EJScreen data has a time lag. The 2.3 update released in July 2024 uses 2020 and 2021 datasets. 2020 was an anomaly year in air quality data due to COVID-19 pandemic lockdown restrictions improving air quality.

³ Steinbrecht, W. S. et al. COVID-19 crisis reduces free tropospheric ozone across the northern hemisphere, *Geophysical Research Letters*, doi:10.1029/2020GL091987, 2021.

iii. Brown University 2025 Quarter 2 Air Quality Report

The National Institute of Environmental Health Sciences awarded Brown University, under the direction of principal investigator Dr. Walker, a \$5 million grant to analyze environmental and health impacts of the wood pellet industry in Mississippi. Gloster is one of the study sites. Researchers are collecting air monitoring data for PM_{2.5}, VOCs, and ozone over time in addition to conducting an adolescent longitudinal health assessment. Brown University provided E2I2 a copy of the most recent air quality monitoring report covering the period April 4th to July 2nd, 2025.

The report shows that PM_{2.5} in Gloster is on average below the EPA regulatory limit of 9 micrograms per cubic meter, except for one day in May when PM_{2.5} was 11 micrograms per cubic meter.

Until the air monitor was moved on 5/4/2025, VOCs fluctuated from a high of 13 to a low of around 2. VOCs are a large group of chemicals rather than a single compound, so there is no single threshold for “harmful” VOC levels. Therefore, without knowing the emissions of each VOC chemical, it is difficult to extrapolate health impacts from the VOC data.

Ozone levels varied between approximately 9 to 44 parts per billion (PPB) before the monitor was moved and between 8 to 29 PPB after the move. According to the EPA, ozone levels below 50 PPB have minimal adverse health effects.

We do not know the location of the air monitors, the reason the monitor was moved, or who moved it. However, the relocation of the air monitor coincides with a significant drop in the measurement of VOC emissions.

C. Health Outcomes

Based on our review of existing reports on wood pellet manufacturing facilities and research studies listed in the methodology section and the Pharos database, the following are possible health impacts associated with living near a wood pellet manufacturing facility: reproductivity problems, developmental problems, sinus problems, respiratory conditions, throat irritation, skin irritation, eye irritation, asthma (including childhood hospitalization), coughing, bronchitis, premature death, cancer, and neurological conditions.

To identify what if any health conditions may be disparately present in Gloster compared to Mendenhall, we looked at several sources discussed below.

i. CDC Places (based on BRFSS data)

Our analysis shows that Gloster residents experience slightly higher prevalence of several medical conditions compared to Mendenhall:

- Vision disability prevalence: Gloster (10.1%) and Mendenhall (9.2%) both exceed the national rate of 5.5% (see Figure A6 in the Appendix).

- Stroke prevalence: Gloster (5.2%) and Mendenhall (4.9%) both exceed the national rate of 2.9% (see Figure A7 in the Appendix).
- High blood pressure prevalence: Gloster (48.3%) exceeds Mendenhall (42.4%) but remains below both the national rate (49.1%) and state rate (63.7%) (see Figure A8 in the Appendix).
- Asthma prevalence: Gloster (11.7%) and Mendenhall (11.6%) show nearly identical rates, both exceeding the state rate of 9.4% (see Figure A9 in the Appendix).

CDC Places Data limitations:

- *Sampling Limitations in Rural Areas*

The Behavioral Risk Factor Surveillance System (BRFSS) uses random digit dialing (RDD) on landlines and cell phones. Small rural communities are often underrepresented in the sample, leading to increased uncertainty and less reliable estimates for places with populations under 1,000.

- *Use of Modeled Estimates (Not Direct Measures)*

CDC PLACES does not use direct survey data for towns like Gloster. Instead, it relies on multilevel regression and post-stratification (MRP) to generate statistical estimates from county-level data and demographic characteristics. These modeled estimates are useful for broad comparisons, but may fail to reflect actual local health conditions, especially in unique or environmentally impacted communities.

- *Geographic Misclassification*

BRFSS often classifies areas based on Metropolitan Statistical Areas (MSAs), which can misidentify rural regions within large counties as “urban”, skewing health trend data. This can mask or distort true disparities in small rural towns that differ significantly from surrounding urban populations.

- *Demographic Adjustment Bias*

BRFSS adjusts results using a statistical method called iterative proportional fitting to match survey samples with local level demographic profiles, but this may obscure localized anomalies (e.g., small clusters of illness or exposure).

ii. Health Vulnerability Module (CDC/ATSDR 2024)

The Health Vulnerability Module combines data about health conditions and social factors to show how vulnerable people in a community may be to poor health outcomes. Each census tract in the U.S. receives a score between 0 and 1, where higher values mean greater vulnerability—that is, people in those areas are more likely to experience health problems or face barriers to good health.

We averaged the values across the census tracts for the cities of Gloster, Mendenhall, and Jackson. Gloster has a health vulnerability value of 0.61, compared to 0.53 for Mendenhall, and 0.40 for Jackson. Gloster's higher value indicates that, on average, residents of Gloster face more health-related challenges than residents in the other two cities.

iii. Pellet Mill Community Impact Survey (Bell et al. 2024)

The Southern Environmental Law Center collaborated with other environmental groups to commission a survey of community members in five different communities that live adjacent to wood pellet production facilities. Gloster was one of the communities surveyed. Of the 67 Gloster households who completed the survey, household members report the following health conditions:

- 55% report frequent coughing
- 75% report frequent eye irritation
- 66% report frequent nose irritation
- 88% report frequent sinus irritation
- 64% report frequent throat irritation

iv. Noise Pollution (Walker et al. 2024)

Wood pellet manufacturing involves the use of heavy machinery (such as log chippers, hammermill, and dryers) and results in increased traffic from trucks and freight trains. These operations have both air quality and noise pollution concerns. Walker et al. (2024) found that Gloster experiences significantly higher noise levels than Mendenhall. Specifically, Gloster has sound levels 2 to 6 decibels higher than Mendenhall, even though Gloster is a smaller, rural community. The authors conclude that the noise pollution is a result of Drax Amite operations. The Pellet Mill Community Impact Survey (Bell et al. 2024) also confirms that more than half of households in Gloster experience noise from Drax every day and 69% hear noise from Drax at least weekly.

Noise pollution is associated with acute health and wellbeing impacts including sleep disturbance and quality and quantity of sleep, decrease in quality of life, and a stress cascade that results in a host of poor mental and physical health conditions (Walker et al. 2024).

v. EPA AirToxScreen

AirToxScreen calculates cancer at the Census block level, the smallest geographic unit that the Census uses for data collection. All census blocks in Amite (Gloster) and Simpson (Mendenhall) counties have a low cancer risk of 30 in a million. However, AirToxscreen shows a slightly increased risk of cancer (40/million) in the two census blocks adjacent to Drax Amite

(280059502003110 and 280059502003112). However, this is still well below the EPA's high cancer risk level of over 100/million.

Data limitations: The AirToxScreen data is 5 years old, and we can expect a delay in the appearance of cancer and subsequent diagnosis after exposure to carcinogens. Further, AirToxScreen is an estimation of cancer risk, not the representation of actual cancer rates. Therefore, 2020 AirToxScreen data likely does not capture accurate, current cancer rates in Gloster.

V. CONCLUSIONS & RECOMMENDATIONS

Based on the data we reviewed, our conclusions include the following:

1. Compared to Mendenhall and the state of Mississippi, Gloster is a socioeconomically disadvantaged community with a higher likelihood of harmful impacts from exposure to ozone and toxic release to air. It ranks 82nd in the state on the EJ ozone index, compared to 21st in the state for Mendenhall. Mendenhall also has a worse EJ ozone ranking compared to Jackson (71st). This data indicates that Gloster is vulnerable to negative health impacts from further ozone and toxic air emissions increases from the proposed Drax Amite expansion.
2. The four HAPs that Drax Amite emitted and reported to the TRI Reporting Program between 2016 and 2023 are associated with a high likelihood of significant health impacts including cancer, eye irritation, neurotoxicity, skin irritation, reproductive toxicity, and developmental toxicity. There is no available data to estimate the cumulative impact of these HAPs on human health.
3. Overall, there is a lack of accurate, current local level data on environmental and health impacts associated with Drax Amite operations due to a combination of factors including:
 - The small, rural nature of Gloster
 - How the EPA and researchers produce both environmental and health data using mathematical estimates instead of actual local measures
 - The relatively short operational timeline of Drax Amite
 - The time lags from exposure to the development of a health condition, subsequent diagnosis, and reporting in health surveillance data.

These data limitations do not mean health impacts are not taking place. The data we reviewed suggests that Gloster may exhibit poorer health than Mendenhall on a few measures (noise pollution, vision disability, stroke prevalence, high blood pressure prevalence, and possibly asthma). Gloster also has a higher (worse) health vulnerability value compared to both Mendenhall and Jackson. More local level investigation into health impacts is needed.

4. Without real-time monitoring of HAPs and VOCs from Drax Amite, the public must rely on what the company reports to the TRI Reporting Program. However, the TRI does not capture the full picture. Not every chemical is on the TRI list, and companies must only report certain pollutants if they reach high annual thresholds (typically over 10,000lbs). Smaller facilities or specific industries may also be exempt. In addition, the system is self-reported, based on estimates rather than direct monitoring. As a result, the community cannot see a complete or accurate picture of the types and amounts of chemicals being released into the air.

Recommendations

1. ***Collect and analyze local level environmental and health data prior to either issuing a permit renewal or approving the permit request to become a major source of air pollution.***

- a. ***To obtain a complete picture of Gloster residents' health status conduct a community-based health assessment to estimate chronic illness rates in Gloster that are associated with exposure to the chemicals released at Drax Amite.***

A community-based health assessment could consist of multiple activities including household surveys; the analysis of vital records such as death certificates; analysis of Medicaid/Medicare claims data; and analysis of Amite County Department of Public Health data. Engaging the community in additional data collection efforts is important to facilitate a trust-based partnership and to obtain accurate, comprehensive data.

- b. ***Conduct real-time, continuous emissions testing of HAPs, VOCs, and criterion pollutants.***

While Brown University conducts ongoing emissions testing of VOCs and some criterion pollutants, there is no local level monitoring for individual and cumulative HAPs and VOCs. Community-based, continuous air monitoring is the only way to measure real-time emissions. We further recommend community-based air monitoring to promote transparency and trust with the community. Finally, we recommend that MDEQ also conduct a series of stack air samplings at various times and dates across a period of time.

2. ***Drax Amite should submit detailed information on emissions estimates from all potential sources of emissions, list all individual HAPs and VOC emissions, and provide more details on the proposed MACT.***

Emissions that Drax Amite report to MDEQ and the TRI Reporting Program may underestimate emissions if they fail to account for all sources of emissions during the wood pellet production process. For example, past reports suggest that Drax Amite is not reporting emissions from pellet coolers and other post-dryer units (EIP 2018).

3. *Assess fire risks.*

Wood pellet manufacturing facilities have known fire risks, as evidenced by the description of the fire prevention and mitigation equipment in Drax Amite's permitting documents. We found no data describing fire incidents at Drax Amite. However, any fire incidents at Drax Amite would significantly and negatively impact air quality in Gloster and be harmful to health if breathed in.

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APPENDIX

Table A1. Demographic Characteristics of Gloster, Mendenhall, MS and the State of Mississippi			
US Census data, 2023 ACS 5-year estimates.			
Demographic Indicators	Gloster	Mendenhall	Mississippi
Population size (2023 ACS 5-year estimates)	1189	2397	2,939,690
Race % (n)			
White alone	24% (282)	54% (1294)	55.6% (1,635,244)
Black or African American alone	75.2% (894)	44% (1054)	35.6% (1,047,345)
American Indian and Alaska Native alone	0.8% (9)	0.2% (5)	0.5% (15,229)
Asian alone	0.3% (4)	0% (0)	0.9% (27,849)
Native Hawaiian and Other Pacific Islander alone	0% (0)	0% (0)	0.0% (1,434)
Other Race alone	0% (0)	0% (0)	2.0% (59,734)
More than one race	0.3% (3)	1.1% (27)	5.2% (152,855)
Median household income % (\$)	\$22,500	\$39,911	\$54,203
Federal poverty level % (n)	32.0% (381)	28.9% (684)	18.0% (512,184)
Gender % (n)			
Male	52.6% (625)	44.0% (1054)	48.5% (1,424,921)
Female	47.4% (564)	56.0% (1343)	51.5% (1,514,769)
Age categories % (n)			
Under 5 years	4.0% (48)	7.5% (180)	5.7% (167,015)
5 to 9 years	2.9% (35)	3.6% (87)	6.0% (177,103)
10 to 14 years	10.8% (129)	5.1% (122)	6.8% (198,632)
15 to 19 years	4.6% (55)	9.8% (236)	7.6% (223,891)
20 to 24 years	4.6% (55)	5.0% (120)	6.6% (192,902)
25 to 29 years	3.2% (38)	5.6% (134)	5.9% (173,595)
30 to 34 years	8.2% (98)	4.3% (104)	6.0% (177,133)
35 to 39 years	0.8% (10)	5.9% (142)	6.1% (180,703)
40 to 44 years	10.8% (128)	3.4% (81)	7.1% (208,325)
45 to 64 years	34.7% (412)	23.9% (572)	24.6% (723,899)
65 and over	15.3% (181)	31% (619)	17.6% (516,492)
Highest educational attainment % (n)			
Population 18 to 24 years % (n)			
Less than high school graduate	13.5% (10)	23.9% (52)	11.8% (33,463)
High school graduate	67.6% (50)	37.6% (82)	36.6% (103,958)
Some college or associate degree	18.9% (14)	33.9% (74)	43.1% (122,560)
Bachelor's degree or higher	0% (0)	4.6% (10)	8.6% (24,328)
Population 25 years and over % (n)			
Less than high school graduate	20.8% (180)	17.7% (293)	12.25 (242,429)
High school graduate	51.4% (446)	26.3% (434)	29.4% (582,307)
Some college, no degree	21.1% (183)	25.6% (423)	21.6% (427,986)
Associate's degree	0% (0)	7.1% (117)	11.2% (221,753)
Bachelor's degree	6.5% (56)	15.1% (250)	15.5% (307,215)
Graduate or professional degree	0.2% (2)	8.2% (135)	10.0% (198,457)
Unemployment rate % (n)	10.1% (41)	5.4% (53)	4.8% (64,637)
Uninsured rate % (n)	10.5% (125)	8.8% (207)	10.3% (297,394)

Notes: Uninsured are the civilian noninstitutionalized population which excludes people in prisons or jails, mental health facilities, and nursing homes or long-term hospitals.

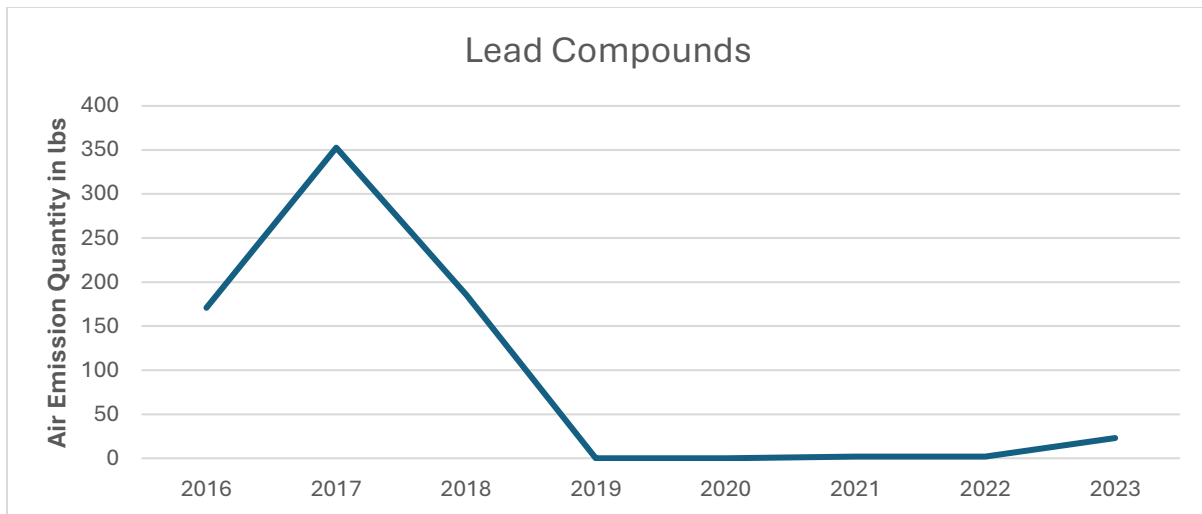


Figure A1. Lead compounds emitted over time (Source: EPA TRI Reporting Program)

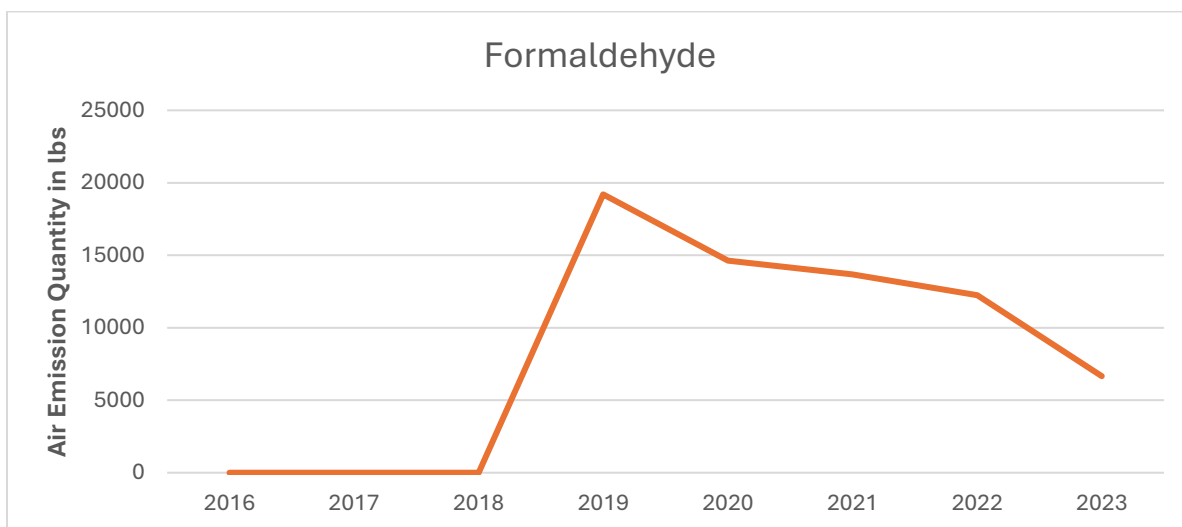


Figure A2. Formaldehyde emitted over time (Source: EPA TRI Reporting Program)

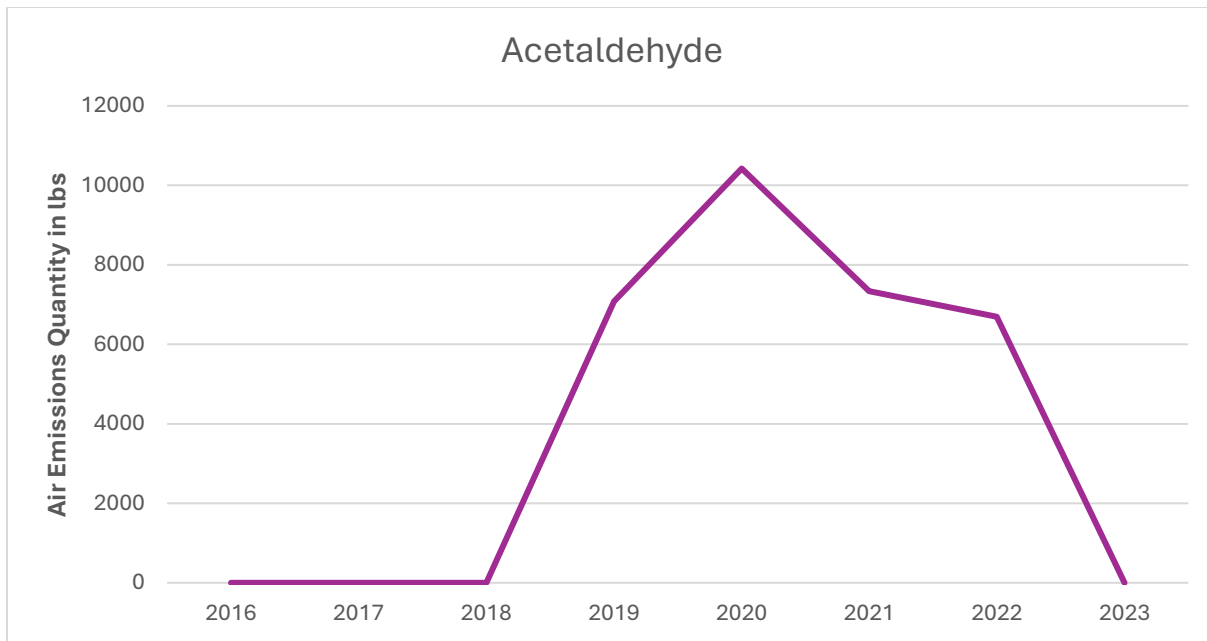


Figure A3. Acetaldehyde emitted over time (Source: EPA TRI Reporting Program)

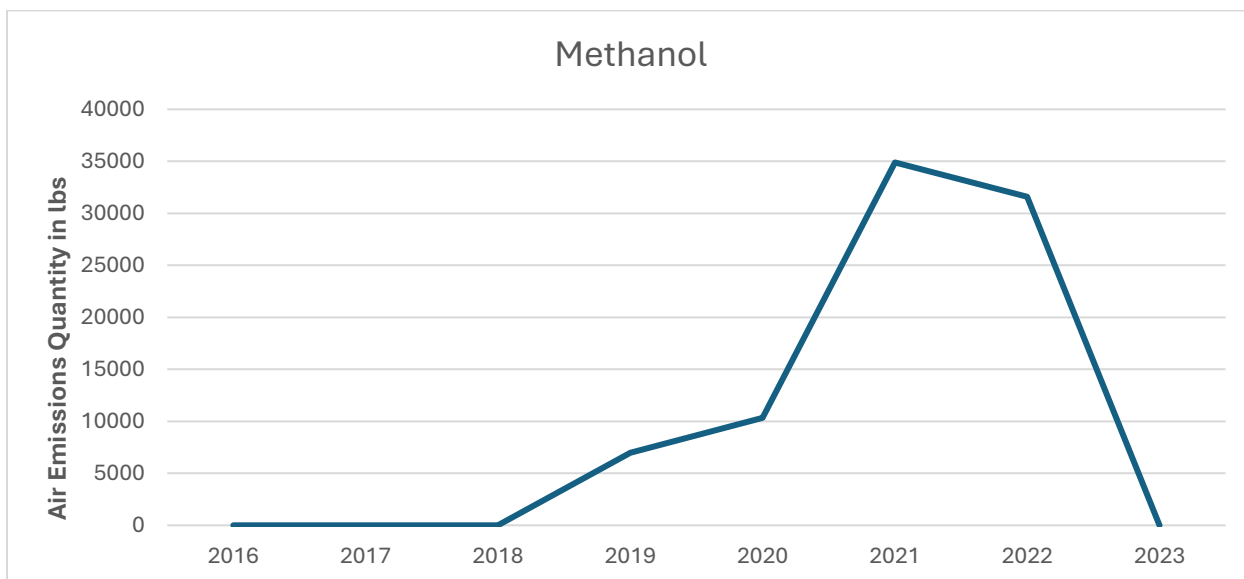


Figure A4. Methanol emitted over time (Source: EPA TRI Reporting Program)

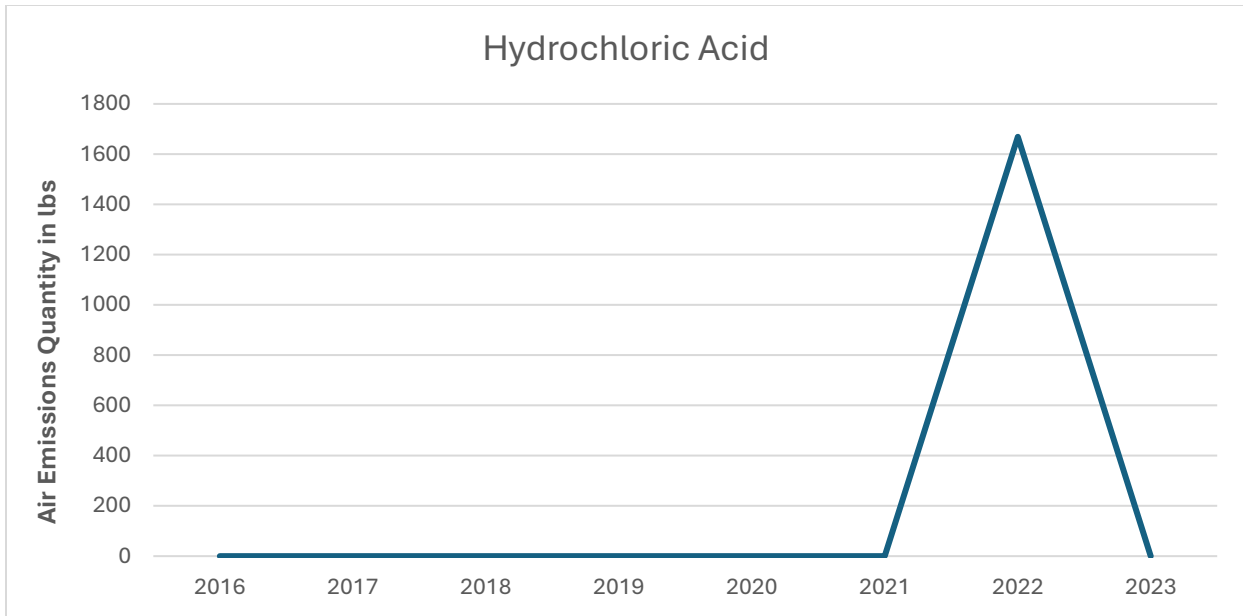


Figure A5. Hydrochloric acid emitted over time (Source: EPA TRI Reporting Program)

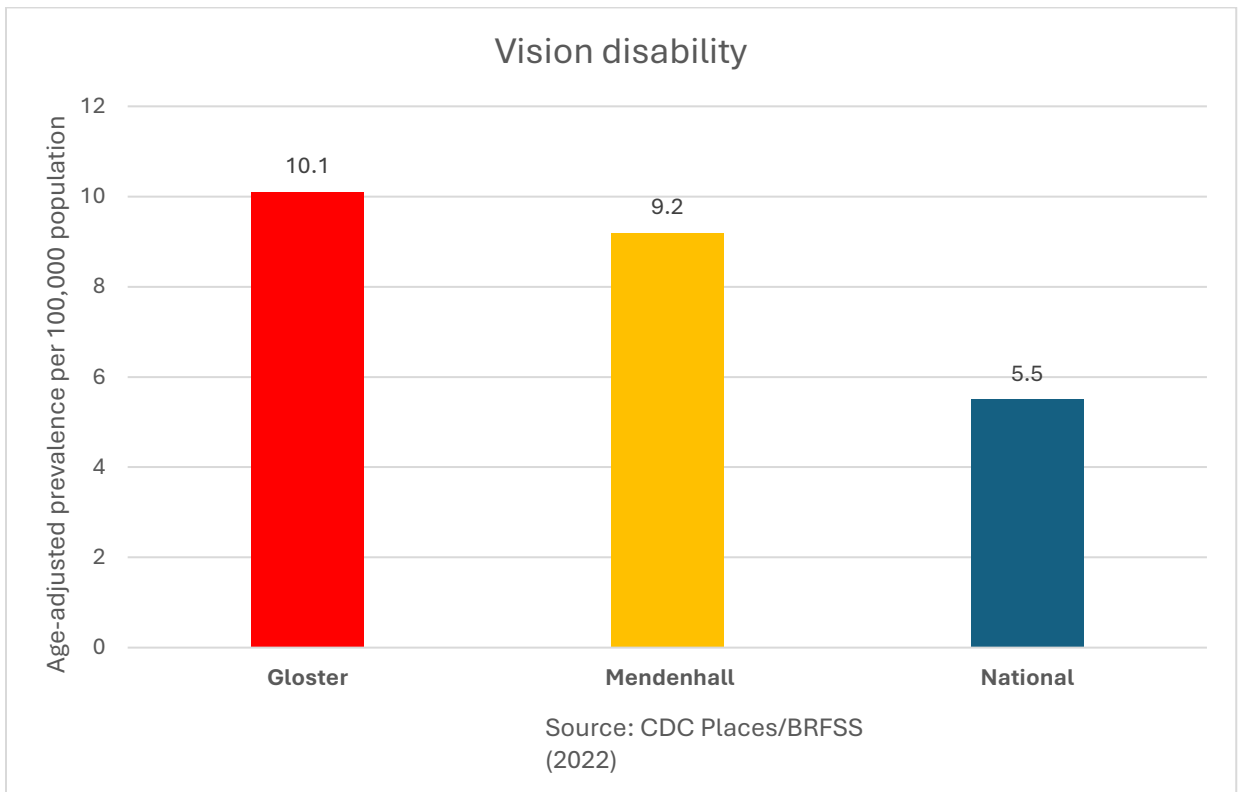


Figure A6. Vision disability prevalence

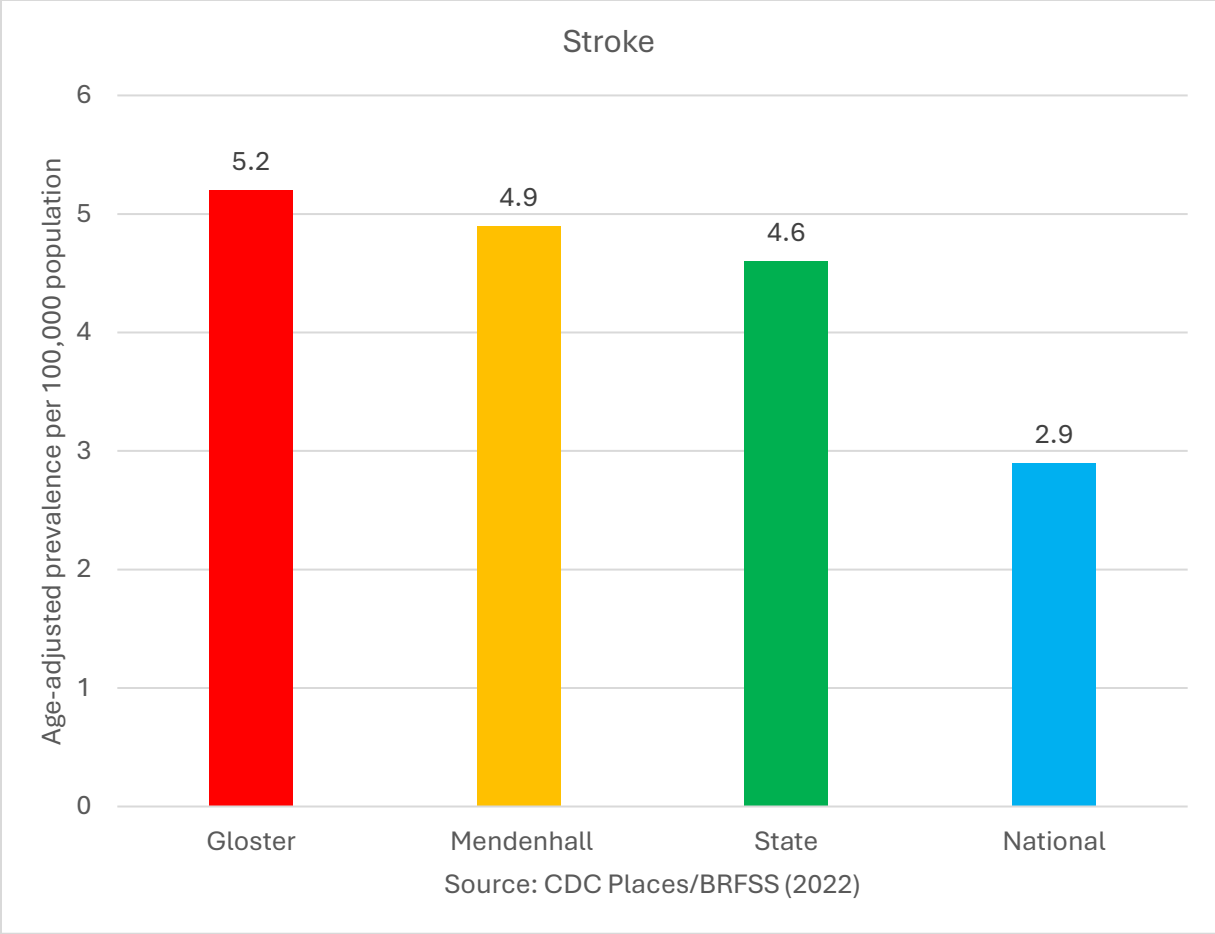


Figure A7. Stroke prevalence

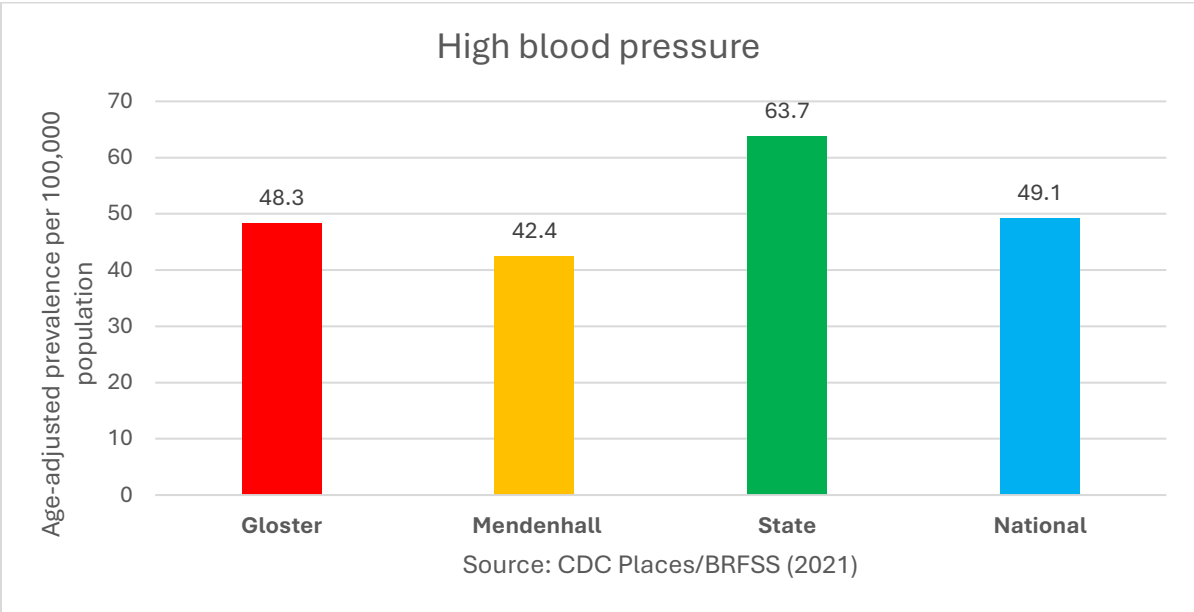


Figure A8. High blood pressure prevalence

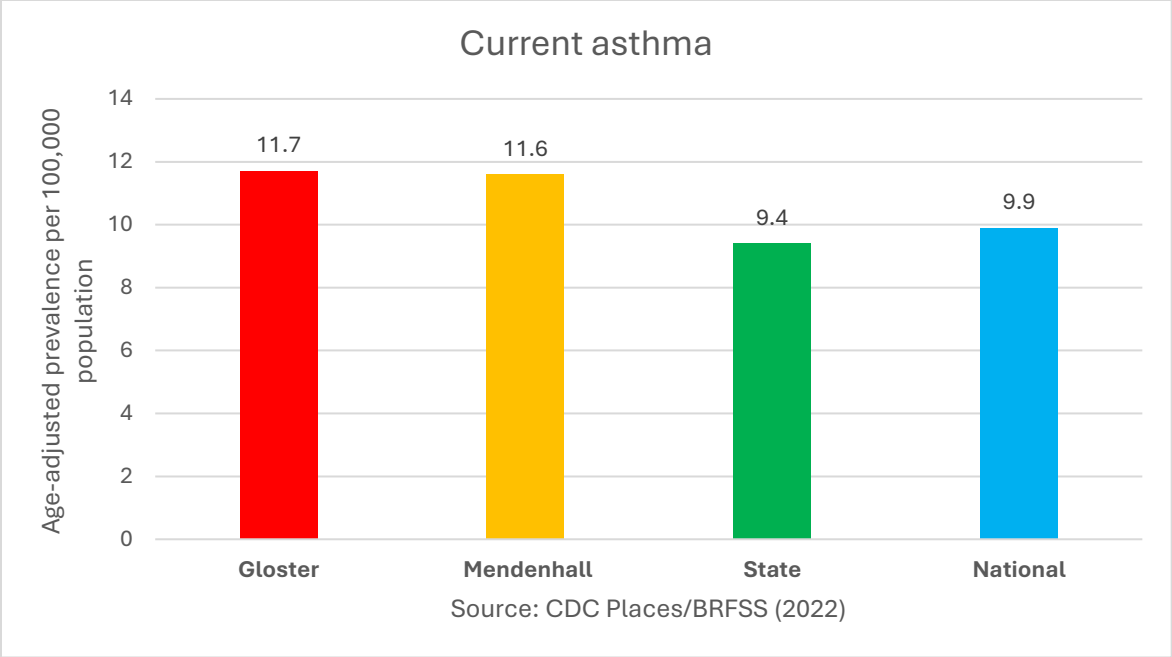


Figure A9. Asthma prevalence

PERMIT REVIEW SUMMARY

Permit Writer: Jaricus Whitlock **Date:** October 9, 2024

Company Name: Amite BioEnergy, LLC – Wood Pellet Manufacturing Facility

Facility Location: 1763 Georgia Pacific Road No. 2
Gloster, MS 3 9638

Source Number: 0080-00031

County: Amite

FACILITY DESCRIPTION

Amite BioEnergy, LLC (“Amite”) is an existing industrial facility that manufactures wood pellets from green wood fiber material (i.e. logs, wood chips and clean mill, and forest residuals). Facility operations consist of the following main processes:

Fugitive Emissions Sources (Emission Group AA-100)

Whole logs, sawdust, and wood chips are delivered to Amite via trucks. Timber logs (softwood only) are debarked and processed in the log chipper. The green wood chips are conveyed to an outdoor storage pile and the bark is transferred for fuel in the wood-fired furnace (Emission Point AA-203a).

Wood Drying Operations (Emission Group AA-200)

The green wood chips are routed to the rotary drum dryer (Emission Point AA-204a) followed by high efficiency cyclones for removing fines. The exhaust from the rotary dryer, the wood-fired furnace and the aforementioned cyclones is routed to a wet electrostatic precipitator (WESP) / regenerative thermal oxidizer (RTO) control system (Emission Point AA-201) for the reduction of total particulate matter (PM), PM less than 10 microns in diameter (PM₁₀), PM less than 2.5 microns in diameter (PM_{2.5}), volatile organic compounds (VOCs), and hazardous air pollutants (HAPs).

Wood Pellet Production Operations (Emission Group AA-300)

The dried wood chips are conveyed to a hammermill feed silo and then ground in six (6) primary hammermills (Emission Point AA-303a). The emissions from each primary hammermill are initially routed to a corresponding baghouse for PM control and then routed to a regenerative catalytic oxidizer (RCO) (Emission Point AA-301) for VOC / HAP control.

The ground chips are sent through three (3) secondary dry hammermills (Emission Point AA-307a) for further reduction in size and then conveyed to the pellet mill feed silos. The emissions from each secondary dry hammermill are initially routed to a corresponding baghouse for PM control and then routed to the RCO for VOC / HAP control.

The processed wood fibers from the primary hammermills or the secondary dry hammermills are conveyed to the six (6) pelletizer lines (Emission Point AA-308a). Each line is equipped with two (2) pellet mills and one (1) pellet cooler. Within the pellet mills, pressure is exerted onto the wood

fibers and the generated heat causes the naturally occurring wood resins to act as a binding agent in the formation of wood pellets. The emissions from each pelletizer line are initially routed to a corresponding baghouse for PM control and then routed to the RCO for VOC / HAP control.

Finished Pellet Storage and Handling (Emission Point Group AA-400)

The formed pellets are cooled in coolers and stored in two (2) pellet silos which exhaust to a common baghouse. Wood pellets are transferred to the load-out building via enclosed conveyors. The wood pellets are screened prior to shipment and fugitive dust is captured in the load-out system. This fine material is remanufactured into wood pellets.

Emergency Engines (AA-500)

The facility operates one (1) diesel-fired compression-ignition emergency generator engine and one (1) diesel-fired, compression-ignition emergency fire water pump engine.

PROPOSED PROJECT / PERMIT ACTION DESCRIPTION

On March 8, 2022, Amite submitted an application requesting a modification to the Permit to Construct (PTC) Air Emissions Equipment issued November 26, 2012 (modified March 21, 2014, and March 9, 2021). Within this application, the facility proposed revisions that reflect “as-built” changes to on-site operations since issuance of the modified PTC on March 9, 2021. Additionally, the facility re-evaluated its potential-to-emit specific emissions following the installation of a regenerative catalytic oxidizer (RCO).

Upon review of the facility’s requested revisions, MDEQ has incorporated the following changes to this modified PTC:

- Remove “Emission Point AA-202” [five (5) green hammermills] as an emission source because none of the units were constructed.
- Remove two (2) pellet coolers and four (4) pellet mills because these units were not constructed. The facility now operates a total of six (6) pellet coolers and twelve (12) pellet mills under “Emission Point AA-308a”.
- Add one (1) secondary dry hammermill to the two (2) existing secondary dry hammermills under “Emission Point AA-307a”. The secondary dry hammermills were not repurposed into dry shavings hammermills as previously permitted.
- Clarify the operation of only one (1) Wood-Fired Furnace Bypass Stack (“Emission Point AA-203d”) instead of two (2) separate stacks.
- Add one (1) bypass stack (“Emission Point AA-303b”) as an emission source for the collective primary dry hammermill systems (“Emission Point AA-303a”).
- Add one (1) bypass stack (“Emission Point AA-307b”) as a potential emission source for the collective secondary dry hammermill systems (“Emission Point AA-307a”).
- Add one (1) bypass stack (“Emission Point AA-308b”) as a potential emission source for the collective pellet mill / cooler systems (“Emission Point AA-308a”).

- Reduce the wood chip throughput limit from 578,708.0 oven-dried tons (ODT) per year to 467,316.0 ODT per year and reduce the wood pellet production limit from 771,392.0 ODT per year to 624,700.0 ODT per year as a result of constraints in the manufacturing process.
- Remove the facility-wide hazardous air pollutant (HAP) limitations of 9.0 tons per year (tpy) for each individual HAP and 24.0 tpy for all combined HAPs due the facility's reclassification as a "HAP major source".
- Increase the facility-wide Prevention of Significant Deterioration (PSD) avoidance limitation for carbon monoxide (CO) from 245.0 tpy to 249.0 tpy.
- Clarify that the work practice standards pertaining to the Wood-Fired Furnace Bypass Stack ("Emission Point AA-203d") and the Wood Chip Rotary Dryer Bypass Stack ("Emission AA-204b") are only for the venting of emissions from periods of furnace start-up, furnace shutdown, and furnace idling.
- Allow the usage of wet electrostatic precipitator by-products (i.e., sludge and washdown waste) as a primary fuel source for the Wood-Fired Furnace ("Emission Point AA-203a").

As a result of Amite being reclassified as a HAP major source, it is now subject to the "case-by-case MACT" (see "**MACT APPLICABILITY**" for further explanation). Accordingly, in coordination with EPA – Region 4, the MDEQ has implemented emissions standards, monitoring requirements, and reporting requirements for the purpose of satisfying criteria required by the case-by-case MACT.

EMISSION SUMMARY

Based on the facility-wide potential uncontrolled emissions (as shown in **Table 1**), Amite has the potential to respectively emit total particulate matter (PM), PM less than 10 microns (μm) in diameter (PM_{10}), PM less than 2.5 μm in diameter ($\text{PM}_{2.5}$), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOCs) above the Prevention of Significant Deterioration (PSD) major source threshold of 250 tons per year (tpy).

However, Amite has requested that emission limitations be imposed to avoid PSD applicability [i.e. PSD avoidance limits]. Therefore, the primary, non-fugitive-emitting operational groupings [i.e. Wood Drying Operations, Wood Pellet Production Operations, Finished Pellet Storage and Handling Operations, and Emergency Engines] are limited to no more than 245.0 tpy for PM, PM_{10} (filterable + condensable), $\text{PM}_{2.5}$ (filterable + condensable) and VOCs and 249.0 tpy for CO.

In order to comply with the noted PSD avoidance limitations, Amite is required to operate various air pollution control devices [i.e. a regenerative thermal oxidizer (RTO); a regenerative catalytic oxidizer (RCO); a wet electrostatic precipitator (WESP); baghouses] to reduce the actual emission of each pollutant. Operational limitations have also been imposed [i.e. throughput limitations; minimum RTO / RCO efficiency requirements] to reinforce the emission limitations.

Given the variability in the emission of nitrogen oxides (NO_x) and CO emissions as a result of operating the RTO and RCO, NO_x emissions from the aforementioned operational groupings are also limited to no more than 245.0 tpy for PSD avoidance purposes.

Table 1: Facility-Wide Emissions

	PM	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	VOCs	Lead	Total HAPs
Maximum Uncontrolled Emissions (tpy)	388.8	386.5	330.3	18.3	177.1	452.5	891.2	0.03	44.2
Controlled Potential Emissions (tpy)	245.0	245.0	245.0	50.9	245.0	249.0	245.0	0.0001	40.1

APPLICABLE/PROPOSED PERMIT LIMITATIONS

Emission Point	Applicable Requirement	Pollutant / Parameter	Limitation	Compliance Demonstration
AA-000	11 Miss. Admin. Code Pt. 2, R. 1.3.A.	Opacity (smoke)	40%	Implement Dust Management Plan, operate and maintain control devices, utilize uncontaminated wood waste and natural gas as fuel sources.
	11 Miss. Admin. Code Pt. 2, R. 1.3.B.	Opacity		
	11 Miss. Admin. Code Pt. 2, R. 1.3.F.(1).	PM	$E = 4.1 \cdot (p^{0.67})$	
AA-200 AA-300 AA-400 AA-500	11 Miss. Admin. Code Pt. 2, R. 2.2.B.(10)., as established in the Permit to Construct issued November 26, 2012 and modified March 9, 2021 (PSD Avoidance Limits)	Total PM (filterable) PM ₁₀ / PM _{2.5} (filterable + condensable) NO _x VOCs	245.0 tpy (Rolling 12-Month Totals)	Perform routine stack testing, develop site-specific emission factors, monitor control devices, calculate and record emissions of each pollutant from all point sources in tons monthly and on rolling 12-month totals.
	11 Miss. Admin. Code Pt. 2, R. 2.2.B.(10)., as established in the Permit to Construct issued November 26, 2012; modified March 9, 2021 and [PTC ISSUED DATE] (PSD Avoidance Limits)	CO	249.0 tpy (Rolling 12-Month Total)	
AA-201 AA-301	40 CR 63.42(c)(2); Subpart B 11 Miss. Admin. Code Pt. 2, R. 2.2.B.(10).	Total HAP Destruction Efficiency	96.0% (for RTO and RCO)	Routine performance testing and during the test, establish minimum combustion temperatures for the RTO and RCO
AA-203a AA-204a	11 Miss. Admin. Code Pt. 2, R. 2.2.B.(10).	Furnace Bypass Usage Restrictions	100.0 hours per year during start-up and shutdown 500.0 hours per year during idle mode (Rolling 12-Month Totals)	Monitor and record the date, time, and duration of every start-up, shutdown, and idle mode period. Calculate and record the total duration of all start-up, shutdown, and idle mode periods in hours per year for each rolling 12-month period.

Emission Point	Applicable Requirement	Pollutant / Parameter	Limitation	Compliance Demonstration
AA-204a	11 Miss. Admin. Code Pt. 2, R. 2.2.B.(10)., as established in the Permit to Construct issued March 9, 2021 and modified [PTC ISSUED DATE]	Dried Wood Chip Throughput	467,316.0 ODT / Year (Rolling 12-Month Total)	Monitor and record the throughput of wood chips dried in the dryer in ODT monthly and on rolling 12-month totals.
AA-301	11 Miss. Admin. Code Pt. 2, R. 2.2.B.(10)., as established in the Permit to Construct issued March 9, 2021 and modified [PTC ISSUED DATE]	Wood Pellet Production	624,700.0 ODT / Year (Rolling 12-Month Total)	Monitor and record the total production of wood pellets in ODT monthly and rolling 12-month totals.
AA-500	40 CFR 60.4211(f)(1) – (3); Subpart III	Hours of Operations	100 Hours / Calendar Year for Maintenance and Testing 50 Hours / Calendar Year for Non-Emergency Situations	Monitor (via a non-resettable hour meter) the hours of operation for both emergency and non-emergency service.
	11 Miss. Admin. Code Pt. 2, R. 1.3.B.	PM	0.6 lb. / MMBTU	The facility will comply with these standards by purchasing engines that are certified to meet the emissions standards found in 40 CFR 60, Subpart III.
	40 CFR 60.4211(c); Subpart III	NMHC + NO _x CO PM (filterable)	Emission Standards in 40 CFR 60.4211(c)	

NSPS APPLICABILITY

40 CFR Part 60, Subpart III – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines: Amite operates two (2) diesel-fired emergency engine that are compression-ignition internal combustion engines manufactured after April 1, 2006. Therefore, the provisions of Subpart III **are** applicable. Accordingly, each engine purchased must be certified to comply with the emission standards promulgated in 40 CFR 60.4211(c).

MACT APPLICABILITY

Amite re-evaluated their potential-to-emit hazardous air pollutants (HAPs) based on performance testing conducted over the span of July 7 – 13, 2021. As a result, the facility will be classified as a major source of HAPs because it has the potential-to-emit over 10 tons per year (tpy) of each individual HAP and 25 tpy of all combined HAPs.

40 CFR Part 63, Subpart DDDD – National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products: The provisions of Subpart DDDD are applicable to any major source that produces “plywood” or an “engineered wood product” as defined in 40 CFR 63.2292 [i.e. a product made with lumber, veneers, strands of wood, or from other small wood elements that are bound together with resin]. Wood pellets – as produced by Amite – do not meet the definition of an “engineered wood product” because they are not bound together by resin. Therefore, the provisions of Subpart DDDD **are not** applicable.

40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines: The provisions of Subpart ZZZZ are applicable to any emergency engine located at a major source of HAPs that commenced construction on or after June 12, 2006. Amite owns and operates two (2) emergency engines that meet the criteria stated above (“Emission Point AA-501” and “Emission Point AA-502”); therefore, the provisions of Subpart ZZZZ **are** applicable. However, Amite will demonstrate compliance with Subpart ZZZZ by complying with the requirements found in 40 CFR Part 60, Subpart IIII. No further requirements apply under Subpart ZZZZ.

40 CFR Part 63, Subpart B – Requirements for Control Technology Determinations for Major Sources in Accordance With Clean Air Act Sections, Sections 112(g) and 112(j): Since Amite is a major source of HAPs **and** there are no existing National Emission Standard for Hazardous Air Pollutants (NESHAP) (i.e., 40 CFR Parts 61 and 63) applicable to wood pellet production, the facility is subject to Subpart B (i.e. “*case-by-case MACT*”).

In accordance with case-by-case MACT, Amite is required to conduct a case-by-case maximum achievable control technology (MACT) analysis that meets the following criteria:

- Determine a MACT emission limitation and control technology that achieves the maximum degree of reduction in emissions of HAP, which can be achieved by utilizing those control technologies that can be identified from available information.
- The MACT emission limitation or requirements cannot be less stringent than the emission control, which is achieved in practice by the best controlled similar source.

Amite submitted its case-by-case MACT analysis within the revised “Case-By-Case MACT Determination Request” document on November 12, 2022. In accordance with the required criteria, Amite outlined the following pertinent items:

- A listing of wood pellet production facilities that are considered “similar sources”;
- An indication of the on-site sources that emit HAPs (as well as denoting the “primary” HAP-emitting sources);
- An evaluation of the available control technology that may achieve the maximum degree of HAP emission reductions; and
- Proposed MACT emission limits that have been achieved in practice by the best controlled source.

Upon review of the analysis, MDEQ concurs with Amite’s proposed selection of their existing regenerative thermal oxidizer (RTO) as the best control technology to minimize HAP emissions from the Wood Chip Rotary Dryer (“Emission Point AA-204a”) as well as the proposed selection of the regenerative catalytic oxidizer (RCO) as the best control technology to minimize HAP emissions Primary Dry Hammermill Pneumatic Systems (“Emission Point AA-303a”); Secondary Dry Hammermill Pneumatic Systems (“Emission Point AA-307a”); Pellet Mill / Cooler Pneumatic Systems (“Emission Point AA-308a”).

With regard to Amite’s proposed MACT emission limits of achieving ninety-five (95.0) percent destruction efficiency of HAPs (measured as VOCs) across the RTO and RCO, MDEQ acknowledges that these limits meet the standard criteria for a “MACT emission limit” (i.e., no

less stringent than the established emission control achieved in practiced by the best controlled similar source). However, MDEQ also recognizes the proposed limits as the MACT “floor” for such controlled similar sources (i.e., wood pellet production facilities that are major HAP sources).

A MACT “floor” is the minimum control level allowed for a MACT standard promulgated under Clean Air Act Section 112(d)(3). For controlled sources similar to Amite (i.e., wood pellet production facilities that are major HAP sources), the minimum control level has been established as “95% destruction efficiency of HAPs (measured as VOCs)” for each applicable control technology. However, in light of expressed environmental justice concerns, MDEQ evaluated MACT “beyond-the-floor” options to determine if a more stringent emission limits were necessary in accordance with Clean Air Act Section 112(d)(2). After taking into consideration the cost of achieving more stringent emission reduction as well as non-air quality health and environmental impacts and energy requirements, MDEQ required the respective operation of the RTO and RCO “*in such a manner as to achieve at minimum ninety-six (96.0) percent destruction efficiency of total HAPs (measured in ‘organic carbon as propane’)*”. Moreover, MDEQ believes that the denoted requirement can be achieved in practice by Amite given that a review of performance testing results for the RTO and RCO indicate respective destruction efficiencies in excess of 96.0%.

PUBLIC PARTICIPATION

The public comment period will begin on October 11, 2024, and end on November 26, 2024 with a copy of the notice published in both the Wilk-Amite Record and Enterprise Journal. Additionally, the MDEQ will hold a public hearing at 6:00 PM on November 14, 2024 at the Gloster Public Library (located at 229 East Main Street; Gloster, MS 39638). The notice for this public hearing will be included within the notice for the public comment period.

RECOMMENDATION

The staff has preliminarily decided to recommend issuance of the permit to the Mississippi Environmental Quality Permit Board as shown in the draft permit. However, the staff recommendation to the Board will be made only after a thorough consideration of all public comments.