AIR CONSTRUCTION PERMIT APPLICATION

Greenfield Wood Pellet Manufacturing Facility

Renewable Biomass Group / Adel, GA

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1. EXECUTIVE SUMMARY

Renewable Biomass Group is proposing to construct a wood pellet manufacturing facility in Adel, Cook County, Georgia (Adel Facility). Renewable Biomass Group is submitting this state implementation plant (SIP) construction permit application to Georgia Environmental Protection Division (EPD) to authorize the construction of the proposed greenfield facility.

The Adel Facility is located in Cook County, Georgia, which is currently designated as being in attainment or an unclassified area with respect to the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants.[1] Therefore, the Adel Facility is potentially subject to Prevention of Significant Deterioration (PSD) permitting requirements. Renewable Biomass Group is proposing to control potential emissions, such that the Adel Facility will be categorized as a synthetic minor source with respect to PSD permitting by maintaining potential criteria pollutant emissions less than 250 tons per year (tpy).

The proposed facility will be a major source with respect to the Title V permitting program, as potential criteria emissions of at least one pollutant exceed the major source threshold of 100 tpy for criteria pollutants. The facility will be a minor source with respect to emissions of hazardous air pollutants (HAP), as potential emissions of individual HAP and total HAP are below the major source thresholds of 10 tpy and 25 tpy, respectively. The initial Title V operating permit application will be submitted to the EPD within twelve months of the commencement of operations for the Adel Facility.

The following information is included as part of this SIP permit application submittal package:

- Section 2 provides a description of the proposed facility operations;
- Section 3 discusses the potential emissions calculation methodologies;
- Section 4 details the regulatory applicability analysis;
- Section 5 describes the toxic air pollutant emissions assessment;
- Appendix A contains the SIP permit application forms;
- Appendix B includes the facility diagrams;
- Appendix C presents the detailed emissions calculations; and
- Appendix D contains the toxic air pollutant impact assessment.

[1] The United States Environmental Protection Agency (U.S. EPA) Green Book. https://www.epa.gov/green-book

2. DESCRIPTION OF FACILITY

Renewable Biomass Group is proposing to construct and operate a wood pellet manufacturing facility in Adel, Cook County, Georgia. The operations are categorized under Standard Industrial Classification (SIC) code 2499, Wood Products – Not Elsewhere Classified. The Adel Facility will process whole logs, green wood residuals, and dry shavings into wood pellets to produce a source of alternative renewable fuel.

The Adel Facility operations will include the following equipment:

- One (1) truck tipper for green residuals;
- One (1) roundwood pile;
- One (1) drum debarker;
- One (1) chipper;
- One (1) bark storage pile;
- One (1) green chip storage pile;
- One (1) green hammermill;
- One (1) biomass-fired dryer;
- One (1) dry chips storage system;
- Three (3) dry hammermills;
- Eleven (11) pellet mills;
- Three (3) pellet coolers;
- Two (2) pellet storage silos; and
- One (1) pellet loadout area.

The Adel Facility will have an annual pellet production capacity of 450,000 metric tons per year (approximately 497,000 U.S. short tons per year) and will have the potential for continuous operation. All future references to tons in this permit application are in terms of U.S. short tons.

2.1 Raw Material Receiving and Processing

To optimize flexibility at the Adel Facility, Renewable Biomass Group plans to have the ability to receive raw material in the form of whole logs or green residuals.

Renewable Biomass Group will have the ability to bring softwood whole logs into the Adel Facility via trucks at a maximum annual capacity of 1,110,000 tons. Logs are unloaded at the unbinding rack and are stored in the whole log pile. The logs will be moved from the pile through a debarker and chipper to be processed into green chips. Bark from the debarker will be routed to the bark hog.

Additionally, Renewable Biomass Group will have the ability to bring green residuals to the facility by truck at a maximum annual capacity of 435,000 tons, where one (1) truck tipper will transfer the green residuals into the processing area along with green chips processed from the whole logs. The residuals will be screened and will be transported through on-site conveyors to the green hammermill as needed.

2.2 Green Hammermilling

The green hammermill enhances the in-feed quality of the wood residuals prior to the drying process. Renewable Biomass Group plans to install one (1) green hammermill at the Adel Facility. The green hammermill reduces the chip size to ½ inch. From the green hammermill, the material will be conveyed to

the infeed of the belt conveyor dryers. As not all green chip material needs to be processed through the green hammermill, smaller sized material will be screened out and approximately one third of the green chip throughput will be processed in the green hammermill. The green hammermill will be limited to a throughput of 337,968 green tpy. Exhaust from the green hammermill will be routed to a cyclone followed by a regenerative catalytic oxidizer (RCO) for emissions control.

2.3 Wood Drying

Renewable Biomass Group is proposing to install one (1) biomass dryer system to dry the wood chips. The dryer processes the wood chips to approximately 10% moisture content in preparation for the pelletizing operation. The wood chips and sawdust are mixed with hot gases from the dryer burner within the dryer. The dryer will be designed to ensure good mixing of wood chips with hot gases and sufficient retention time.

The dryer processes the residual mix containing approximately 40-50% moisture to dried wood with a moisture content of approximately 10%. The exhaust gases will be controlled by a wet electrostatic precipitator (WESP) for particulate matter (PM) and metal HAP and by a regenerative thermal oxidizer (RTO) for volatile organic compounds (VOC), carbon monoxide (CO), and organic HAP control. Heat for the dryer will be provided by biomass combustion in the burner. The RTO burner will combust natural gas only and have a total maximum heat input capacity of 32 million British Thermal Units per hour (MMBtu/hr).

Storage bins or silos will be used to hold dry chips at various points in the post-dryer part of the process.

2.4 Dry Hammermilling

From the dryer, the material will be conveyed into one of three (3) dry hammermills. The dry hammermills are designed to further reduce the material size. As not all dried chips need to be processed through the dry hammermill, smaller sized material will be screened out and a lower throughput will be processed in the dry hammermill. The dry hammermill system will be limited to a throughput of 246,234 tpy. Exhaust from the dry hammermills will be routed to a cyclone followed by the aforementioned RCO for emissions control.

2.5 Pelletizing Operation

Following the dry hammermilling process, the wood fiber will be conveyed to the pelletizing area, which will include pelletizers and pellet coolers. Renewable Biomass Group plans on installing eleven (11) pelletizers. The pelletizers compress the wood fiber into pellets by rolling and squeezing the material through holes in a dye. The process of squeezing the wood material generates heat which causes the wood's natural lignin to flow. The wood's natural lignin produces a natural glue which holds the pellet together.

Immediately after the pellets are produced, they will be directed to the pellet cooler in the pelletizing area, which consists of three (3) pellet coolers. Ambient air will be used as a cooling medium in a direct contact process of heat exchange. Exhaust air from this pellet press system and cooling process will be routed to cyclones followed by the aforementioned RCO.

2.6 Pellet Storage and Loadout

Pellets produced will be transferred into two (2) pellet loadout storage silos. The pellets will feed out of the storage silos into open top railcars for transfer off-site, with a potential annual throughput of 497,000 tons of pellets per year.

2.7 Auxiliary Natural Gas Equipment

A 5 MMBtu/hr natural gas-fired burner will be used to heat up the ductwork from the dryer, preventing build-up from the processed wood chips. The burner will exhaust into the ductwork to the RTO.

Additionally, a 32 MMBtu/hr natural gas-fired RCO will be used to control emissions from the green hammermill, dry hammermill, pellet mills, and pellet coolers.

2.8 Emergency Fire Pump

There will be one diesel emergency fire pump that will be installed at the Adel Facility. The engine will have a capacity of between 75 and 300 hp and will operate a maximum of 500 hours annually.

3. EMISSIONS QUANTIFICATION

The Adel Facility has emissions of CO, NO_X, filterable PM, total PM_{10}, total $PM_{2.5}$, sulfur dioxide (SO_2), VOC, greenhouse gases (GHGs) in the form of carbon dioxide equivalent (CO_2e), and HAP. Detailed emissions calculations for the facility are included in Appendix C.

3.1 Whole Log and Green Chips Processing

The wood handling, storage, debarking, and wood chipping operations are sources of fugitive filterable $PM/PM_{10}/PM_{2.5}$ emissions. Emission rates of these processing operations are estimated based on the drop point equation in AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles* (September 2006). Fugitive dust from the drop and transfer operations that are not confined in an enclosure and are not equipped with a dust control system (i.e., baghouse) are estimated based on maximum throughput rates, and the methodology outlined in AP 42 Section 13.2.4, Equation 1:

$$PM\ Emissions\ \left(\frac{lb}{ton}\right) = k \times 0.0032 \times \left(\frac{U}{5}\right)^{1.3} \div \left(\frac{M}{2}\right)^{1.4}$$

Where:

k = particle size multiplier, obtained from AP-42 Section 13.2.4.4
M = material moisture content, based on facility design basis
U = mean wind speed, mph, based on site measurements

As the site is designed to receive both whole logs and green residuals for pelletizing, emissions are quantified for both scenarios assuming an annual throughput of 497,000 tons of finished pellets per year at 7% moisture content. Annual throughputs of whole logs and green residuals are 1,100,000 tons of whole logs and 435,000 green tons, respectively, based on equipment sizing. As these sources are not combustion sources, condensable PM is negligible. Therefore, filterable $PM/PM_{10}/PM_{2.5}$ is equal to total $PM/PM_{10}/PM_{2.5}$.

3.2 Green Hammermill

The green hammermilling operations are sources of filterable $PM/PM_{10}/PM_{2.5}$, VOC, and organic HAP emissions. Filterable $PM/PM_{10}/PM_{2.5}$ emissions from the green hammermill are controlled by a dust collector. Filterable $PM/PM_{10}/PM_{2.5}$ emissions are calculated using an exit grain loading rate methodology based on vendor estimates for the control devices. This emissions calculation method uses the exhaust air flow rate and estimated mass concentration as opposed to control device efficiency. As these sources are not combustion sources, condensable PM is negligible. Therefore, filterable $PM/PM_{10}/PM_{2.5}$ is equal to total $PM/PM_{10}/PM_{2.5}$.

The uncontrolled VOC emission rate is based on historical site-specific stack testing of the (former) Westervelt Aliceville facility wet classisizers, which were controlled with an RTO at that facility, taking into account a presumed 95% control efficiency for RTO control and back-calculating an uncontrolled emission factor, and adding a 10% safety factor for conservatism. The formaldehyde, acetaldehyde, and methanol emission rates are from Georgia EPD guidance for hammermills at wood pellets manufacturing facilities. Acrolein and propionaldehyde emission rates are based on historical site-specific stack testing of the Enviva Pellets Sampson (NC) dry hammermill. The phenol emission rate is based on the emission factor from AP-42 Section 10.6.2, Table 10.6.2-7 for a hammermill. Green hammermill emissions are then routed to the RCO

for further emission control. Per Georgia EPD's guidance for wood pellet manufacturing facilities, a 95% DRE is applied for VOC and HAP emissions routed to an RCO.

3.3 Dryer System

The dryer system consists of the dryer operation and combustion emissions from the RTO for the dryer. Emissions from the dryer occur as a result of the material drying and combustion of biomass to provide heat to the dryer. The dryer vendor has provided emission guarantees for CO, NO_X, SO_2, VOC, PM, and total HAP after control by the RTO. Potential emissions for other pollutants from the dryer are calculated using uncontrolled emission factors from the Georgia EPD guidance for wood pellet manufacturing facilities for a rotary dryer (direct wood-fired processing green softwood at a Wood Pellet Manufacturing facility). For other individual HAP of acrolein, phenol, and propionaldehyde, uncontrolled emissions factors for wood drying from AP-42 Section 10.6.2, *Particleboard Manufacturing*, Table 10.6.2-3, for a Rotary dryer, green, direct wood-fired, softwood (06/02) are used. A removal efficiency of 70% is applied for HCl as a WESP unit is used for PM control. For the remaining organic HAP emission factors, a 95% control efficiency is applied to account for the RTO units.

Potential emissions from natural gas combustion in the RTO are calculated using AP-42 Section 1.4, *Natural Gas Combustion*, Tables 1.4-1 and 1.4-3 emission factors. Emissions of GHG from natural gas combustion in the form of CO_2e were calculated by multiplying each GHG pollutant by its respective global warming potential pursuant to 40 CFR Part 98.

3.4 Dry Chips Storage

Dry chip storage operations are non-fugitive sources of filterable PM/PM_{10}/$PM_{2.5}$, VOC, and organic HAP emissions. Emissions are quantified for the dry chips storage process as a whole using the annual throughput of dried chips at the Adel facility, and not at each individual bin or silo. Emission rates of these processing operations are estimated based on the drop point equation in AP-42, Section 13.2.4, *Aggregate Handling and Storage Piles* (September 2006). Dust from the drop and transfer operations that are not confined in an enclosure and are not equipped with a dust control system (i.e., baghouse) are estimated based on maximum throughput rates, and the methodology outlined in AP 42 Section 13.2.4, Equation 1:

$$PM\ Emissions\ \left(\frac{lb}{ton}\right) = k \times 0.0032 \times \left(\frac{U}{5}\right)^{1.3} \div \left(\frac{M}{2}\right)^{1.4}$$

Where:

k = particle size multiplier, obtained from AP-42 Section 13.2.4.4
M = material moisture content, based on facility design basis
U = mean wind speed, mph, based on site measurements

As these sources are not combustion sources, condensable PM is negligible. Therefore, filterable PM/PM_{10}/$PM_{2.5}$ equals total PM/PM_{10}/$PM_{2.5}$.

Dry chip storage results in emissions of VOC and organic HAP. The VOC emission rate is based on information submitted as part of the Enviva Pellets Sampson (NC) permit application, pursuant to the mean emission factor from the National Council for Air and Stream Improvement (NCASI) Wood Products Database (February 2013) for dry wood handling operations at an oriented strand board (OSB) mill. The NCASI emission factor was converted from units of pounds per thousand square feet (lb/MSF) to lb/ton using the typical density and moisture content of an OSB panel, pursuant to the Enviva application. The Enviva application included an emission rate for methanol from dry wood handling operations at an OSB

mill, which was more conservative than the methanol emission rate for a similar source from the Georgia EPD guidance for pellet mills. The formaldehyde and acetaldehyde emission rates are from Georgia EPD guidance for storage/handling at wood pellets manufacturing facilities. Pursuant to the NCASI database as referenced in the Enviva application, emissions of other HAP are not expected from dry material storage. Therefore, no other individual HAP emissions are quantified from this source.

3.5 Dry Hammermills and Pelletizers/Pellet Coolers

The grinding and pelletizing operations are non-fugitive sources of filterable PM/PM_{10}/$PM_{2.5}$, VOC, and organic HAP emissions. Filterable PM/PM_{10}/$PM_{2.5}$ emissions from the dry hammermill and pelletizing operation are controlled by dust collector systems. Filterable PM/PM_{10}/$PM_{2.5}$ emissions from the dry hammermill, pelletizing operation are calculated using an exit grain loading rate methodology based on vendor estimates for the control devices. This emissions calculation method uses the exhaust air flow rate and estimated mass concentration as opposed to control device efficiency. As these sources are not combustion sources, condensable PM is negligible. Therefore, filterable PM/PM_{10}/$PM_{2.5}$ equals total PM/PM_{10}/$PM_{2.5}$.

The VOC, formaldehyde, acetaldehyde, and methanol emission rates for the dry hammermills are from Georgia EPD guidance for dry hammermills at wood pellets manufacturing facilities. Acrolein, phenol, and propionaldehyde emission rates for the dry hammermills are based on historical site-specific stack testing of the Enviva Pellets Sampson (NC) dry hammermill and emission factors from AP-42 Section 10.6.2-7 for a hammermill. Dry hammermill emissions are then routed to the RCO for further emission control. Per Georgia EPD's guidance for wood pellet manufacturing facilities, a 95% DRE is applied for VOC and HAP emissions routed to an RCO.

The VOC, formaldehyde, acetaldehyde, and methanol emission rates for the pellet mills and coolers are from Georgia EPD guidance for pellet mills/pellet coolers (without steam injection or extraction) at wood pellet manufacturing facilities. Acrolein, phenol, and propionaldehyde emission rates for the pellet mills and pellet coolers are based on historical site-specific stack testing of the Enviva Pellets Sampson (NC) dry hammermill, which was conservatively used for pellet mill/pellet cooler as no publicly available data for pellet milling/pellet cooling is available at this time, and uncontrolled emission factors from AP-42 Section 10.6.2 (Particleboard Manufacturing) for a Board Cooler, UF resin. The pellet mill and pellet cooler emissions are routed to the RCO for further emission control. Per Georgia EPD's guidance for wood pellet manufacturing facilities, a 95% DRE is applied for VOC and HAP emissions routed to an RCO.

3.6 Pellet Storage and Loadout

Pellet storage and loadout operations are non-fugitive sources of filterable PM/PM_{10}/$PM_{2.5}$, VOC, and organic HAP emissions. Filterable PM/PM_{10}/$PM_{2.5}$ emissions from pellet storage and loadout operations are controlled by a dust collector. Filterable PM/PM_{10}/$PM_{2.5}$ emissions are calculated using an exit grain loading rate methodology based on vendor estimates for the control devices. This emissions calculation method uses the exhaust air flow rate and estimated mass concentration as opposed to control device efficiency. As these sources are not combustion sources, condensable PM is negligible. Therefore, filterable PM/PM_{10}/$PM_{2.5}$ equals total PM/PM_{10}/$PM_{2.5}$.

The VOC, formaldehyde, acetaldehyde, and methanol emission rates are from Georgia EPD guidance for storage/handling at wood pellets manufacturing facilities. Pursuant to the NCASI database as referenced in the Enviva application for dry material storage and included in Section 3.4, emissions of other HAP are not expected from pellet storage. Therefore, no other individual HAP emissions are quantified from this source.

3.7 Fire Water Pump Engine

Diesel combustion in the emergency fire water pump engine result in emissions of CO, NO_X, total $PM/PM_{10}/PM_{2.5}$, SO_2, VOC, GHGs, and HAP. The engine criteria pollutant emissions calculations are based on NSPS Subpart IIII limitations for several criteria pollutants (PM and NO_X) and AP-42 Section 3.3 (VOC, CO, HAP, CO_2).[2] Note that total PM_{10} and total $PM_{2.5}$ are assumed to be equal to total PM for the engine. SO_2 emissions are based on a maximum fuel sulfur content of 15 ppm by weight (as required by NSPS Subpart IIII beginning October 1, 2010). CH_4 and N_2O emission factors were calculated using emission factors for diesel fuel from 40 CFR 98, Subpart C, Table C-2. Emissions of GHG in the form of CO_2e were calculated by multiplying each GHG pollutant by its respective global warming potential from 40 CFR Part 98, Subpart A, Table A-1. A maximum operating schedule of 500 hours per year is assumed for estimating potential emissions from the emergency fire pump engine.[3]

3.8 Auxiliary Natural Gas Equipment

Small natural gas-fired burners will be used to control tar build-up in the ducting. A natural gas-fired RCO will be used for control of emissions from the green hammermill, dry hammermill, pellet mills, and pellet coolers. Emissions are quantified using the natural gas combustion emission factors from AP-42 Section 1.4.

Emissions from the tar buildup control burner are routed to the RTO for further emission control. Both the RTO and RCO are assumed to control VOC with 95% efficiency and CO with 50% efficiency. For the organic HAP emission factors, a 95% control efficiency is applied to account for routing to the RTO and RCO units. Emissions of GHG from natural gas combustion in the form of CO_2e were calculated by multiplying each GHG pollutant by its respective global warming potential pursuant to 40 CFR Part 98.

3.9 Facility-Wide Potential Emissions

Table 3-1 includes the facility-wide controlled criteria pollutant, GHG, and HAP emissions. Detailed emissions calculations are included in Appendix C of the permit application. The potential emissions in Table 3-1 include emissions with fugitives, which are compared to the Title V Major Source thresholds, and emissions without fugitives, which are compared to the PSD Major Source thresholds. Facility-wide emissions can exclude fugitives from the PSD major source determination as wood pellet production operation is not on the list of 28 categories with a lower major source threshold for criteria pollutants, which requires subject source categories to include fugitive emissions for permitting applicability determinations.

[2] U.S. EPA AP-42 Section 3.3, *Gasoline and Diesel Industrial Engines*. October 1996. https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s03.pdf

[3] Potential operation includes non-emergency service (readiness testing and maintenance as recommended by the manufacturer) and emergency usage.

Table 3-1. Facility-Wide Potential Emissions

Pollutant	Potential Emissions Without Fugitives (tpy)	PSD Major Source Threshold (tpy)	Above Threshold?	Potential Emissions Including Fugitives (tpy)	Title V Major Source Threshold (tpy)	Above Threshold ?
Filterable PM	70.81	250	No	70.98	100	No
Total PM_{10}	100.09	250	No	100.17	100	Yes
Total $PM_{2.5}$	100.08	250	No	100.09	100	Yes
NO_X	249.48	250	No	249.48	100	Yes
CO	207.78	250	No	207.78	100	Yes
SO_2	0.25	250	No	0.25	100	No
VOC	216.22	250	No	216.22	100	Yes
CO_2e	35,853	75,000	No	35,853	N/A	No
Total HAP	8.11	N/A	No	8.11	25	No
Individual HAP*	2.88	N/A	No	2.88	10	No

* The maximum individual HAP is Formaldehyde

4. REGULATORY APPLICABILITY REVIEW

Potentially applicable rules are discussed for the Adel Facility in the following section. These include federal and state air regulations.

4.1 New Source Review

NSR requires that federal construction permitting of new emission sources or modifications to existing emission sources be completed when significant net emission increases result. Two distinct NSR permitting programs apply depending on whether the facility is located in an attainment or nonattainment area for a particular pollutant Nonattainment new source review (NNSR) permitting applies to new construction or modifications that result in emission increases of a particular pollutant for which the area in which the facility is located is classified as "nonattainment" for that pollutant. The PSD permitting program applies to project increases of those pollutants for which the area the facility is located in is classified as "attainment" or "unclassifiable".

The Adel Facility will be located in Cook County, which has been classified as in attainment with the NAAQS or unclassified for all regulated pollutants.[4] Therefore, the Adel Facility is not subject to NNSR permitting requirements for any criteria pollutants. The facility is potentially subject to PSD permitting requirements.

Under PSD permitting rules, the major source threshold is 250 tpy for criteria pollutants, unless the facility is listed specifically in 40 CFR 52.21 as having a lower 100 tpy threshold. Wood pellet production is not on the list of 28 categories detailed in 40 CFR 52.21 with a lower threshold of 100 tpy for criteria pollutants. As shown in Table 3-1, the Adel Facility will be a minor source for the purposes of PSD permitting requirements as facility-wide potential emissions of all criteria pollutants will be below the major source threshold of 250 tpy.

4.1.1 Emissions Limitations

Renewable Biomass Group will be operating control devices on the equipment at the Adel facility, limiting potential emissions of criteria pollutants. Therefore, Renewable Biomass Group is requesting facility-wide emissions limits of 249 tons per rolling 12-month period for Total PM_{10}, NO_X, CO, and VOC.

4.2 Title V Operating Permit Program

40 CFR Part 70 establishes the federal Title V operating permit program. Georgia has incorporated the provisions of the federal program in the Georgia Rules for Air Quality Control (GRAQC) 391-3-1-.03(10) *Title V Operating Permits*. The major source thresholds with respect to the Georgia Title V operating permit program for sources in attainment areas are 10 tons per year of a single HAP, 25 tpy of any combination of HAP, or 100 tpy of a criteria pollutant. As shown previously in Table 3-1, it is estimated that the facility wide potential emissions will exceed the Title V major source thresholds for at least one criteria pollutant. Therefore, Renewable Biomass Group will submit an application for the initial Title V operating permit within twelve (12) months after operation of the facility commences as required by the program.

[4] 40 CFR 81.311. Cook County is not identified as an area contributing to the ambient air level of ozone in the Metropolitan Atlanta Ozone Non-Attainment Area.

4.3 Greenhouse Gas Tailoring Rule

On May 13, 2010, the EPA finalized the Tailoring Rule (published at 75 FR 31514 on June 3, 2010) which establishes an approach to addressing greenhouse gases (GHGs) from stationary sources under the Clean Air Act (CAA) permitting programs (PSD and Title V). The Tailoring Rule addresses PSD permitting with respect to GHGs. On June 23, 2014, the U.S. Supreme Court issued a decision regarding the application of stationary source permitting to GHGs. While the implications of the court decision are currently being examined, EPA issued a memo on July 24, 2014 to all the EPA Regional Administrators clarifying that it does not intend to continue processing PSD applications that trigger PSD solely based on GHGs. Furthermore, for sources that trigger PSD based on pollutants other than GHGs ("Step 1" or "anyway sources"), EPA will continue to require GHG BACT if the source emits greater than 75,000 tpy CO_2e.[5] The July 24, 2014 memo regarding EPA's implementation policy on the GHG Tailoring Rule and stated the agency will not be processing PSD permit applications that trigger solely based on GHG emissions, and moreover, EPD will continue to consider 75,000 tpy CO_2e as the de minimis threshold.

4.4 New Source Performance Standards

Georgia EPD has received delegation from EPA to regulate facilities subject to NSPS. Regulatory requirements for facilities subject to NSPS are incorporated by reference in Georgia's Rules for Air Quality Control, 391 3 1 .02(8) and located in 40 CFR Part 60. NSPS require new, modified, or reconstructed sources to control emissions to the level achievable by the best-demonstrated technology as specified in the applicable provisions.

4.4.1 40 CFR 60 Subpart A – General Provisions

All affected sources subject to source-specific NSPS are subject to the general provisions of NSPS Subpart A unless specifically excluded by the source-specific NSPS. Subpart A requires initial notification, performance testing, recordkeeping and monitoring, provides reference methods, and mandates general control device requirements for all other subparts as applicable.

4.4.2 40 CFR 60 Subpart D – Fossil Fuel-Fired Steam Generators

NSPS Subpart D, *Standards of Performance for Fossil Fuel-Fired Steam Generators for which Construction is Commenced after August 17, 1971*, applies to steam generating units with a heat input capacity of 250 MMBtu/hr or greater from fossil fuel combustion for which construction is commenced after August 17, 1971. The dryer burner at the Adel Facility will not have a maximum heat input capacity greater than 250 MMBtu/hr, nor will the unit produce steam. Therefore, the dryer burner will not be subject to NSPS Subpart D.

4.4.3 40 CFR 60 Subpart Da – Electric Utility Steam Generators

NSPS Subpart Da, *Standards of Performance for Electric Utility Steam Generating Units for which Construction is Commenced After September 18, 1978*, applies to electric utility steam generating units (EGUs) with a fossil fuel heat input capacity of 250 MMBtu/hr or greater (alone or in combination with any other fuel) for which construction, modification, or reconstruction began after September 18, 1978. The dryer burner at the Adel Facility will not be subject to Subpart Da as the unit does not meet the definition of electric utility steam generating units.

[5] EPA memo to Regional Administrators accessed at: https://19january2017snapshot.epa.gov/sites/production/files/2015-07/documents/2014scotus.pdf

4.4.4 40 CFR 60 Subpart Db – Industrial, Commercial, and Institutional Steam Generating Units

NSPS Subpart Db, *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units, applies to industrial, commercial, and institutional steam generating units with a heat input greater than 100 MMBtu/hr that began construction, modification, or reconstruction after June 19, 1984*. The dryer burner has a maximum heat input capacity of 100 MMBtu/hr. Moreover, the unit will not generate steam for process operations and does not meet the definition of a steam generating unit subject to this regulation. Therefore, the dryer will not be subject to the requirements of NSPS Subpart Db.

4.4.5 40 CFR 60 Subpart Dc – Small Industrial, Commercial, and Institutional Steam Generating Units

NSPS Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*, applies to steam generating units with a maximum heat input capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr. The applicability date for NSPS Subpart Dc is June 9, 1989. The dryer burner has a maximum heat input capacity of 100 MMBtu/hr and is in the range of heat input capacities regulated under NSPS Subpart Db. However, the dryer will be used to generate heat for drying wood and will not be utilized to generate steam for process operations, and hence does not meet the definition of a steam generating unit regulated under this rule. Therefore, the dryer system will not be subject to the requirements of NSPS Subpart Dc.

4.4.6 40 CFR 60 Subpart E – Incinerators

NSPS Subpart E, *Standards of Performance for Incinerators*, applies to incinerators with a charging rate of 50 tons/day for which construction or modification commenced after August 17, 1971. An incinerator is defined as any furnace used in the process of burning solid waste for the purpose of reducing the volume of the waste by removing combustible matter. The dryer burner, RTO, and RCO at the Adel Facility will not combust solid waste; therefore, this subpart is not applicable.

4.4.7 40 CFR 60 Subpart IIII – Compression Ignition Internal Combustion Engines

NSPS Subpart IIII applies to stationary compression ignition (CI) internal combustion engines (ICE) manufactured after April 1, 2006. Renewable Biomass Group will install a diesel-fired emergency fire pump. This regulation is potentially applicable to the diesel-fired pump engine, which is anticipated to be rated between 175 hp to 300 hp. The proposed unit meets the definition of emergency stationary ICE in 40 CFR 60.4219. Per the NSPS, a fire pump engine is defined as "emergency stationary internal combustion engine certified to National Fire Protection Association (NFPA) requirements that is used to provide power to pump water for fire suppression or protection." The unit is a fire pump engine that will be certified to National Fire Protection Association (NFPA) requirements.[6]

4.4.7.1 Emission Limits

Per 40 CFR 60.4202(a)(2), the emergency use fire pump engine must meet the requirements of 40 CFR 89.112 and 113. The engine has been certified by its manufacturer to be in compliance with these emission standards.

[6] 40 CFR 60.4219

Per 40 CFR 60.4205(c), the emergency fire pump engine must meet the emission standards in Table 4 of the rule, which include:

- NHMC + NO_X – 4.0 g/hp-hr
- PM – 0.20 g/hp-hr

Additionally pursuant to 40 CFR 60.4207, the fire pump engine will have to meet the fuel requirements of 40 CFR 80.510(a) and (b), which state that fuel oil combusted in CI ICE must meet the following requirements:

- Maximum sulfur content of 15 ppm; and
- Minimum Centane index of 40 or maximum aromatic content of 35% by volume.

Renewable Biomass Group will use fuel that meets the required specifications.

4.4.7.2 Monitoring, Recordkeeping, and Reporting

Renewable Biomass Group must operate and maintain the stationary CI ICE according to the manufacturer's written instructions or procedures developed by Renewable Biomass Group that are approved by the engine manufacturer. In addition, Renewable Biomass Group may only change those settings that are permitted by the manufacturer. The engine is required to be equipped with a non-resettable hour meter prior to startup of the engine.

Per 40 CFR 60.4211(e), emergency stationary ICE may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State, or local government, the manufacturer, the vendor, or the insurance company associated with the engine. Maintenance checks and readiness testing of such units is limited to 100 hours per year. There is no time limit on the use of emergency stationary ICE in emergency situations given in the regulation.

No initial notifications are required for emergency engines, per 40 CFR 60.4214(b). Renewable Biomass Group will keep records of the operation of the engine in emergency and non-emergency services that are recorded through the non-resettable hour meter. Renewable Biomass Group must record the time of operation of the engine and the reason the engine was in operation during that time. Renewable Biomass Group should keep records of the Certificate of Conformity, a document typically supplied by the manufacturer stating the engine is NFPA certified and certified to meet EPA standards.

4.4.8 Non-Applicability of All Other NSPS

NSPS standards are developed for particular industrial source categories and the applicability of a particular NSPS to a facility can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to the Adel Facility.

4.5 National Emission Standards for Hazardous Air Pollutants

NESHAP are emission standards for HAP and are applicable to major and area sources of HAP. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. An area source is a stationary source that is not a major source. Part 63 NESHAP allowable emission limits are established on the basis of a Maximum Achievable Control Technology (MACT) determination for a particular source category. NESHAP apply to sources in specifically regulated industrial source categories (CAA Section 112(d)) or on a case-by-case basis (Section 112(g)) for

facilities not regulated as a specific industrial source type. Potential emissions at the Adel Facility will be below 25 tpy for total HAP and 10 tpy for all individual HAP. Therefore, the facility is an area source of HAP emissions.

Regulatory requirements for facilities subject to Part 61 and Part 63 NESHAP are incorporated by reference in Georgia's Rules for Air Quality Control, 391-3-1-.02(9).

4.5.1 40 CFR 63 Subpart A – General Provisions

NESHAP Subpart A, *General Provisions*, contains national emission standards for HAP defined in Section 112(b) of the Clean Air Act. All affected sources which are subject to another NESHAP are subject to the general provisions of NESHAP Subpart A, unless specifically excluded by the source-specific NESHAP.

4.5.2 40 CFR 63 Subpart DDDD – Plywood and Composite Wood Products

NESHAP Subpart DDDD, *NESHAP for Plywood and Composite Wood Products*, applies to major sources of HAP that manufacture plywood or composite wood products (PCWP) by bonding wood materials (fibers, particles, strands, veneers, etc.) or agricultural fiber, generally with resin under heat and pressure, to form a structural panel or engineered wood product. The Adel Facility is an area source of HAP emissions; therefore, NESHAP Subpart DDDD does not apply.

4.5.3 40 CFR 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines

NESHAP Subpart ZZZZ regulates HAP emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. Per 40 CFR 63.6590(a)(2)(iii), a stationary RICE at a major source of HAP is considered new if construction commences on or after June 12, 2006. The proposed diesel emergency fire pump engine qualifies as a new stationary RICE. However, compliance per NESHAP for the engine is attained through compliance with the requirements of NSPS IIII.[7] Renewable Biomass Group will ensure compliance to applicable requirements or limits for the diesel fire pump engine.

4.5.4 40 CFR 63 Subpart DDDDD – Industrial, Commercial, and Institutional Boilers and Process Heaters (Major Sources)

NESHAP Subpart DDDDD, *NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters*, regulates HAP emissions from solid, liquid, and gaseous-fired boilers and process heaters at facilities that are major sources of HAP. The Adel Facility will be an area source of HAP emissions; therefore, the dryer burner at the facility is not subject to Subpart DDDDD.

4.5.5 40 CFR 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers (Area Sources)

NESHAP Subpart JJJJJJ, *NESHAP for Industrial, Commercial, and Institutional Boilers Area Sources*, regulates HAP emissions from boilers at facilities that are area sources of HAP. The Adel Facility dryer burner and dryer are not defined as boilers per 40 CFR 63.11237, because no portion of the heat from the burner or the dryer is used to generate steam at the facility.

[7] 40 CFR 63.6590(c)(6)

Boiler means an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam or hot water. Controlled flame combustion refers to a steady-state, or near steady state, process wherein fuel and/or oxidizer feed rates are controlled. Waste heat boilers are excluded from this definition.

Therefore, the dryer and dryer burner are not subject to the requirements of NESHAP Subpart JJJJJJ.

4.5.6 40 CFR 63 Subpart QQQQQQ – Wood Preserving (Area Sources)

NESHAP Subpart QQQQQQ, *NESHAP for Wood Preserving Area Sources*, applies to area sources of HAP that conduct wood preserving operations. A wood preserving operation is defined by Subpart QQQQQQ as a pressure treatment process with use of a wood preservative containing chromium, arsenic, dioxins, or methylene chloride, where the preservative is applied to the wood product inside a retort or similarly closed vessel. The Adel Facility will not use any wood preservatives in the production of the wood pellets. Therefore, NESHAP Subpart QQQQQQ is not applicable.

4.5.7 Non-Applicability of All Other NESHAP

NESHAP standards are developed for particular industrial source categories, and the applicability of a particular NESHAP to a facility can be readily ascertained based on the industrial source covered. All other NESHAP are categorically not applicable to the facility.

4.6 Georgia Rules for Air Quality Control

In addition to federal air regulations, GRAQC 391-3-1 establishes regulations applicable at the emission unit level (source-specific) and at the facility level. The rules also contain requirements related to the need for construction and/or operating permits.

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

This regulation limits the opacity from all sources to 40%, provided that the source is not subject to some other emission limitation under GRAQC 391-3-1-.02(2). This regulation is applicable to the RTO, emergency fire pump, and other operations at the Adel Facility. The dryer and dryer burner, however, are subject to another opacity limit under GRAQC 391-3-1-.02(2)(d).

4.6.2 GRAQC 391-3-1-.02(2)(d) – Fuel Burning Equipment

This regulation limits emissions from fuel burning equipment based on heat input capacity. Although NO_X limits only apply to units with heat input capacities greater than 250 MMBtu/hr, PM limits apply to all fuel-burning equipment.

Georgia defines fuel-burning equipment as:

…equipment the primary purpose of which is the production of thermal energy from the combustion of any fuel. Such equipment is generally that used for, but not limited to, heating water, generating or superheating steam, heating air as in warm air furnaces, furnishing process heat indirectly, through transfer by fluids or transmissions through process vessel walls.[8]

[8] GRAQC 391-3-1-.01(cc)

The proposed dryer burner will supply heat to the drying process and thus, meets the definition of fuel burning equipment and will be subject to this rule. The diesel-fired emergency fire pump engine will be used to produce electricity, not thermal energy; hence the unit is not subject to this regulation.

This regulation limits PM emissions from all fuel-burning equipment based on the heating capacity of the equipment units. The dryer burner will have a heat input capacity equal to or greater than 10 MMBtu/hr, and equal to or less than 2,000 MMBtu/hr. Therefore, the unit is limited to PM emissions determined from the following equation:

$$P = 0.7 * (10 / R)^{0.202}$$

Where:

P = allowable weight of PM emissions (pounds per MMBtu heat input)
R = heat input of fuel-burning equipment (MMBtu/hr)

In addition, opacity is limited to 20% except for one six-minute period per hour, which may be up to 27%.

4.6.3 GRAQC 391-3-1-.02(2)(e) – PM Emissions from Manufacturing Processes

This regulation, commonly known as the process weight rule (PWR), establishes PM limits for all sources if not specified elsewhere. The PM emissions are limited based on the following equations (for equipment constructed or modified after July 2, 1968), where equation (a) applies to sources with a process input rate of less than or equal to 30 tph, while equation (b) applies to sources with a process input rate of more than 30 tph:[9]

(a) $E = 4.10 \times P^{0.67}$ (b) $E = 55.0 \times P^{0.11} - 40$

where: E = allowable PM emission rate (lb/hr)
P = process input weight rate (tons/hr)

This regulation applies to the raw material and pellets processing and handling systems. Since the dryer and dryer burner are subject to a PM limit under Rule (d), this rule does not apply to the units.

4.6.4 GRAQC 391-3-1-.02(2)(g) – Sulfur Dioxide

This regulation establishes SO_2 emission limits for fuel-burning sources, not "equipment". The proposed diesel fire pump engine has a maximum heat input capacity less than 100 MMBtu/hr and is hence, subject to a fuel sulfur content limit of 2.5%, by weight, for any fuel fired. The dryer burner has a maximum heat input capacity greater than or equal to 100 MMBtu/hr and is subject to a fuel sulfur limit of 3% by weight. The emergency fire pump engine will be subject to a more stringent fuel sulfur standard of 15 ppm through NSPS Subpart IIII, thereby subsuming the Rule (g) sulfur limit.

4.6.5 GRAQC 391-3-1-.02(2)(n) – Fugitive Dust

This regulation requires facilities to take reasonable precautions to prevent fugitive dust from becoming airborne. Operations at the facility, including the wood chips, sawdust, and pellets handling and storage systems, are covered by this generally applicable rule. The appropriate precautions will be taken to prevent

[9] GRAQC 391-3-1-.02(2)(e)(1)(i)

fugitive dust from becoming airborne and ensure that opacity from fugitive dust sources is less than 20% as required by this rule.

4.6.6 GRAQC 391-3-1-.02(2)(lll) - NO_X from Fuel-Burning Equipment

This regulation limits NO_X emissions from fuel-burning equipment with capacities between 10 and 250 MMBtu/hr that are located in or near the original Atlanta 1-hour ozone nonattainment area. The Adel Facility is not located within the geographic area covered by this rule, and is therefore, not subject to this regulation.

4.6.7 GRAQC 391-3-1-.02(2)(mmm) – NO_X Emissions from Stationary Gas Turbines and Stationary Engines used to Generate Electricity

Rule (mmm) provides NO_X emission standards for stationary gas turbines and stationary engines located in certain counties in the Atlanta metropolitan area. The Adel Facility is not located in any of the subject counties; therefore, the emergency fire pump will not be subject to this regulation.

4.6.8 GRAQC 391-3-1-.02(3) – Sampling

This regulation requires any sampling, computation, and analysis to determine compliance with any emission limits or standards established by the Georgia SIP be completed in accordance with Georgia EPD's *Procedures for Testing and Monitoring Sources of Air Pollutants*. The facility will comply with the applicable portions of this rule as required.

4.6.9 GRAQC 391-3-1-.02(5) – Open Burning

This regulation imposes restrictions on open burning activities. The regulation specifies what type of burning is permitted, when, and limits opacity to 40%. The facility shall comply with the requirements of this regulation in the event of performing open burning.

4.6.10 GRAQC 391-3-1-.02(6)(b) – Source Monitoring

This regulation allows EPD to require a facility to install, maintain, and use monitoring devices necessary to determine compliance with any emission limits or standards established by the Georgia SIP. Such devices shall be installed, operated, calibrated, maintained, and information reported in accordance with the EPD's *Procedures for Testing and Monitoring Sources of Air Pollutants*. The Adel Facility will comply with the applicable portions of this rule as required.

4.6.11 GRAQC 391-3-1-.02(7) – PSD of Air Quality

This regulation incorporates the federal PSD program in 40 CFR Part 52.21, with certain revisions. PSD applicability was discussed in Section 4.1 of the permit application.

4.6.12 GRAQC 391-3-1-.03(1) – Construction Permitting

Potential emissions for the proposed facility will be above the de minimis construction permitting thresholds specified in GRAQC 391-3-1-.03(6)(i). Therefore, a construction permit application is necessary. The required Georgia SIP application forms are included in Appendix A.

4.6.13 GRAQC 391-3-1-.03(10), Title V Operating Permits

The facility will be a Title V major source and will submit the initial Title V permit application within 12 months of the commencement of operation at the Adel Facility.

5. TOXIC AIR POLLUTANT EMISSIONS IMPACT ASSESSMENT

Georgia EPD requests that a toxics impact assessment (TIA) be completed as a part of this application. A TIA was conducted, and the facility passed the TIA. This section details the assumptions used for completing the TIA and the results of the TIA.

Georgia EPD regulates the emissions of toxic air pollutants (TAP) through a program approved under the provisions of GRAQC Rule 391-3-1-.02(2)(a)3(ii). A TAP is defined as any substance that may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. Procedures governing the Georgia EPD's review of toxic air pollutant emissions as part of air permit reviews are contained in EPD's *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions* (the *Guideline*).[10]

The Guideline has established the Allowable Ambient Concentration (AAC) and Minimum Emission Rate (MER) for each TAP, which are included in Appendix A of the Guideline. Additionally, procedures for establishing the AACs are included in Appendix C of the Guideline.

5.1 Determination of Toxic Air Pollutant Impact

The following section describes the methodology used to determine the toxics impacts from the proposed facility. Renewable Biomass Group evaluated emissions of acetaldehyde, acrolein, formaldehyde, methanol, phenol, and propionaldehyde from the production process as well as pollutants emitted as byproducts from natural gas combustion.

5.1.1 Methodology

A TIA was performed in accordance with the Guideline. Section 2.2 of the Guideline requires a comparison between the facility-wide emission rate and the MER. For a pollutant that has a facility-wide emission rate above the MER, the Guideline requires the use of screening model (SCREEN3) or refined models (AERMOD or ISCST3) to determine the maximum ground level concentrations for TAP. Facility-wide emission rates are compared to the MER for the identified TAP, as shown in Table 5-1.

[10] Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions. Georgia Department of Natural Resources, Environmental Protection Division, Air Protection Branch, Revised, May 2017.

Table 5-1. Comparison of Facility-Wide Potential Emissions to Minimum Emission Rate

Pollutant	CAS No.	Total Potential Emissions (tpy)	Total Potential Emissions (lb/yr)	MER[1] (lb/yr)	Above MER (Y/N)
1,3-Butadiene	106990	2.05E-05	4.11E-02	7.30E+00	No
Acetaldehyde	75070	1.93E+00	3.87E+03	1.11E+03	Yes
Acrolein	107028	4.29E-01	8.57E+02	4.87E+00	Yes
Arsenic	7440382	1.00E-04	2.00E-01	5.67E-02	Yes
Beryllium	7440417	3.59E-06	7.17E-03	9.73E-01	No
Benzene	71432	5.21E-04	1.04E+00	3.16E+01	No
Cadmium	7440439	3.26E-04	6.52E-01	1.35E+00	No
Chromium	7440473	4.15E-04	8.30E-01	5.84E+01	No
Cobalt	7440484	2.49E-05	4.98E-02	1.17E+01	No
Formaldehyde	50000	2.88E+00	5.75E+03	2.67E+02	Yes
Hexane	110543	2.67E-02	5.33E+01	1.70E+05	No
Lead	7439921	1.48E-04	2.96E-01	5.84E+00	No
Manganese	7439965	1.13E-04	2.25E-01	1.22E+01	No
Methanol	67561	2.16E+00	4.32E+03	3.01E+04	No
Mercury	7439976	7.70E-05	1.54E-01	7.30E+01	No
Naphthalene	91203	5.36E-05	1.07E-01	7.30E+02	No
Nickel	7440020	6.22E-04	1.24E+00	3.86E+01	No
Phenol	108952	4.80E-01	9.60E+02	2.20E+03	No
Propionaldehyde	123386	4.73E-01	9.46E+02	1.95E+03	No
Selenium	7782492	7.11E-06	1.42E-02	2.34E+01	No
Toluene	108883	2.65E-04	5.30E-01	1.22E+06	No
Xylene (o)	108383	1.50E-04	2.99E-01	2.43E+04	No

1. MER - Minimum Emission Rate obtained from Georgia EPD's Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions: Appendix A (Revised May 2017)

Acetaldehyde, acrolein, arsenic and formaldehyde had emissions rates above the respective MER, therefore, modeling for acetaldehyde, acrolein, arsenic and formaldehyde was completed. Due to the number of stacks and variable stack parameters, refined modeling techniques were selected for this compliance assessment.[11] The latest version (19191) of the AERMOD modeling system was used to estimate maximum ground-level concentrations.

AERMOD is a refined, steady-state, multiple source, Gaussian dispersion model. The AERMOD model has the Plume Rise Modeling Enhancements (PRIME) incorporated in the regulatory version, so the direction-specific building downwash dimensions used as inputs are determined by the Building Profile Input Program, PRIME (BPIP PRIME), version 04274. BPIP PRIME is designed to incorporate the concepts and procedures expressed in the Good Engineering Practice (GEP) Technical Support document, the Building Downwash Guidance document, and other related documents, while incorporating the PRIME enhancements to improve prediction of ambient impacts in building cavities and wake regions.

[11] Per recent conversation with EPD, EPD is in process of removing ISCST3 as an option for refined modeling techniques from the Guideline. Therefore, AREMOD is selected for this modeling demosntration.

The AERMOD modeling system is composed of three modular components: AERMAP, the terrain preprocessor; AERMET, the meteorological preprocessor; and AERMOD, the dispersion module. AERMAP is used to extract terrain elevations for selected model objects – emission sources, buildings and receptor points – and to generate the receptor hill heights that are used by AERMOD to drive advanced terrain processing algorithms. National Elevation Database (NED) data available from the USGS are utilized to interpolate surveyed elevations onto user-specified model objects in the absence of more accurate site-specific elevation data.

AERMET generates separate surface file and vertical profile file to pass meteorological observations and turbulence parameters to AERMOD. For this assessment, AERMET meteorological data was downloaded from EPD's website.[12]

The following section describes the modeling protocol and source parameters used in the refined dispersion modeling assessment for the facility.

5.1.2 Stack Parameters

Table 5-2 and Table 5-3 provide a summary of the location and stack parameters used in the dispersion model. Table 5-4 and Table 5-5 provide a summary of modeled emission rates. For purposes of the modeling assessment, emissions are evaluated at each chip storage silo by taking the total emissions for the dry chip storage process and dividing by the number of silos at the Adel facility.

Table 5-2. Stack Parameters Modeled – Point Source

Stack	Description	UTM Easting m	UTM Northing m	Stack Height m	Stack Temp K	Stack Velocity m/s	Stack Diameter m
S1	RTO/Dryer	270361.15	3441367.68	15.24	394.26	18.29	2.22
S2	RCO/GHM/DHM/PM/PC	270281.14	3441349.78	15.24	394.26	14.76	2.22
S8	Pellet Storage Silo	270371.10	3441204.40	21.34	Ambient	1.52	1.40

Table 5-3. Stack Parameters Modeled – Area Source

Source	Description	UTM Easting m	UTM Northing m	Surface Area m^2	Elevation m	Release Height m	Radius m	Vertices --	Initial Vertical Dimension m
S3	Chip Storage Silo No. 1	270376.60	3441345.40	50.27	66.86	12.00	4.00	20.00	--
S4	Chip Storage Silo No. 2	270294.80	3441316.40	50.27	66.86	12.00	4.00	20.00	--
S5	Chip Storage Silo No. 3	270109.00	3441431.20	50.27	66.86	12.00	4.00	20.00	--
S6	Chip Storage Silo No. 4	270306.30	3441434.30	50.27	66.86	12.00	4.00	20.00	--
S7	Chip Storage Silo No. 5	270307.40	3441396.50	50.27	66.86	12.00	4.00	20.00	--

[12] https://epd.georgia.gov/air-protection-branch-technical-guidance-0/air-quality-modeling/georgia-aermet-meteorological-data

Table 5-4. Emission Rates Modeled – Point Source

Stack	Description	Acrolein Emission Rate g/s	Acetaldehyde Emission Rate g/s	Arsenic Emission Rate g/s	Formaldehyde Emission Rate g/s
S1	RTO/Dryer	8.22E-03	3.93E-02	2.09E-06	5.01E-02
S2	RCO/GHM/DHM/PM/PC	4.11E-03	2.04E-03	7.91E-07	4.09E-03
S8	Pellet Storage Silo	--	7.15E-03	--	1.43E-02

Table 5-5. Emission Rates Modeled – Area Source

Source	Description	Acetaldehyde Emission Rate		Formaldehyde Emission Rate	
		g/s	g/s.m^2	g/s	g/s.m^2
S3	Chip Storage Silo No. 1	1.43E-03	2.84E-05	2.86E-03	5.69E-05
S4	Chip Storage Silo No. 2	1.43E-03	2.84E-05	2.86E-03	5.69E-05
S5	Chip Storage Silo No. 3	1.43E-03	2.84E-05	2.86E-03	5.69E-05
S6	Chip Storage Silo No. 4	1.43E-03	2.84E-05	2.86E-03	5.69E-05
S7	Chip Storage Silo No. 5	1.43E-03	2.84E-05	2.86E-03	5.69E-05

5.1.3 Land Use Classification

Classification of land use in the immediate area surrounding a facility is important in determining the appropriate dispersion coefficients to select for a particular modeling application. The selection of either rural or urban dispersion coefficients for a specific application should follow one of two procedures. These include a land use classification procedure or a population-based procedure to determine whether the area is primarily urban or rural.

Of the two methods, the land use procedure is considered more definitive. The land use within the total area circumscribed by a 5 km radius circle (78.5 km2) about the facility was classified using the meteorological land use typing scheme proposed by Auer. If land use types I1 (Heavy Industrial), I2 (Light Industrial), C1 (Commercial), R2 (Residential; Small Lot Single Family & Duplex), and R3 (Residential; Multi-Family) account for 50 percent or more of the circumscribed area, urban dispersion coefficients should be used; otherwise, rural dispersion coefficients are appropriate.

The 1992 United States Geological Survey (USGS) National Land Cover Dataset (NLCD92) set is convenient to use for characterizing land use surrounding a particular facility since it can be processed in AERSURFACE. The AERSURFACE tool was developed to aid users in obtaining surface characteristic values for input into AERMET for AERMOD meteorological data processing. AERSURFACE (v. 13016) was used to count the number of occurrences for each of the 21 USGS NLCD92 land use classes within the 5 km radius circle (78.5 km^2) about the facility.

Each USGS NLCD92 land use class was the compared to the most appropriate Auer land use category to quantify the total urban and rural area. As 98.79% of the area can be classified as rural, rural dispersion coefficients were used.

5.1.4 Modeling Protocol

The following provides a brief summary of the protocol of methods used to determine the maximum ground-level concentration (MGLC) of Formaldehyde, Acrolein, Phenol, and Propionaldehyde:

- AERMOD (v19191) was used;
- The regulatory default model option was used;
- Consideration was given to both simple and complex terrain;
- Rural dispersion coefficients were used as discussed previously;
- The direction-specific building dimensions used as input to the AERMOD model were calculated using the U.S. EPA sanctioned Building Profile Input Program, PRIME version (BPIP PRIME), version 04274, as incorporated in the BREEZE®AERMOD Pro software, developed by Trinity;
- The North American Datum of 1983 (NAD83) was used to specify receptor and source locations;
- 25 m spaced receptors were placed along the property line, 100 meter spaced receptors were placed extending out to 2 km, and 250 meter spaced receptors were placed extending from 2 km to 5 km;
- Receptor and source elevations were determined by processing their respective NAD83 UTM coordinates in AERMAP using 1-arc second National Elevation Dataset (NED) data obtained from the USGS National Seamless Map Server; and
- Five-years of AERMET Adjusted USTAR meteorological data for the Valdosta surface (No. 93845) and Tallahassee upper air (No. 93805) stations for calendar years 2012, 2014, 2016 through 2018 were used (anemometer height of 60.3 meters). This meteorological data was downloaded from the EPD website.

5.1.5 Modeling Results

Using the source parameters, emission rates, and the protocol described above, AREMOD was executed for five-years of meteorological data to determine the maximum 1-hr and annual concentrations as applicable for acetaldehyde, acrolein, arsenic and formaldehyde at each receptor location. Table 5-6 summarizes the results of the MGLC for each TAP. MGLC for each TAP is below the AAC for each TAP.

Table 5-6. Modeling Results

Pollutant	Year	Max. conc. (Hourly) (ug/m^3)	Max. conc. (Annual) (ug/m^3)	AAC (Annual) (ug/m^3)	Result > AAC?	Max. conc. (15-min)[1] (ug/m^3)	AAC (15-min) (ug/m^3)	Result > AAC?
	2012	0.13	3.11E-03	--	--	--	--	--
	2014	0.13	3.69E-03	--	--	--	--	--
	2016	0.13	3.41E-03	--	--	--	--	--
	2017	0.13	3.39E-03	--	--	--	--	--
	2018	0.15	3.77E-03	--	--	--	--	--
Acrolein	**Max**	**0.15**	**3.77E-03**	**0.35**	**No**	**0.20**	**23.00**	**No**
	2012	3.00E-05	0.00E+00	--	--	--	--	--
	2014	3.00E-05	0.00E+00	--	--	--	--	--
	2016	3.00E-05	0.00E+00	--	--	--	--	--
	2017	3.00E-05	0.00E+00	--	--	--	--	--
	2018	4.00E-05	0.00E+00	--	--	--	--	--
Arsenic	**Max**	**4.00E-05**	**0.00E+00**	**2.33E-04**	**No**	**0.00**	**0.20**	**No**
	2012	4.68	0.18	--	--	--	--	--
	2014	4.65	0.20	--	--	--	--	--
	2016	4.72	0.17	--	--	--	--	--
	2017	4.70	0.16	--	--	--	--	--
	2018	4.58	0.19	--	--	--	--	--
Acetaldehyde	**Max**	**4.72**	**0.20**	**576.00**	**No**	**6.23**	**48,000**	**No**
	2012	9.37	0.36	--	--	--	--	--
	2014	9.31	0.39	--	--	--	--	--
	2016	9.45	0.33	--	--	--	--	--
	2017	9.40	0.31	--	--	--	--	--
	2018	9.17	0.37	--	--	--	--	--
Formaldehyde	**Max**	**9.45**	**0.39**	**0.02**	**Yes**	**12.47**	**0.00**	**Yes**

1. The maximum ground-level hourly concentrations produced is multiplied by 1.32 to derive maximum concentration in 15-minutes.

APPENDIX A. SIP APPLICATION FORMS

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

SIP AIR PERMIT APPLICATION

EPD Use Only

Date Received: _____ Application No. _____

FORM 1.00: GENERAL INFORMATION

1. Facility Information

Facility Name: Renewable Biomass Group - Adel Facility

AIRS No. (if known): 04-13- -

Facility Location: Street: US-41

City: Adel Georgia Zip: 31620 County: Cook

Is this facility a "small business" as defined in the instructions? Yes: ☐ No: ☐

2. Facility Coordinates

Latitude: 31° 05' 00" **NORTH** Longitude: 83° 24' 29" **WEST**

UTM Coordinates: 270281.14 **EAST** 3441349.87 **NORTH** **ZONE** 17

3. Facility Owner

Name of Owner: Renewable Biomass Group

Owner Address Street: 160 Airport Road, Adel Industrial Park

City: Adel State: Georgia Zip: 31620

4. Permitting Contact and Mailing Address

Contact Person: Patrick Madigan Title: General Manager & Director

Telephone No.: _____ Ext. _____ Fax No.: _____

Email Address: Patrick@renewablebiomassgroup.com

Mailing Address: Same as: Facility Location: ☐ Owner Address: ☒ Other: ☐

If Other: Street Address: _____

City: _____ State: _____ Zip: _____

5. Authorized Official

Name: Patrick Madigan Title: General Manager & Director

Address of Official Street: 160 Airport Road, Adel Industrial Park

City: Adel State: Georgia Zip: 31620

This application is submitted in accordance with the provisions of the Georgia Rules for Air Quality Control and, to the best of my knowledge, is complete and correct.

Signature: Patrick Madigan Date: 2/Feb/2020

6. Reason for Application: (Check all that apply)

☒ New Facility (to be constructed)

☐ Existing Facility (initial or modification application)

☐ Permit to Construct

☐ Permit to Operate

☐ Change of Location

☐ Permit to Modify Existing Equipment: Affected Permit No.: _____

☐ Revision of Data Submitted in an Earlier Application

Application No.: _____

Date of Original Submittal: _____

7. Permitting Exemption Activities (for permitted facilities only):

Have any exempt modifications based on emission level per Georgia Rule 391-3-1-.03(6)(i)(3) been performed at the facility that have not been previously incorporated in a permit?

☒ **No** ☐ **Yes, please fill out the SIP Exemption Attachment** (See Instructions for the attachment download)

8. Has assistance been provided to you for any part of this application?

☐ **No** ☐ **Yes, SBAP** ☒ **Yes, a consultant has been employed or will be employed.**

If yes, please provide the following information:

Name of Consulting Company: Trinity Consultants

Name of Contact: Katie Brubaker, P.E.

Telephone No.: 678.441.9977 Fax No.: 678.441.9978

Email Address: kbrubaker@trinityconsultants.com

Mailing Address: Street: 3495 Piedmont Road, Building 10, Suite 905

City: Atlanta State: Georgia Zip: 30305

Describe the Consultant's Involvement:

Assisted with application preparation.

9. Submitted Application Forms: Select only the necessary forms for the facility application that will be submitted.

No. of Forms	Form
1	2.00 Emission Unit List
1	2.01 Boilers and Fuel Burning Equipment
	2.02 Storage Tank Physical Data
	2.03 Printing Operations
	2.04 Surface Coating Operations
	2.05 Waste Incinerators (solid/liquid waste destruction)
1	2.06 Manufacturing and Operational Data
1	3.00 Air Pollution Control Devices (APCD)
	3.01 Scrubbers
	3.02 Baghouses & Other Filter Collectors
1	3.03 Electrostatic Precipitators
1	4.00 Emissions Data
1	5.00 Monitoring Information
1	6.00 Fugitive Emission Sources
1	7.00 Air Modeling Information

10. Construction or Modification Date

Estimated Start Date: December 2020

11. If confidential information is being submitted in this application, were the guidelines followed in the "Procedures for Requesting that Submitted Information be treated as Confidential"?

☒ No ☐ Yes

12. New Facility Emissions Summary

Criteria Pollutant	New Facility	
	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	207.78	<207.78
Nitrogen oxides (NOx)	249.48	<249.48
Particulate Matter (PM) (filterable only)	70.98	<70.98
PM <10 microns (PM10)	100.17	<100.17
PM <2.5 microns (PM2.5)	100.09	<100.09
Sulfur dioxide (SO_2)	0.25	<0.25
Volatile Organic Compounds (VOC)	216.22	<216.22
Greenhouse Gases (GHGs) (in CO2e)	35,853	<35,853
Total Hazardous Air Pollutants (HAPs)	8.11	<8.11
Individual HAPs Listed Below:		
Acetaldehyde	1.93	1.93
Formaldehyde	2.88	2.88
Methanol	2.17	2.17
Acrolein	0.43	0.43
Phenol	0.48	0.48
Propionaldehyde	0.47	0.47

13. Existing Facility Emissions Summary

Criteria Pollutant	Current Facility		After Modification	
	Potential (tpy)	Actual (tpy)	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)				
Nitrogen oxides (NOx)				
Particulate Matter (PM) (filterable only)				
PM <10 microns (PM10)				
PM <2.5 microns (PM2.5)				
Sulfur dioxide (SO_2)				
Volatile Organic Compounds (VOC)				
Greenhouse Gases (GHGs) (in CO2e)				
Total Hazardous Air Pollutants (HAPs)				
Individual HAPs Listed Below:				

14. 4-Digit Facility Identification Code:

SIC Code: 2499 SIC Description: Wood products, not elsewhere classified

NAICS Code: 321999 NAICS Description: All other miscellaneous wood product manufacturing

15. Description of general production process and operation for which a permit is being requested. If necessary, attach additional sheets to give an adequate description. Include layout drawings, as necessary, to describe each process. References should be made to source codes used in the application.

See application narrative.

16. Additional information provided in attachments as listed below:

Attachment A - SIP Forms

Attachment B - Facility Diagrams

Attachment C - Potential Emission Calculations

Attachment D - Toxics Impact Assessment

Attachment E -

Attachment F -

17. Additional Information: Unless previously submitted, include the following two items:

☒ Plot plan/map of facility location or date of previous submittal:

☒ Flow Diagram or date of previous submittal:

18. Other Environmental Permitting Needs:

Will this facility/modification trigger the need for environmental permits/approvals (other than air) such as Hazardous Waste Generation, Solid Waste Handling, Water withdrawal, water discharge, SWPPP, mining, landfill, etc.?

☐ **No** ☒ **Yes, please list below:**

SWPPP

19. List requested permit limits including synthetic minor (SM) limits.

249 tpy CO, NOx, filterable PM, VOC

20. Effective March 1, 2019, permit application fees will be assessed. The fee amount varies based on type of permit application. Application acknowledgement emails will be sent to the current registered fee contact in the GECO system. If fee contacts have changed, please list that below:

Fee Contact name: Patrick Madigan

Fee Contact email address: Patrick@renewablebiomassgroup.com

Fee Contact phone number:

Fee invoices will be created through the GECO system shortly after the application is received. It is the applicant's responsibility to access the facility GECO account, generate the fee invoice, and submit payment within 10 days after notification.

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 2.00 – EMISSION UNIT LIST

Emission Unit ID	Name	Manufacturer and Model Number	Description
GHM1	Green Hammermill	TBD	Green Hammermill
DR1	Dryer	TBD	Dryer
CS1	Dry Chip Storage	TBD	Dry Chip Storage
DHM1-3	Dry Hammermill Nos. 1-3	TBD	Dry Hammermill Nos. 1-3
PM1-11	Pellet Mill Nos. 1-11	TBD	Pellet Mill Nos. 1-11
PC1-3	Pellet Cooler Nos. 1-3	TBD	Pellet Cooler Nos. 1-3
PS1	Pellet Storage	TBD	Pellet Storage
FP1	Emergency Fire Pump	TBD	Emergency Fire Pump

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 2.01 – BOILERS AND FUEL BURNING EQUIPMENT

Emission Unit ID	Type of Burner	Type of Draft[1]	Design Capacity of Unit (MMBtu/hr Input)	Percent Excess Air	Dates		Date & Description of Last Modification
					Construction	Installation	
DR1	Dryer	TBD	TBD	TBD	December 2020	December 2020	N/A

[1] This column does not have to be completed for natural gas only fired equipment.

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FUEL DATA

Emission Unit ID	Fuel Type	Potential Annual Consumption				Hourly Consumption		Heat Content		Percent Sulfur		Percent Ash in Solid Fuel	
		Total Quantity		Percent Use by Season									
		Amount	Units	Ozone Season May 1 - Sept 30	Non-ozone Season Oct 1 - Apr 30	Max.	Avg.	Min.	Avg.	Max.	Avg.	Max.	Avg.
DR1	**Biomass**	**TBD**	**Tons**	**41.67**	**58.33**	**TBD**	**TBD**						

Fuel Supplier Information						
Fuel Type	Name of Supplier	Phone Number	Supplier Location			
			Address	City	State	Zip
Biomass	**Bark from whole logs**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

Production Schedule:	Annual production schedule for the facility based on finished products, in tons per year and the hours of production per year. For batch operations, provide the annualized calculations in an attachment and include it in Form 1.00 *General Information*, Item 16.
Hourly Production Rate:	Enter the hourly production rate (HPR) for the process/operation and give the appropriate units, e.g. tpy, lb/hr, gal/hr, parts/hr. The "Design" HPR is the amount the process is designed to perform. The "Normal" HPR is the production that this process operates based on current or anticipated production schedules. The "Maximum" HPR is the maximum hourly production that the emission unit can achieve. Indicate the "Units" of production that are used to express the "Design", "Normal", and "Maximum" HPR. For batch operations, provide the annualized calculations in an attachment and include it in Form 1.00 *General Information*, Item 16.

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 2.06 – MANUFACTURING AND OPERATIONAL DATA

Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr

Additional Data Attached? ☒ - No ☐ - Yes, please include the attachment in list on Form 1.00, Item 16.

Seasonal and/or Peak Operating Periods: N/A

Dates of Annually Occurring Shutdowns: N/A

PRODUCTION INPUT FACTORS

Emission Unit ID	Emission Unit Name	Const. Date	Input Raw Material(s)	Annual Input	Hourly Process Input Rate		
					Design	Normal	Maximum
GHM1	Green Hammermill		Green chips	337,968	38.5 tons/hr	38.5 tons/hr	38.5 tons/hr
DR1	Dryer		Green chips	497,000	56.7 tons/hr	56.7 tons/hr	56.7 tons/hr
CS1	Dry Chip Storage		Dry chips	497,000	56.7 tons/hr	56.7 tons/hr	56.7 tons/hr
SCN1	Dry Screening and Grinding		Dry chips	497,000	56.7 tons/hr	56.7 tons/hr	56.7 tons/hr
DHM1-3	Dry Hammermill Nos. 1-3		Dry chips	497,000	56.7 tons/hr	56.7 tons/hr	56.7 tons/hr
PM1-11/ PC1-3	Pellet Mill Nos. 1-11 Pellet Cooler Nos. 1-3		Dry chips	497,000	56.7 tons/hr	56.7 tons/hr	56.7 tons/hr
PS1	Pellet Storage		Pellets	497,000	56.7 tons/hr	56.7 tons/hr	56.7 tons/hr
PL1	Pellet Loadout		Pellets	497,000	56.7 tons/hr	56.7 tons/hr	56.7 tons/hr

PRODUCTS OF MANUFACTURING

Emission Unit ID	Description of Product	Production Schedule		Hourly Production Rate (Give units: e.g. lb/hr, ton/hr)			
		Tons/yr	Hr/yr	Design	Normal	Maximum	Units
PM1-11/ PC1-3	Pellets	497,000	8,760	56.7 tons/hr	56.7 tons/hr	56.7 tons/hr	56.7 tons/hr

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

Form 3.00 – AIR POLLUTION CONTROL DEVICES - PART A: GENERAL EQUIPMENT INFORMATION

APCD Unit ID	Emission Unit ID	APCD Type (Baghouse, ESP, Scrubber etc)	Date Installed	Make & Model Number (Attach Mfg. Specifications & Literature)	Unit Modified from Mfg Specifications?	Gas Temp. °F		Inlet Gas Flow Rate (acfm)
						Inlet	Outlet	
RTO1	DR1	RTO	December 2020	TBD	No	TBD	250	150,000
WES1	DR1	WESP	December 2020	TBD	No	TBD	250	150,000
RCO1	GHM1	RCO	December 2020	TBD	No	TBD	250	121,080
RCO1	DHM1-3	RCO	December 2020	TBD	No	TBD	250	121,080
RCO1	PM1-11	RCO	December 2020	TBD	No	TBD	250	121,080
RCO1	PC1-3	RCO	December 2020	TBD	No	TBD	250	121,080
CYC1	GHM1	Cyclone	December 2020	TBD	No	Ambient	Ambient	3,000
CYC2-4	DHM1-3	Cyclones	December 2020	TBD	No	Ambient	Ambient	28,080 (total)
CYC5-8	PM1-11	Cyclones	December 2020	TBD	No	Ambient	Ambient	90,000 (total)
CYC5-8	PC1-3	Cyclones	December 2020	TBD	No	Ambient	Ambient	90,000 (total)
CYC9	PS1	Cyclone	December 2020	TBD	No	Ambient	Ambient	5,000

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

Form 3.00 – AIR POLLUTION CONTROL DEVICES – PART B: EMISSION INFORMATION

APCD Unit ID	Pollutants Controlled	Percent Control Efficiency		Inlet Stream To APCD		Exit Stream From APCD		Pressure Drop Across Unit (Inches of water)
		Design	Actual	lb/hr	Method of Determination	lb/hr	Method of Determination	
RTO1	VOC and HAP	95%	95%	TBD	TBD	TBD	TBD	TBD
WES1	PM	TBD	TBD	TBD	TBD	TBD	TBD	TBD
RCO1	VOC and HAP	95%	95%	TBD	TBD	TBD	TBD	TBD
CYC1	PM	TBD	TBD	TBD	TBD	TBD	TBD	TBD
CYC2-4	PM	TBD	TBD	TBD	TBD	TBD	TBD	TBD
CYC5-8	PM	TBD	TBD	TBD	TBD	TBD	TBD	TBD
CYC9	PM	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 3.02 – BAGHOUSES & OTHER FILTER COLLECTORS

APCD ID	Filter Surface Area (ft^2)	No. of Bags	Inlet Gas Dew Point Temp. (°F)	Inlet Gas Temp. (°F)	Bag or Filter Material	Pressure Drop (inches of water)	Cleaning Method	Gas Cooling Method	Leak Detection System Type
CYC1	TBD	TBD	TBD	Ambient	TBD	TBD	TBD	TBD	TBD
CYC2	TBD	TBD	TBD	Ambient	TBD	TBD	TBD	TBD	TBD
CYC3	TBD	TBD	TBD	Ambient	TBD	TBD	TBD	TBD	TBD
CYC4	TBD	TBD	TBD	Ambient	TBD	TBD	TBD	TBD	TBD
CYC5	TBD	TBD	TBD	Ambient	TBD	TBD	TBD	TBD	TBD
CYC6	TBD	TBD	TBD	Ambient	TBD	TBD	TBD	TBD	TBD
CYC7	TBD	TBD	TBD	Ambient	TBD	TBD	TBD	TBD	TBD
CYC8	TBD	TBD	TBD	Ambient	TBD	TBD	TBD	TBD	TBD
CYC9	TBD	TBD	TBD	Ambient	TBD	TBD	TBD	TBD	TBD

Attach a physical description, dimensions and drawings for each baghouse and any additional information available such as particle size, maintenance schedules, monitoring procedures and breakdown/by-pass procedures. Explain how collected material is disposed of or utilized. Include the attachment in the list on Form 1.00 *General Information*, Item 16

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 3.03 –ELECTROSTATIC PRECIPITATORS

APCD ID	Type of ESP (Wet or Dry)	Field No.	Voltage (Volts)		Current (Amps)		Total Power (kW)	Water Flow Rate[1] e.g. Gal/min, Gal/hr	Inlet Gas Velocity e.g. ft/min, ft/sec	Spark Rate sparks/min
			Primary	Secondary	Primary	Secondary				
WES1	Wet	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

[1] Complete only for wet ESP's.

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
GHM1	CYC1, RCO1	RCO1	Filterable PM	<0.26	0.26	<1.13	1.13	Manufacturer guarantee
			Total PM10	<0.26	0.26	<1.13	1.13	Manufacturer guarantee
			Total PM2.5	<0.26	0.26	<1.13	1.13	Manufacturer guarantee
			VOC	<2.08	2.08	<9.11	9.11	Stack Test – Other Site
			Total HAP	<0.10	0.10	<0.42	0.42	AP-42, Stack Test – Other Site, Other Application – NCASI, EPD EF
			Max Individual HAP (Formaldehyde)	<0.02	0.02	<0.07	0.07	EPD EF
DR1 Note: Emissions from Dryer only	RTO1, WES1	RTO1	CO	<45.8	45.8	<200.60	200.60	Manufacturer guarantee
			NOx	<52.8	52.8	<231.26	231.26	Manufacturer guarantee
			Filterable PM	<5.3	5.3	<23.00	23.00	Manufacturer guarantee
			Total PM10	<11.5	11.5	<50.33	50.33	Manufacturer guarantee, EPD EF
			Total PM2.5	<11.5	11.5	<50.33	50.33	Manufacturer guarantee, EPD EF
			SO2	<0.00	0.00	<0.00	0.00	Manufacturer guarantee
			VOC	<12.8	12.8	<45.00	45.00	Manufacturer guarantee
			Total HAP	<1.53	1.53	<5.00	5.00	EPD EF, AP-42
			Max Individual HAP (Formaldehyde)	<3.97E-01	3.97E-01	<1.74	1.74	EPD EF

CS1		CS1	Filterable PM	<3.37E-03	3.37E-03	<1.48E-02	1.48E-02	AP-42
			Total PM10	<1.60E-03	1.60E-03	<6.99E-03	6.99E-03	AP-42
			Total PM2.5	<2.42E-03	2.42E-03	<1.06E-03	1.06E-03	AP-42
			VOC	<6.81	6.81	<29.82	29.82	Other Application - NCASI
			Total HAP	<0.28	0.28	<1.23	1.23	Other Application – NCASI, EPD EF
			Max Individual HAP (Formaldehyde)	<0.11	0.11	<0.50	0.50	EPD EF
DHM1-3	CYC2-4, RCO1	RCO1	Filterable PM	<2.41	2.41	<10.54	10.54	Manufacturer guarantee
			Total PM10	<2.41	2.41	<10.54	10.54	Manufacturer guarantee
			Total PM2.5	<2.41	2.41	<10.54	10.54	Manufacturer guarantee
			VOC	<3.51	3.51	<15.39	15.39	EPD EF
			Total HAP	<0.04	0.04	<0.19	0.19	EPD EF, Stack Test – Other Site, AP-42
			Max Individual HAP (Formaldehyde)	<0.01	0.01	<0.05	0.05	EPD EF
PM1-11 PC1-3	CYC5-8, RCO1	RCO1	Filterable PM	<7.71	7.71	<33.79	33.79	Manufacturer guarantee
			Total PM10	<7.71	7.71	<33.79	33.79	Manufacturer guarantee
			Total PM2.5	<7.71	7.71	<33.79	33.79	Manufacturer guarantee
			VOC	<1.42	1.42	<6.21	6.21	EPD EF
			Total HAP	<0.06	0.06	<0.25	0.25	EPD EF, Stack Test – Other Site, AP-42
			Max Individual HAP (Formaldehyde)	<0.01	0.01	<0.02	0.02	EPD EF
PS1	CYC9	PS1	Filterable PM	<0.43	0.43	<1.88	1.88	Manufacturer guarantee
			Total PM10	<0.43	0.43	<1.88	1.88	Manufacturer guarantee
			Total PM2.5	<0.43	0.43	<1.88	1.88	Manufacturer guarantee
			VOC	<22.69	22.69	<99.40	99.40	EPD EF
			Total HAP	<0.23	0.23	<0.99	0.99	EPD EF
			Max Individual HAP (Formaldehyde)	<0.11	0.11	<0.50	0.50	EPD EF

FP1		FP1	CO	<2.00	2.00	<0.50	0.50	AP-42
			NOx	<9.30	9.30	<2.33	2.33	AP-42
			Filterable PM	<0.66	0.66	<0.17	0.17	AP-42
			Total PM10	<0.66	0.66	<0.17	0.17	AP-42
			Total PM2.5	<0.66	0.66	<0.17	0.17	AP-42
			SO2	<0.62	0.62	<0.15	0.15	AP-42
			VOC	<0.74	0.74	<0.19	0.19	AP-42
			CO2e	<346.18	346.18	<86.54	86.54	AP-42
			Total HAP	<1.36E-02	1.36E-02	<3.39E-03	3.39E-03	AP-42
			Max Individual HAP (Formaldehyde)	<2.48E-03	2.48E-03	<6.20E-04	6.20E-04	AP-42

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 5.00 MONITORING INFORMATION

Emission Unit ID/ APCD ID	Emission Unit/APCD Name	Monitored Parameter		Monitoring Frequency
		Parameter	Units	
RTO1	Regenerative Thermal Oxidizer No. 1	Temperature	Degrees F	Continuous
WES1	Wet ESP	Voltage	Amps	Continuous
RCO1	Regenerative Catalytic Oxidizer No. 1	Temperature	Degrees F	Continuous
GHM1	Green Hammermill	Throughput	Tons	Monthly
DR1	Dryer	Throughput	Tons	Monthly
DHM1-3	Dry Hammermill	Throughput	Tons	Monthly

Comments:

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 6.00 – FUGITIVE EMISSION SOURCES

Fugitive Emission Source ID	Description of Source	Emission Reduction Precautions	Pot. Fugitive Emissions	
			Amount (tpy)	Pollutant
LTUL	Log Truck Unloading	Dust control	3.27E-02, 1.55E-02, 2.34E-03	Filterable PM, Total PM10, Total PM2.5
WLP	Whole Log Pile	Dust control	3.27E-02, 1.55E-02, 2.34E-03	Filterable PM, Total PM10, Total PM2.5
DBRK	Drum Debarker	Dust control	3.27E-02, 1.55E-02, 2.34E-03	Filterable PM, Total PM10, Total PM2.5
CHPR	Chipper	Dust control	3.27E-02, 1.55E-02, 2.34E-03	Filterable PM, Total PM10, Total PM2.5
CTUL	Chip Truck Unloading	Dust control	1.29E-02, 6.12E-03, 9.26E-04	Filterable PM, Total PM10, Total PM2.5
GCPL	Green Chip Pile	Dust control	1.29E-02, 6.12E-03, 9.26E-04	Filterable PM, Total PM10, Total PM2.5
GCSC	Green Chip Screening	Dust control	1.29E-02, 6.12E-03, 9.26E-04	Filterable PM, Total PM10, Total PM2.5

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 7.00 – AIR MODELING INFORMATION: Stack Data

Stack ID	Emission Unit ID(s)	Stack Information			Dimensions of largest Structure Near Stack		Exit Gas Conditions at Maximum Emission Rate			
		Height Above Grade (ft)	Inside Diameter (ft)	Exhaust Direction	Height (ft)	Longest Side (ft)	Velocity (ft/sec)	Temperature (°F)	Flow Rate (acfm)	
									Average	Maximum
S1	DR1	50	7.28	Vertical	N/A	N/A	60	250	<150,000	150,000
S2	GHM1, DHM1-3, PM1-11, PC1-3	50	7.28	Vertical	N/A	N/A	48.43	250	<121,080	121,080
S3	CS1	39	26.25	Area Source	N/A	N/A	1	Ambient	N/A	N/A
S4	CS1	39	26.25	Area Source	N/A	N/A	1	Ambient	N/A	N/A
S5	CS1	39	26.25	Area Source	N/A	N/A	1	Ambient	N/A	N/A
S6	CS1	39	26.25	Area Source	N/A	N/A	1	Ambient	N/A	N/A
S7	CS1	39	26.25	Area Source	N/A	N/A	1	Ambient	N/A	N/A
S8	PS1	70	4.61	Vertical	N/A	N/A	5	Ambient	<5,000	5,000

NOTE: If emissions are not vented through a stack, describe point of discharge below and, if necessary, include an attachment. List the attachment in Form 1.00 *General Information*, Item 16.

Facility Name: Renewable Biomass Group **Date of Application:** July 2020

FORM 7.00 AIR MODELING INFORMATION: Chemicals Data

Chemical	Potential Emission Rate (lb/hr)	Toxicity	Reference	MSDS Attached
See Section 5 and Appendix D of the permit application				☐
				☐
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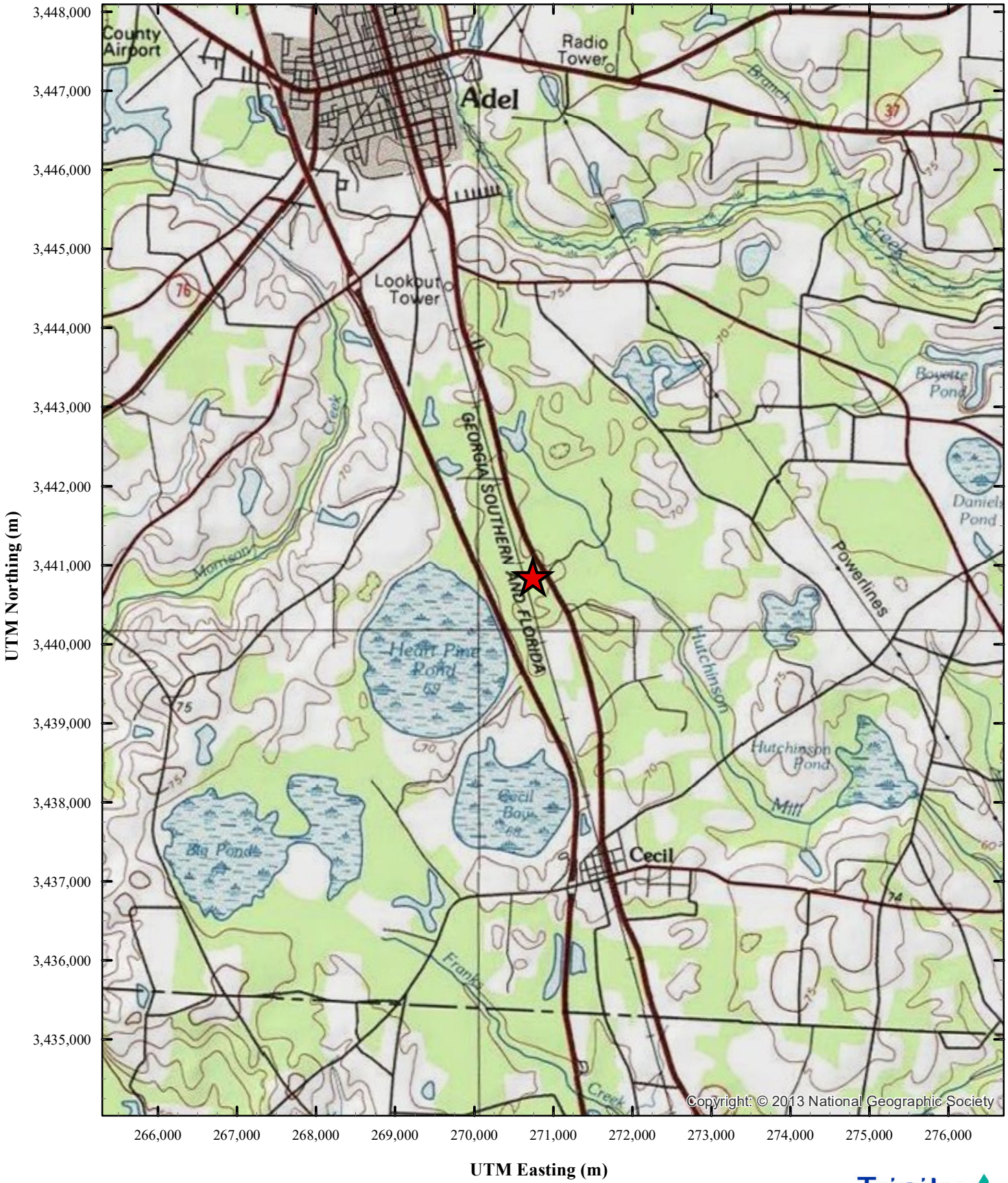
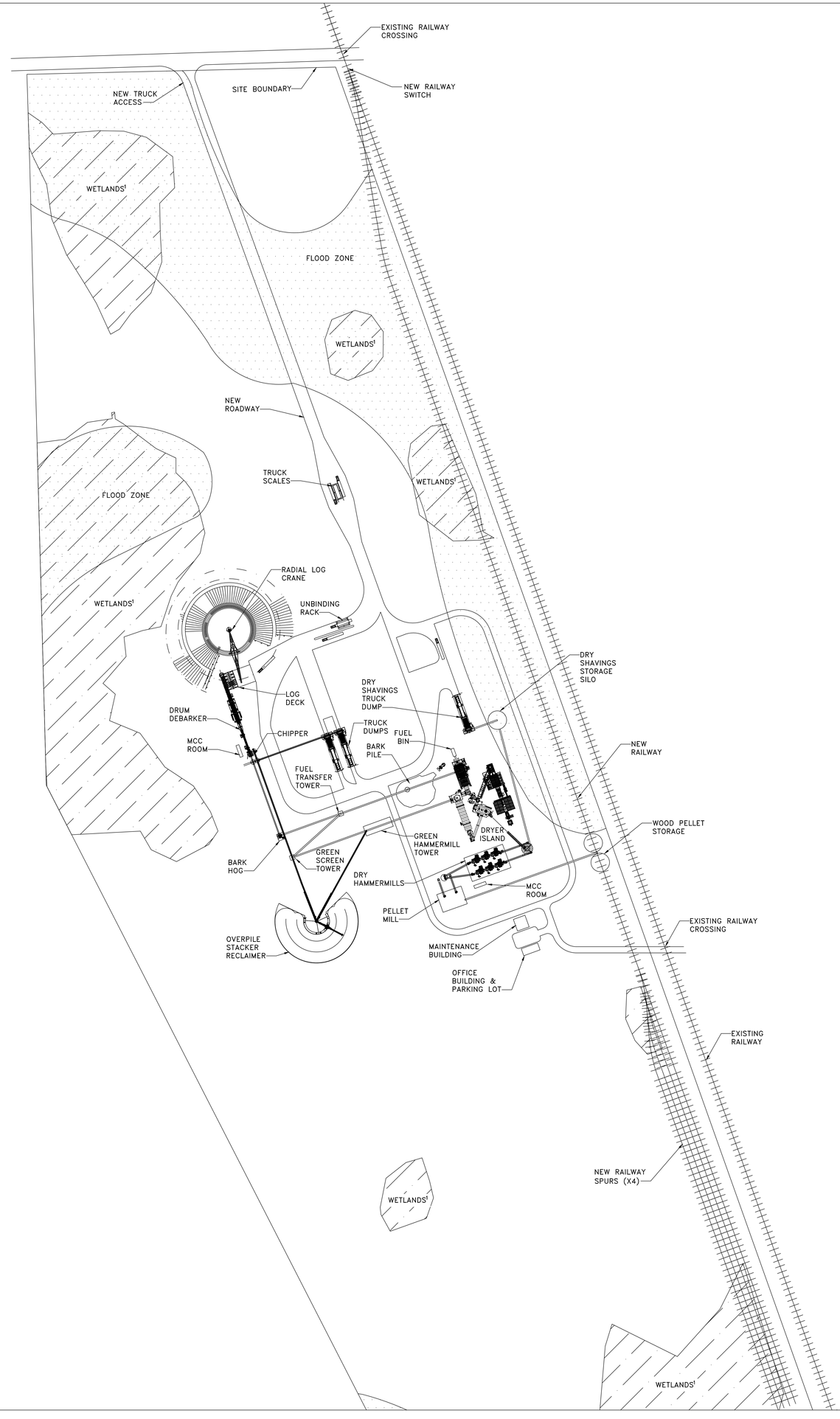
APPENDIX B. FACILITY DIAGRAMS

Figure B-1. Area Map
Renewable Biomass Group - Adel, Cook County, Georgia



Coordinates reflect UTM projection Zone 17, NAD83.

Trinity Consultants



Notes:

1. WETLANDS ARE DISPLAYED FOR REFERENCE ONLY. LOCATIONS OF WETLANDS ARE BASED ON REPRESENTATIVE HISTORICAL DATA AND ARE SUBJECT TO CHANGE PENDING CERTIFIED WETLAND DELINEATION SURVEY.

REV:	DESCRIPTION:	BY:	DATE:
B	ISSUED FOR INFORMATION	JGH	07APR20
A	ISSUED FOR REVIEW	JCP	11MAR20

STATUS: PRELIMINARY

NEXUS PMG
101 COLLEGE ST, STE 2A, GREENVILLE, SC 29601
P: 864-448-0063 W: NEXUSPMG.COM

CLIENT: RENEWABLE BIOMASS GROUP
FAUSETT ROAD
ADEL, GA 31620

FIRM: NEXUS PROJECT DEVELOPMENT SERVICES
101 COLLEGE ST, STE 2A
GREENVILLE, SC 29601

SEAL:

PRELIMINARY: NOT FOR CONSTRUCTION, FABRICATION, INSTALLATION OR RECORD. THIS IS NOT A SEALED DOCUMENT.

SITE: ADEL, COOK COUNTY GEORGIA

TITLE: SITE LAYOUT OVERALL

SCALE:	DATE:	DRAWN:	CHECKED:
GRAPHIC	06MAR20	SAK	JCP

PROJECT:	DRAWING NO:	REVISION:
RBG-AD0100	PR-SP-001	B

APPENDIX C. POTENTIAL EMISSIONS CALCULATIONS

Table C-1. Facility Wide Emissions

Emission Sources	Emission Unit ID	Emissions (tpy) CO	NO_X	Filterable PM	Total PM_{10}	Total $PM_{2.5}$	SO_2	VOC	CO_2e	Acetaldehyde	Formaldehyde	Methanol	Total HAP
Whole Log Processing													
Truck Unloading	Fugitive	--	--	3.27E-02	1.55E-02	2.34E-03	--	--	--	--	--	--	--
Whole Log Pile	Fugitive	--	--	3.27E-02	1.55E-02	2.34E-03	--	--	--	--	--	--	--
Drum Debarker	Fugitive	--	--	3.27E-02	1.55E-02	2.34E-03	--	--	--	--	--	--	--
Chipper	Fugitive	--	--	3.27E-02	1.55E-02	2.34E-03	--	--	--	--	--	--	--
Green Residuals Processing													
Truck Unloading	Fugitive	--	--	1.29E-02	6.12E-03	9.26E-04	--	--	--	--	--	--	--
Wood Chip Pile	Fugitive	--	--	1.29E-02	6.12E-03	9.26E-04	--	--	--	--	--	--	--
Green Chip Screening	Fugitive	--	--	1.29E-02	6.12E-03	9.26E-04	--	--	--	--	--	--	--
Green Hammermill	GHM1	--	--	1.13	1.13	1.13	--	9.11	--	0.03	0.07	0.03	0.42
Drying													
Dryer[1]	DR1	200.60	231.26	23.00	50.33	50.33	--	56.06	--	1.37	1.74	1.37	5.00
RTO Burners[1]					1.04	1.04	--		16,587	--	5.15E-04	--	
Tar Buildup Control	DR1	0.90	2.15	4.08E-02	0.16	0.16	1.29E-02	5.90E-03	2,592	--	8.05E-05	--	2.19E-03
Dry Chips Storage													
Dry Chips Storage[2]	CS1	--	--	1.48E-02	6.99E-03	1.06E-03	--	29.82	--	0.25	0.50	0.48	1.23
Pelletizing													
Dry Hammermill Nos. 1-3	DHM1-3	--	--	10.54	10.54	10.54	--	15.39	--	0.02	0.05	0.02	0.19
Pellet Mills Nos. 1-11	PM1-11	--	--	33.79	33.79	33.79	--	6.21	--	0.01	0.02	0.01	0.25
Pellet Coolers Nos. 1-3	PC1-3												
Pellet Storage and Loadout													
Pellet Storage and Loadout	PS1	--	--	1.88	1.88	1.88	--	99.40	--	0.25	0.50	0.25	0.99
Miscellaneous													
RCO Burners	Includes GHM1, DHM1-3, PM1-11, PC1-3	5.77	13.74	0.26	1.04	1.04	0.08	3.78E-02	16,587	--	5.15E-04	--	1.38E-02
Diesel Fire Pump	FP1	0.50	2.33	0.17	0.17	0.17	0.15	0.19	86.54	--	6.20E-04	--	3.39E-03
Facility-Wide Total With Fugitives		**207.78**	**249.48**	**70.98**	**100.17**	**100.09**	**0.25**	**216.22**	**35,853**	**1.93**	**2.88**	**2.17**	**8.11**
Facility-Wide Total Without Fugitives[3]		**207.78**	**249.48**	**70.81**	**100.09**	**100.08**	**0.25**	**216.22**	**35,853**	**1.93**	**2.88**	**2.17**	**8.11**
Title V Major Source Threshold (tpy)		**100**	**100**	**100**	**100**	**100**	**100**	**100**	**N/A**	**10**	**10**	**10**	**25**
Above Threshold?[3]		**Yes**	**Yes**	**No**	**Yes**	**Yes**	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**
PSD Major Source Threshold (tpy)		**250**	**250**	**250**	**250**	**250**	**250**	**250**	**75,000**	**N/A**	**N/A**	**N/A**	**N/A**
Above Threshold?[3]		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**	**N/A**	**N/A**	**N/A**

1. Emissions of certain pollutants for which a Manufacturer guarantee was provided are combined for the dryer and RTO combustion, as guarantee is for emissions exiting the RTO stack.
2. Potential emissions are quantified for the entire dry chip storage process at the Adel facility using the potential facility production rate of 497,000 short tons/yr for all storage silos, and not at each individual storage bin or silo.

3. Facility-wide emissions can exclude fugitives from the PSD major source determination as wood pellet production operation is not on the list of 28 categories with a lower major source threshold for criteria pollutants, which requires subject source categories to include fugitive emissions for permitting applicability determinations. Facility-wide emissions with fugitives are compared to the Title V Major Source thresholds, and facility-wide emissions without fugitives are compared to the PSD Major Source thresholds.

Table C-2. Whole Log Receiving, Processing, and Storage Operating Parameters

Emission Source	Annual Throughput (tons/year)[1]
Truck Unloading	1,100,000
Whole Log Pile	1,100,000
Drum Debarker	1,100,000
Chipper	1,100,000

1. Annual throughput based on amount of dryed material needed to generate final amount of finished pellets.

Table C-3. Raw Material Handling Emission Factors

Pollutant	Emission Factor[1] (lb/ton)
Filterable PM	5.95E-05
Filterable PM_{10}	2.81E-05
Filterable $PM_{2.5}$	4.26E-06

1. PM emission factor for receiving and storage calculated using continuous drop point equation from AP-42, Section 13.2.4 Aggregate Handling and Storage Piles (11/06).

PM Emission Factor (lb/ton) = $[k * (0.0032) * (U/5)^{1.3}] / (M/2)^{1.4}$

k - PM	0.74	Particle size multiplier for PM_{30} per AP-42, Section 13.2.4-4 (11/06).
k - PM_{10}	0.35	Particle size multiplier for PM_{10} per AP-42, Section 13.2.4-4 (11/06).
k - $PM_{2.5}$	0.053	Particle size multiplier for $PM_{2.5}$ per AP-42, Section 13.2.4.3.
M (%)	40	Moisture content indicated on moisture balance.
U	7.400	Based on EPA's TANKS 4.09d Database for Athens, GA.

Table C-4. Potential Emissions from Raw Material Handling

Emission Source	Potential Emissions[1]					
	Filterable PM		Filterable PM_{10}		Filterable $PM_{2.5}$	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Truck Unloading	7.47E-03	3.27E-02	3.53E-03	1.55E-02	5.35E-04	2.34E-03
Whole Log Pile	7.47E-03	3.27E-02	3.53E-03	1.55E-02	5.35E-04	2.34E-03
Drum Debarker	7.47E-03	3.27E-02	3.53E-03	1.55E-02	5.35E-04	2.34E-03
Chipper	7.47E-03	3.27E-02	3.53E-03	1.55E-02	5.35E-04	2.34E-03

1. Potential Emissions are calculated as follows:
Potential Emissions (tons/year) = Emission Factor (lb/ton) * Annual Throughput (tons/year) / 2,000 (lbs/ton)
Potential Emissions (lb/hour) = Emission Factor (lb/ton) * Annual Throughput (tons/year) / Annual Operation (hours/year)
Annual operation assumes 8,760 hours/year of operation

Table C-5. Green Chip Receiving, Processing, and Storage Operating Parameters

Emission Source	Annual Throughput (tons/year)[1]
Truck Unloading	435,000
Wood Chip Pile	435,000
Green Chip Screening	435,000

1. Annual throughput based on capacity of green residuals processing system.

Table C-6. Raw Material Handling Emission Factors

Pollutant	Emission Factor[1] (lb/ton)
Filterable PM	5.95E-05
Filterable PM_{10}	2.81E-05
Filterable $PM_{2.5}$	4.26E-06

1. PM emission factor for receiving and storage calculated using continuous drop point equation from AP-42, Section 13.2.4 Aggregate Handling and Storage Piles (11/06).

PM Emission Factor (lb/ton) $= [k * (0.0032) * (U/5)^{1.3}] / (M/2)^{1.4}$

k - PM	0.74	Particle size multiplier for PM_{30} per AP-42, Section 13.2.4-4 (11/06).
k - PM_{10}	0.35	Particle size multiplier for PM_{10} per AP-42, Section 13.2.4-4 (11/06).
k - $PM_{2.5}$	0.053	Particle size multiplier for $PM_{2.5}$ per AP-42, Section 13.2.4.3.
M (%)	40	Moisture content indicated on moisture balance.
U	7.400	Based on EPA's TANKS 4.09d Database for Athens, GA.

Table C-7. Potential Emissions from Raw Material Handling

Emission Source	Potential Emissions[1]					
	Filterable PM		Filterable PM_{10}		Filterable $PM_{2.5}$	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Truck Unloading	2.95E-03	1.29E-02	1.40E-03	6.12E-03	2.11E-04	9.26E-04
Wood Chip Pile	2.95E-03	1.29E-02	1.40E-03	6.12E-03	2.11E-04	9.26E-04
Green Chip Screening	2.95E-03	1.29E-02	1.40E-03	6.12E-03	2.11E-04	9.26E-04

1. Potential Emissions are calculated as follows:
   Potential Emissions (tons/year) = Emission Factor (lb/ton) * Annual Throughput (tons/year) / 2,000 (lbs/ton)
   Potential Emissions (lb/hour) = Emission Factor (lb/ton) * Annual Throughput (tons/year) / Annual Operation (hours/year)
   Annual operation assumes 8,760 hours/year of operation

Table C-8. Green Hammermills Operating Parameters

Emission Source	Annual Throughput (tons/year)[1]
Green Hammermills	337,968

1. Annual throughput of green residuals that require processing through the green hammermill, based on capacity of green hammermill.

Table C-9. Green Hammermills Dust Collector Control Device Operating Parameters and Potential PM Emissions

Control Device	Flow Rate (dscfm)[1]	Loading Rate (gr/dscf)[1]	Potential Emissions[2] Filterable $PM/PM_{10}/PM_{2.5}$ (lb/hr)	(tpy)
Green Hammermill Filters	3,000	0.010	0.26	1.13

1. Flowrate provided by Nexus PMG. Loading rate assumed.
2. Potential emissions are calculated as follows:
   Potential Emissions (lb/hour) = Flowrate (dscfm) * 60 (mins/hr) * Pollutant Loading (grs/dscf) / 7,000 (gr/lb)
   Potential Emissions (tons/year) = Potential Emissions (lb/hour) * Annual Operation (hours/year) / 2,000 (lbs/ton)
   Where annual emissions assume 8,760 hours of operation per year for conservatism.

Table C-10. Green Hammermills Potential VOC and HAP Emissions

Pollutant	Emission Factor (lb/ton)	Control Efficiency[6] (%)	Potential Emissions[7] (lb/hr)	(tpy)
VOC[1]	1.08	95%	2.08	9.11
Acetaldehyde[2]	4.00E-03	95%	0.01	0.03
Formaldehyde[2]	8.00E-03	95%	0.02	0.07
Methanol[2]	4.00E-03	95%	0.01	0.03
Acrolein[3]	1.08E-02	95%	0.02	0.09
Phenol[4]	4.50E-03	95%	0.01	0.04
Propionaldehyde[3]	1.88E-02	95%	0.04	0.16
Total HAP[5]	-		0.10	0.42

1. Emission factor from Westervelt wet classisizers testing. Emissions from the Westervelt wet classisizers were controlled with an RTO; therefore, the uncontrolled emission factor was taken by back-calculating the controlled emission factor assuming a 95% control efficiency and a 10% safety factor applied.
2. Emission factors from GA EPD guidance for Hammermills at Wood Pellets Facilities.
3. Emission factors for a dry hammermill from Enviva Sampson (NC) permit application.
4. Emission factor from AP-42 Section 10.6.2, Table 10.6.2-7 for a hammermill. Emission factors for other pollutants are non-detect.
5. Total HAP is the sum of all individual HAP emissions.
6. Per GA EPD guidance for storage/handling at Wood Pellets Facilities, a 95% DRE is applied for VOC and HAP emissions routed to an oxidizer. The green hammermill will be routed to the RCO.
7. Potential emissions are calculated as follows:
   Potential Emissions (lb/hour) = Potential Emissions (tpy) * 2,000 (lb/ton) / Annual Operation (hr/yr)
   Potential Emissions (tons/year) = Emission Factor (lb/ton) * (1 - Control Efficiency (%)) * Annual Throughput (tons/year) / 2,000 (lbs/ton)

Table C-11. Dryer Operating Parameters

Parameter[1]	Value	Units
Potential Operation	8,760	hr/yr
Annual Chip Throughput	497,000	ODT/yr

1. Annual throughput calculated based on throughput of pellets produced per year.

Table C-12. Dryer Potential Criteria Pollutant and GHG Emissions

Pollutant	Wood Drying Emission Factor[1] (lb/ODT)	WESP Control Efficiency (%)	RTO Control Efficiency (%)	Potential Emissions[2] (lb/hr)	(tpy)
CO[3]	5.30	-	50%	45.8	200.60
NO_X[3]	2.70	-	-	52.8	231.26
Filterable PM[3]	2.20	90%	-	5.3	23.00
Condensable PM	1.10	90%	-	6.2	27.34
Total PM_{10}[4]	3.30	90%	-	11.5	50.33
Total $PM_{2.5}$[4]	3.30	90%	-	11.5	50.33
SO_2	-	-	-	0.0	0.00
VOC[3]	6.00	-	95%	12.8	56.06

1. Emission factors for wood drying are the recommended uncontrolled emission factors from GA EPD for a rotary dryer, direct wood-fired processing green softwood at a Wood Pellet Manufacturing facility. Please note that the filterable PM factor is conservative as EPD guidance states that 2.2 lb/ODT is for total PM, but AP-42 Table 10.6.2-1 states that it is only filterable PM.
2. Potential emissions are calculated as follows:
Potential Emissions (tpy) = [Wood Drying EF (lb/ODT) * Dryer Capacity (ODT/yr)] * [100% - Control efficiency (%)]
Potential Emissions (lb/hr) = Potential Emissions (tpy) / Annual Operation (hr/yr) * 2,000 (lb/ton)
3. Potential Emissions for these pollutants are based on Vendor Guarantees for the Dryer/RTO system.
4. Emission factors for Total PM_{10} and Total $PM_{2.5}$ are the sum of the filterable and condensable components. It is conservatively assumed that filterable PM = filterable PM_{10} = filterable $PM_{2.5}$.

Table C-13. Dryer Potential HAP Emissions

Pollutant	Wood Drying Emission Factor (lb/ODT)	Control Efficiency[1] (%)	Potential Emissions[2] (lb/hr)	(tpy)
Acetaldehyde[3]	1.10E-01	95%	3.12E-01	1.37E+00
Acrolein[4]	2.30E-02	95%	6.52E-02	2.86E-01
Formaldehyde[3]	1.40E-01	95%	3.97E-01	1.74E+00
HCl[3]	1.90E-02	70%	3.23E-01	1.42E+00
Methanol[3]	1.10E-01	95%	3.12E-01	1.37E+00
Phenol[4]	2.80E-02	95%	7.94E-02	3.48E-01
Propionaldehyde[4]	1.30E-02	95%	3.69E-02	1.62E-01
Total HAP[5]			**1.53**	**5.00**

1. Organic HAP emissions are controlled by an RTO, thus a 95% control efficiency has been applied to all organic HAP. A 70% removal efficiency is used for HCl as a WESP is used for PM control based on recommendations from GA EPD for a direct wood fired dryer processing green softwood at a Wood Pellet Manufacturing facility.
2. Potential emissions are calculated as follows:
Potential Emissions (tpy) = [Wood Drying EF (lb/ODT) * Dryer Capacity (ODT/yr)] * [100% - Control efficiency (%)]
Potential Emissions (lb/hr) = Potential Emissions (tpy) / Annual Operation (hr/yr) * 2,000 (lb/ton)

Table C-14. RTO Operating Parameters

Parameter[1]	Value	Units
Unit Heat Input	32.00	MMBtu/hr
Potential Operation	8,760	hr/yr
Natural Gas Heating Value	1,020	Btu/scf
Natural Gas Combustion Limit	275	MMscf/yr

1. Operating parameters provided by Nexus PMG.

Table C-15. RTO Burners Potential Criteria and HAP Pollutant Emissions

Pollutant	Uncontrolled Emission Factor[1] (lb/MMscf)	Control Efficiency[2]	Potential Emissions[3] (lb/hr)	(tpy)
CO[4]	84	50%	--	--
NO_X[4]	100	--	--	--
Filterable PM[4]	1.90	--	--	--
Condensable PM	5.70	--	0.18	0.78
Total PM	7.60	--	0.24	1.04
Total PM_{10}[5]	7.60	--	0.24	1.04
Total $PM_{2.5}$[5]	7.60	--	0.24	1.04
SO_2[4]	0.6	--	--	--
VOC[4]	5.5	95%	--	--
Lead	5.00E-04	--	1.57E-05	6.87E-05
CH_4	2.3	--	0.07	0.32
N_2O	2.2	--	0.07	0.30
CO_2	120,000	--	3,765	16,489
CO_2e[6]	120,713	--	3,787	16,587
HAP Emissions				
Arsenic Compounds	2.00E-04	--	6.27E-06	2.75E-05
Benzene	2.10E-03	95%	3.29E-06	1.44E-05
Beryllium Compounds	1.21E-05	--	3.80E-07	1.66E-06
Cadmium	1.10E-03	--	3.45E-05	1.51E-04
Chromium Compounds	1.40E-03	--	4.39E-05	1.92E-04
Cobalt Compounds(CoC)	8.40E-05	--	2.64E-06	1.15E-05
Formaldehyde	7.50E-02	95%	1.18E-04	5.15E-04
Hexane	1.80E+00	95%	0.00	0.01
Lead	5.00E-04	--	1.57E-05	6.87E-05
Manganese	3.80E-04	--	1.19E-05	5.22E-05
Mercury	2.60E-04	--	8.16E-06	3.57E-05
Naphthalene	6.10E-04	95%	9.57E-07	4.19E-06
Nickel Compounds	2.10E-03	--	6.59E-05	2.89E-04
Selenium Compounds	2.40E-05	--	7.53E-07	3.30E-06
Toluene(Methylbenzene)	3.40E-03	95%	5.33E-06	2.34E-05
*Polycyclic Organic Matter (POM) * Polycyclic Aromatic Compounds (PAC)***				
2-Methylnaphthalene*	2.40E-05	95%	3.76E-08	1.65E-07
3-Methylchloranthrene**	1.80E-06	95%	2.82E-09	1.24E-08
7,12-Dimethylbenzo(a)anthracene**	1.60E-05	95%	2.51E-08	1.10E-07
Acenaphthene*	1.80E-06	95%	2.82E-09	1.24E-08
Acenaphthylene*	1.80E-06	95%	2.82E-09	1.24E-08
Anthracene*	2.40E-06	95%	3.76E-09	1.65E-08
Benzo(a)anthracene**	1.80E-06	95%	2.82E-09	1.24E-08
Benzo(a)pyrene**	1.20E-06	95%	1.88E-09	8.24E-09
Benzo(b)fluoranthene**	1.80E-06	95%	2.82E-09	1.24E-08
Benzo(k)fluoranthene)**	1.80E-06	95%	2.82E-09	1.24E-08
Benzo(g,h,i)perylene*	1.20E-06	95%	1.88E-09	8.24E-09
Chrysene(Benzo(a)phenanthrene)**	1.80E-06	95%	2.82E-09	1.24E-08
Dibenzo(a,h)anthracene**	1.20E-06	95%	1.88E-09	8.24E-09
Fluoranthene*	3.00E-06	95%	4.71E-09	2.06E-08
Fluorene*	2.80E-06	95%	4.39E-09	1.92E-08
Indeno(1,2,3-cd)pyrene**	1.80E-06	95%	2.82E-09	1.24E-08
Phenanathrene*	1.70E-05	95%	2.67E-08	1.17E-07
Pyrene*	5.00E-06	95%	7.84E-09	3.44E-08
			Total HAP	**0.01**

1. Uncontrolled emission factors for natural gas combustion from AP-42, Section 1.4 - Natural Gas Combustion, Table 1.4-1,3 (9/03).
2. The RTO is assumed to control VOC and Organic HAP with 95% efficiency, and is assumed to control CO with 50% efficiency.
3. Potential emissions are calculated as follows:
Potential Emissions (lb/hr) = [Natural Gas Combustion EF (lb/MMBtu) * Heat Input Capacity (MMBtu/hr)] * (1 - Control efficiency (%))
Potential Emissions (tpy) = Hourly emissions (lb/hr) * Operation (hr/yr) / 2,000 (lb/ton)
4. Emissions for these pollutants are included with the dryer emissions, as the manufacturer guarantee is for emissions exiting the RTO stack.
5. Emission factors for Total PM_{10} and Total $PM_{2.5}$ are the sum of the filterable and condensable components. It is conservatively assumed that filterable PM = filterable PM_{10} = filterable $PM_{2.5}$.
6. CO_2e is calculated using Global Warming Potentials (GWPs) from 40 CFR Part 98, Subpart A, Table A-1 effective January 1, 2014. GWPs used for CO_2, CH_4, and N_2O are listed below.

CO_2	1
CH_4	25
N_2O	298

Table C-16. Tar Buildup Control Operating Parameters

Parameter[1]	Value	Units
Heat Input Capacity	5	MMBtu/hr
Natural Gas Usage	4.90E-03	MMscf/hr
Potential Operation	8,760	hr/yr

1. Operating parameters provided by Nexus PMG.

Table C-17. Tar Buildup Control Potential Criteria Pollutant and GHG Emissions

Pollutant	Natural Gas Combustion Emission Factor[1] (lb/MMscf)	Control Efficiency[2] (%)	Potential Emissions[3] (lb/hr)	(tpy)
CO	84	50%	0.21	0.90
NO_X	100	-	0.49	2.15
Filterable PM	1.9	-	0.01	0.04
Condensable PM	5.7	-	0.03	0.12
Total PM	7.6	-	0.04	0.16
Total PM_{10}[4]	7.6	-	0.04	0.16
Total $PM_{2.5}$[4]	7.6	-	0.04	0.16
SO_2	0.6	-	2.94E-03	0.01
VOC	5.5	95%	1.35E-03	5.90E-03
CH_4	2.30	-	0.01	0.05
N_2O	2.20	-	0.01	0.05
CO_2	120,000	-	588	2,576
CO_2e[5]	120,713	-	592	2,592

1. Uncontrolled emission factors for natural gas combustion from AP-42, Section 1.4 - Natural Gas Combustion, Table 1.4-1,3 (9/03).
2. The RTO is assumed to control VOC with 95% efficiency and CO with 50% efficiency.
3. Potential emissions are calculated as follows:
Potential Emissions (lb/hr) = { [Natural Gas Combustion EF (lb/MMscf) * Heat Input Capacity (MMscf/hr)] + [Wood Drying EF (lb/ODT) * Dryer Capacity (ODT/hr)] } * [100% - Control efficiency (%)]
Potential Emissions (tpy) = Potential Emissions (lb/hr) * Annual Operation (hr/yr) / 2,000 (lb/ton)
4. Emission factors for Total PM_{10} and Total $PM_{2.5}$ are the sum of the filterable and condensable components. It is conservatively assumed that filterable PM = filterable PM_{10} = filterable $PM_{2.5}$.
5. CO_2e is calculated using Global Warming Potentials (GWPs) from 40 CFR Part 98, Subpart A, Table A-1 effective January 1, 2014. GWPs used for CO_2, CH_4, and N_2O are listed below.

CO_2	1
CH_4	25
N_2O	298

Table C-18. Tar Buildup Control Burner Potential HAP Emissions

Pollutant	Natural Gas Combustion Emission Factor[1] (lb/MMscf)	Control Efficiency[2] (%)	Potential Emissions[3] (lb/hr)	(tpy)
Arsenic Compounds	2.10E-03		1.03E-05	4.51E-05
Benzene	2.10E-03	95%	5.15E-07	2.25E-06
Beryllium Compounds	1.21E-05		5.93E-08	2.60E-07
Cadmium	1.10E-03		5.39E-06	2.36E-05
Chromium Compounds	1.40E-03		6.86E-06	3.01E-05
Cobalt Compounds(CoC)	8.40E-05		4.12E-07	1.80E-06
Formaldehyde	7.50E-02	95%	1.84E-05	8.05E-05
Hexane	1.80E+00	95%	4.41E-04	1.93E-03
Lead	5.00E-04		2.45E-06	1.07E-05
Manganese	3.80E-04		1.86E-06	8.16E-06
Mercury	2.60E-04		1.27E-06	5.58E-06
Naphthalene	6.10E-04	95%	1.50E-07	6.55E-07
Nickel Compounds	2.10E-03		1.03E-05	4.51E-05
Selenium Compounds	2.40E-05		1.18E-07	5.15E-07
Toluene(Methylbenzene)	3.40E-03	95%	8.33E-07	3.65E-06
*Polycyclic Organic Matter (POM) * Polycyclic Aromatic Compounds (PAC)***				
2-Methylnaphthalene*	2.40E-05	95%	5.88E-09	2.58E-08
3-Methylchloranthrene**	1.80E-06	95%	4.41E-10	1.93E-09
7,12-Dimethylbenzo(a)anthracene**	1.60E-05	95%	3.92E-09	1.72E-08
Acenaphthene*	1.80E-06	95%	4.41E-10	1.93E-09
Acenaphthylene*	1.80E-06	95%	4.41E-10	1.93E-09
Anthracene*	2.40E-06	95%	5.88E-10	2.58E-09
Benzo(a)anthracene**	1.80E-06	95%	4.41E-10	1.93E-09
Benzo(a)pyrene**	1.20E-06	95%	2.94E-10	1.29E-09
Benzo(b)fluoranthene**	1.80E-06	95%	4.41E-10	1.93E-09
Benzo(k)fluoranthene)**	1.80E-06	95%	4.41E-10	1.93E-09
Benzo(g,h,i)perylene*	1.20E-06	95%	2.94E-10	1.29E-09
Chrysene(Benzo(a)phenanthrene)**	1.80E-06	95%	4.41E-10	1.93E-09
Dibenzo(a,h)anthracene**	1.20E-06	95%	2.94E-10	1.29E-09
Fluoranthene*	3.00E-06	95%	7.35E-10	3.22E-09
Fluorene*	2.80E-06	95%	6.86E-10	3.01E-09
Indeno(1,2,3-cd)pyrene**	1.80E-06	95%	4.41E-10	1.93E-09
Phenanathrene*	1.70E-05	95%	4.17E-09	1.83E-08
Pyrene*	5.00E-06	95%	1.23E-09	5.37E-09
Total HAP			**5.00E-04**	**2.19E-03**

1. Uncontrolled emission factors for natural gas combustion from AP-42, Section 1.4 - Natural Gas Combustion, Table 1.4-1,3 (9/03).
2. Organic HAP emissions are controlled by an RTO, thus a 95% control efficiency has been applied to all organic HAP.
3. Potential emissions are calculated as follows:
Emissions (lb/hr) = [Natural Gas Combustion EF (lb/MMBtu) × Heat Input Capacity (MMBtu/hr)] × (1 - Control efficiency (%))
Emissions (tpy) = Hourly emissions (lb/hr) × Operation (hr/yr) / 2,000 (lb/ton)

Table C-19. Dry Material Storage Operating Parameters

Emission Source	Annual Throughput (tons/year)[1]
Dry Chip Storage	497,000

1. Throughput based on amount of finished pellets.

Table C-20. Raw Material Handling Emission Factors

Pollutant	Emission Factor[1] (lb/ton)
Filterable PM	5.95E-05
Filterable PM_{10}	2.81E-05
Filterable $PM_{2.5}$	4.26E-06

1. PM emission factor for receiving and storage calculated using continuous drop point equation from AP-42, Section 13.2.4 Aggregate Handling and Storage Piles (11/06).

PM Emission Factor (lb/ton) = $[k * (0.0032) * (U/5)^{1.3}] / (M/2)^{1.4}$

k - PM	0.74	Particle size multiplier for PM_{30} per AP-42, Section 13.2.4-4 (11/06).
k - PM_{10}	0.35	Particle size multiplier for PM_{10} per AP-42, Section 13.2.4-4 (11/06).
k - $PM_{2.5}$	0.053	Particle size multiplier for $PM_{2.5}$ per AP-42, Section 13.2.4.3.
M (%)	40	Moisture content indicated on moisture balance.
U	7.400	Based on EPA's TANKS 4.09d Database for Athens, GA.

Table C-21. Potential Emissions from Raw Material Handling

Emission Source	Potential Emissions[1]					
	Filterable PM		Filterable PM_{10}		Filterable $PM_{2.5}$	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Dry Chip Storage	3.37E-03	1.48E-02	1.60E-03	6.99E-03	2.42E-04	1.06E-03

1. Potential Emissions are calculated as follows:
Potential Emissions (tons/year) = Emission Factor (lb/ton) * Annual Throughput (tons/year) / 2,000 (lbs/ton)
Potential Emissions (lb/hour) = Emission Factor (lb/ton) * Annual Throughput (tons/year) / Annual Operation (hours/year)
Annual operation assumes 8,760 hours/year of operation

Table C-22. Dry Chip Storage Potential VOC and HAP Emissions

Pollutant	Emission factor (lb/ton)	Potential Emissions[5] (lb/hr)	(tpy)
VOC[1]	0.12	6.81	29.82
Acetaldehyde[2]	1.00E-03	0.06	0.25
Formaldehyde[2]	2.00E-03	0.11	0.50
Methanol[1]	1.95E-03	0.11	0.48
Total HAP[3,4]	-	0.28	1.23

1. Emission factors from Enviva Pellets Sampson (NC) permit application, pursuant to the mean emission factors from NCASI's Wood Products Database (February 2013) for dry wood handling operations at an OSB mill. Factors converted from lb/MSF to lb/ODT using the typical density and moisture content of an OSB panel, per the Enviva application.
2. Emission factors from GA EPD guidance for storage/handling at Wood Pellets Facilities.

3. Pursuant to information included in the Enviva Pellets Sampson (NC) permit application and NCASI emission factors referenced, the individual HAP quantified from NCASI include formaldehyde and methanol. The worst-case emission factors between the NCASI Wood Products Emission Factors and Georgia EPD guidance were used to quantify HAP emissions. Emissions of individual HAP beyond those listed are not expected to be emitted.
4. Total HAP is the sum of all individual HAP emissions.
5. Potential emissions are quantified for the entire dry chip storage process at the Adel facility using the potential facility production rate of 497,000 short tons/yr for all storage silos, and not at each individual storage bin or silo. Potential emissions are calculated as follows:
Potential Emissions (lb/hour) = Potential Emissions (tpy) * 2,000 (lb/ton) / Annual Operation (hr/yr)
Potential Emissions (tons/year) = Emission Factor (lb/ton) * (1 - Control Efficiency (%)) * Annual Throughput (tons/year) / 2,000 (lbs/ton)
Where annual emissions assume 8,760 hours of operation per year for conservatism.

Table C-23. Pelletizing Operating Parameters

Emission Source	Annual Throughput[1]	Units
Total Capacity		
Dry Hammermills	246,234	tons/year
Pellet Mills	497,000	tons/year
Pellet Coolers	497,000	tons/year
Volumetric Capacity		
Pellet Density[2]	40	lb/ft^3
Pellet Mill Nos. 1 - 3[3]	24,850,000	ft^3/year
Pellet Cooler Nos. 1 - 3[3]	24,850,000	ft^3/year

1. Annual throughput baesd on finished pellet production capacity.
2. Pellet density assumed based on industry information.
3. Potential volume throughput estimated as follows: Potential Mass Throughput (tons/year) * 2,000 (lb/ton) / Pellet Density (lb/ft^3)

Table C-24. Hammermill and Pellet Mill/Cooler Dust Collector Control Device Operating Parameters and Potential PM Emissions

Control Device	Flow Rate (dscfm)[1]	Loading Rate (gr/dscf)[1]	Potential Emissions[2] Filterable $PM/PM_{10}/PM_{2.5}$ (lb/hr)	(tpy)
Dry Hammermill Cyclones	28,080	0.010	2.41	10.54
Pellet Mill/Cooler Cyclones	90,000	0.010	7.71	33.79

1. Flowrate provided by Nexus PMG. Loading rate assumed.
2. Potential emissions are calculated as follows:
   Potential Emissions (lb/hour) = Flowrate (dscfm) * 60 (mins/hr) * Pollutant Loading (grs/dscf) / 7,000 (gr/lb)
   Potential Emissions (tons/year) = Potential Emissions (lb/hour) * Annual Operation (hours/year) / 2,000 (lbs/ton)
   Where annual emissions assume 8,760 hours of operation per year for conservatism.

Table C-25. Hammermills Potential VOC and HAP Emissions

Pollutant	Factor (lb/ton)	Control Efficiency[5] (%)	Potential Emissions[6] (lb/hr)	(tpy)
VOC[1]	2.5	95%	3.51	15.39
Acetaldehyde[1]	4.00E-03	95%	0.01	0.02
Formaldehyde[1]	8.00E-03	95%	0.01	0.05
Methanol[1]	4.00E-03	95%	0.01	0.02
Acrolein[2]	7.80E-03	95%	0.01	0.05
Phenol[3]	4.50E-03	95%	0.01	0.03
Propionaldehyde[2]	3.00E-03	95%	0.00	0.02
Total HAP[4]	-		0.04	0.19

1. Emission factors from GA EPD guidance for Hammermills at Wood Pellets Facilities. Emissions are quantified from the overall hammermilling processes (total throughput), not individually by each component. Therefore, annual emissions are based on the annual throughputs through the overall hammermilling process.
2. Emission factors from Enviva dry hammermill testing as the maximum test result. Emissions are quantified from the overall hammermilling processes (total throughput), not individually by each component. Therefore, annual emissions are based on the annual throughputs through the overall hammermilling process.
3. Emission factors from AP-42 Section 10.6.2-7 for a hammermill. Emissions are quantified from the overall hammermilling processes (total throughput), not individually by each component. Therefore, annual emissions are based on the annual throughputs through the overall hammermilling process.
4. Total HAP is the sum of all individual HAP emissions.
5. Per GA EPD guidance for storage/handling at Wood Pellets Facilities, a 95% DRE is applied for VOC and HAP emissions routed to an RTO. Emissions from the dry hammermills will be routed to the dryer and will be treated through the RTO.
6. Potential emissions are calculated as follows:
   Potential Emissions (lb/hour) = Potential Emissions (tpy) * 2,000 (lb/ton) / Annual Operation (hr/yr)
   Potential Emissions (tons/year) = Emission Factor (lb/ton) * (1 - Control Efficiency (%)) * Annual Throughput (tons/year) / 2,000 (lbs/ton)
   Where annual emissions assume 8,760 hours of operation per year for conservatism.

Table C-26. Pellet Mills and Pellet Coolers Potential VOC and HAP Emissions

Pollutant	factor (lb/ton)	Units	Control Efficiency[5] (%)	Potential Emissions[6] (lb/hr)	(tpy)
VOC[1]	0.50	lb/ton	95%	1.42	6.21
Acetaldehyde[1]	1.00E-03	lb/ton	95%	0.00	0.01
Formaldehyde[1]	2.00E-03	lb/ton	95%	0.01	0.02
Methanol[1]	1.00E-03	lb/ton	95%	0.00	0.01
Acrolein[2]	5.84E-06	lb/ft^3	95%	8.29E-04	0.00
Phenol[2]	1.07E-04	lb/ft^3	95%	0.02	0.07
Propionaldehyde[3]	1.08E-02	lb/ton	95%	0.03	0.13
Total HAP[4]	-	-		0.06	0.25

1. Emission factors from GA EPD guidance for pelletizers and pellet mills (without steam injection or extraction) at Wood Pellets Facilities. Emissions are quantified from the overall pelletizing and pellet milling processes, not individually by each component. Therefore, annual emissions are based on the annual throughputs through the overall pelletizing and pellet milling process.

2. Uncontrolled emission factors from AP-42 Section 10.6.2 (Particleboard Manufacturing) Table 10.6.2-6, Board Cooler, UF resin (06/02). Emission factors are converted from lb/MSF to lb/ft3 using the conversion (0.26 kg/m3 = 1 lb/MSF 3/4) provided in Footnote a of Table 10.6.2-6.

Factor Conversion 0.26 kg/m3 = 0.016 lb/ft3

3. Emission factors from Enviva Pellets Sampson (NC) permit application from pellet mill/pellet cooler testing.
4. Total HAP is the sum of all individual HAP emissions.
5. Per GA EPD guidance for storage/handling at Wood Pellets Facilities, a 95% DRE is applied for VOC and HAP emissions routed to an RTO. Emissions from the pellet mills and pellet coolers will be routed to the dryer and will be treated through the RTO.
6. Potential emissions are calculated as follows:
   Potential Emissions (lb/hour) = Potential Emissions (tpy) * 2,000 (lb/ton) / Annual Operation (hr/yr)
   Potential Emissions (tons/year) = Emission Factor (lb/ton) * (1 - Control Efficiency (%)) * Annual Throughput (tons/year) / 2,000 (lbs/ton)
   Potential Emissions (tons/year) = Emission Factor (lb/ft^3) * Annual Volumetric Throughput (ft^3/year) / 2,000 (lbs/ton)
   Where annual emissions assume 8,760 hours of operation per year for conservatism.

Table C-27. Pellet Storage & Loadout Operating Parameters

Emission Source	Annual Throughput (tons/year)[1]
Pellet Storage	497,000

1. Throughput based on production of finished pellets.

Table C-28. Pellet Storage/Loadout Dust Collector Control Device Operating Parameters and Potential PM Emissions

Control Device	Flow Rate (dscfm)[1]	Loading Rate (gr/dscf)[1]	Potential Emissions[2] Filterable PM/PM_{10}/$PM_{2.5}$ (lb/hr)	(tpy)
Pellet Storage and Loadout	5,000	0.010	0.43	1.88

1. Flowrate provided by Nexus PMG. Loading rate assumed.
2. Potential emissions are calculated as follows:
   Potential Emissions (lb/hour) = Flowrate (dscfm) * 60 (mins/hr) * Pollutant Loading (grs/dscf) / 7,000 (gr/lb)
   Potential Emissions (tons/year) = Potential Emissions (lb/hour) * Annual Operation (hours/year) / 2,000 (lbs/ton)
   Where annual emissions assume 8,760 hours of operation per year for conservatism.

Table C-29. Pellet Storage Potential VOC and HAP Emissions

Pollutant	Emission factor	Potential Emissions[5] (lb/hr)	(tpy)
VOC[1]	0.40	22.69	99.40
Acetaldehyde[1]	1.00E-03	0.06	0.25
Formaldehyde[1]	2.00E-03	0.11	0.50
Methanol[1]	1.00E-03	0.06	0.25
Total HAP[2,3]	-	0.23	0.99

1. Emission factors from GA EPD guidance for pellet storage/handling at Wood Pellets Facilities. Holding time in the silos will be a maximum of 12 hours.
2. Individual HAP quantified are the only HAP expected from material storage.
3. Total HAP is the sum of all individual HAP emissions.
4. Emissions are quantified for all material storage and handling. Although VOC and HAP emissions can be released throughout the material handling and storage process, the total amount of emissions are included here. Potential emissions are calculated as follows:
   Potential Emissions (lb/hour) = Potential Emissions (tpy) * 2,000 (lb/ton) / Annual Operation (hr/yr)
   Potential Emissions (tons/year) = Emission Factor (lb/ton) * Annual Throughput (tons/year) / 2,000 (lbs/ton)
   Where annual emissions assume 8,760 hours of operation per year for conservatism.

Table C-30. RCO Operating Parameters

Parameter[1]	Value	Units
Unit Heat Input	32.00	MMBtu/hr
Potential Operation	8,760	hr/yr
Natural Gas Heating Value	1,020	Btu/scf
Natural Gas Combustion Limit	275	MMscf/yr

1. Operating parameters provided by Nexus PMG.

Table C-31. RCO Burners Potential Criteria and HAP Pollutant Emissions

Pollutant	Natural Gas Uncontrolled Emission Factor[1] (lb/MMscf)	Control Efficiency[2]	Potential Emissions[3] (lb/hr)	Potential Emissions[3] (tpy)
CO	84	50%	1.32	5.77
NO_X	100	--	3.14	13.74
Filterable PM	1.90	--	0.06	0.26
Condensable PM	5.70	--	0.18	0.78
Total PM	7.60	--	0.24	1.04
Total PM_{10}[4]	7.60	--	0.24	1.04
Total $PM_{2.5}$[4]	7.60	--	0.24	1.04
SO_2	0.6	--	0.02	0.08
VOC	5.5	95%	8.63E-03	0.04
Lead	5.00E-04	--	1.57E-05	6.87E-05
CH_4	2.3	--	0.07	0.32
N_2O	2.2	--	0.07	0.30
CO_2	120,000	--	3,765	16,489
CO_2e[5]	120,713	--	3,787	16,587
HAP Emissions				
Arsenic Compounds	2.00E-04	--	6.27E-06	2.75E-05
Benzene	2.10E-03	95%	3.29E-06	1.44E-05
Beryllium Compounds	1.21E-05	--	3.80E-07	1.66E-06
Cadmium	1.10E-03	--	3.45E-05	1.51E-04
Chromium Compounds	1.40E-03	--	4.39E-05	1.92E-04
Cobalt Compounds(CoC)	8.40E-05	--	2.64E-06	1.15E-05
Formaldehyde	7.50E-02	95%	1.18E-04	5.15E-04
Hexane	1.80E+00	95%	0.00	0.01
Lead	5.00E-04	--	1.57E-05	6.87E-05
Manganese	3.80E-04	--	1.19E-05	5.22E-05
Mercury	2.60E-04	--	8.16E-06	3.57E-05
Naphthalene	6.10E-04	95%	9.57E-07	4.19E-06
Nickel Compounds	2.10E-03	--	6.59E-05	2.89E-04
Selenium Compounds	2.40E-05	--	7.53E-07	3.30E-06
Toluene(Methylbenzene)	3.40E-03	95%	5.33E-06	2.34E-05
*Polycyclic Organic Matter (POM) * Polycyclic Aromatic Compounds (PAC)***				
2-Methylnaphthalene*	2.40E-05	95%	3.76E-08	1.65E-07
3-Methylchloranthrene**	1.80E-06	95%	2.82E-09	1.24E-08
7,12-Dimethylbenzo(a)anthracene**	1.60E-05	95%	2.51E-08	1.10E-07
Acenaphthene*	1.80E-06	95%	2.82E-09	1.24E-08
Acenaphthylene*	1.80E-06	95%	2.82E-09	1.24E-08
Anthracene*	2.40E-06	95%	3.76E-09	1.65E-08
Benzo(a)anthracene**	1.80E-06	95%	2.82E-09	1.24E-08
Benzo(a)pyrene**	1.20E-06	95%	1.88E-09	8.24E-09
Benzo(b)fluoranthene**	1.80E-06	95%	2.82E-09	1.24E-08
Benzo(k)fluoranthene)**	1.80E-06	95%	2.82E-09	1.24E-08
Benzo(g,h,i)perylene*	1.20E-06	95%	1.88E-09	8.24E-09
Chrysene(Benzo(a)phenanthrene)**	1.80E-06	95%	2.82E-09	1.24E-08
Dibenzo(a,h)anthracene**	1.20E-06	95%	1.88E-09	8.24E-09
Fluoranthene*	3.00E-06	95%	4.71E-09	2.06E-08
Fluorene*	2.80E-06	95%	4.39E-09	1.92E-08
Indeno(1,2,3-cd)pyrene**	1.80E-06	95%	2.82E-09	1.24E-08
Phenanathrene*	1.70E-05	95%	2.67E-08	1.17E-07
Pyrene*	5.00E-06	95%	7.84E-09	3.44E-08
			Total HAP	**0.01**

1. Uncontrolled emission factors for natural gas combustion from AP-42, Section 1.4 - Natural Gas Combustion, Table 1.4-1,3 (9/03).
2. The RCO is assumed to control VOC and Organic HAP with 95% efficiency, and is assumed to control CO with 50% efficiency.
3. Potential emissions are calculated as follows:
Potential Emissions (lb/hr) = [Natural Gas Combustion EF (lb/MMBtu) * Heat Input Capacity (MMBtu/hr)] * (1 - Control efficiency (%))
Potential Emissions (tpy) = Hourly emissions (lb/hr) * Operation (hr/yr) / 2,000 (lb/ton)
4. Emission factors for Total PM_{10} and Total $PM_{2.5}$ are the sum of the filterable and condensable components. It is conservatively assumed that filterable PM = filterable PM_{10} = filterable $PM_{2.5}$.
5. CO_2e is calculated using Global Warming Potentials (GWPs) from 40 CFR Part 98, Subpart A, Table A-1 effective January 1, 2014. GWPs used for CO_2, CH_4, and N_2O are listed below.

CO_2	1
CH_4	25
N_2O	298

Table C-32. Emergency Fire Pump Operating Parameters

Parameter	Value	Units
Fuel	Diesel	
Maximum Power Output[1]	224	kW
Maximum Power Output[1]	300	hp
Potential Operation	500	hr/yr
Power Conversion[2]	7,000	Btu/hp-hr
Maximum Heat Input[3]	2.10	MMBtu/hr

1. Maximum power output based on regulatory requirements.
2. Conversion factor for diesel fuel as noted in AP-42, Section 3.3, Table 3.3-1 footnote.
3. Calculated as Power Conversion (Btu/hp-hr) * Power Output (hp) / 10^6 (Btu/MMBtu)

Table C-33. Emergency Fire Pump Potential Emissions

Pollutant	Emission Factor[1] (lb/hp-hr)	Emission Factor[1] (lb/MMBtu)	Potential Emissions[5,6] (lb/hr)	Potential Emissions[5,6] (tpy)
NO_X	3.10E-02	4.43	9.30	2.33
VOC	2.47E-03	0.35	0.74	0.19
CO	6.68E-03	0.95	2.00	0.50
Filterable PM	2.20E-03	0.31	0.66	0.17
Total PM[2]	2.20E-03	0.31	0.66	0.17
Total PM_{10}[2]	2.20E-03	0.31	0.66	0.17
Total $PM_{2.5}$[2]	2.20E-03	0.31	0.66	0.17
SO_2	2.05E-03	0.29	0.62	0.15
CO_2	1.15	164.3	345.00	86.25
CH_4[3]	4.63E-05	6.61E-03	1.39E-02	3.47E-03
N_2O[3]	9.26E-06	1.32E-03	2.78E-03	6.94E-04
CO_2e[4]	1.15	164.8	346.18	86.54
Acetaldehyde	5.37E-06	7.67E-04	1.61E-03	4.03E-04
Acrolein	6.48E-07	9.25E-05	1.94E-04	4.86E-05
Benzene	6.53E-06	9.33E-04	1.96E-03	4.90E-04
Formaldehyde	8.26E-06	1.18E-03	2.48E-03	6.20E-04
Toluene	2.86E-06	4.09E-04	8.59E-04	2.15E-04
Xylene (o)	2.00E-06	2.85E-04	5.99E-04	1.50E-04
Propylene	1.81E-05	2.58E-03	5.42E-03	1.35E-03
1,3-Butadiene	2.74E-07	3.91E-05	8.21E-05	2.05E-05
Naphthalene	5.94E-07	8.48E-05	1.78E-04	4.45E-05
Acenaphthylene	3.54E-08	5.06E-06	1.06E-05	2.66E-06
Acenaphthene	9.94E-09	1.42E-06	2.98E-06	7.46E-07
Fluorene	2.04E-07	2.92E-05	6.13E-05	1.53E-05
Phenanthrene	2.06E-07	2.94E-05	6.17E-05	1.54E-05
Anthracene	1.31E-08	1.87E-06	3.93E-06	9.82E-07
Fluoranthene	5.33E-08	7.61E-06	1.60E-05	4.00E-06
Pyrene	3.35E-08	4.78E-06	1.00E-05	2.51E-06
Benzo(a)anthracene	1.18E-08	1.68E-06	3.53E-06	8.82E-07
Chrysene	2.47E-09	3.53E-07	7.41E-07	1.85E-07
Benzo(b)fluoranthene	6.94E-10	9.91E-08	2.08E-07	5.20E-08
Benzo(k)fluoranthene	1.09E-09	1.55E-07	3.26E-07	8.14E-08
Benzo(a)pyrene	1.32E-09	1.88E-07	3.95E-07	9.87E-08
Indeno(1,2,3-cd)pyrene	2.63E-09	3.75E-07	7.88E-07	1.97E-07
Dibenzo(a,h)anthracene	4.08E-09	5.83E-07	1.22E-06	3.06E-07
Benzo(g,h,i)perylene	3.42E-09	4.89E-07	1.03E-06	2.57E-07
			Total HAP:	**3.39E-03**

1. Emission factors from AP-42 Section 3.3 (Gasoline and Diesel Industrial Engines), Table 3.3-1 and 3.3-2 (10/96).
2. All PM is assumed to have a diameter of less than one micron. Additionally, there is no CPM factor available; thus, PM = PM_{10} = $PM_{2.5}$.
3. CH_4 and N_2O factors are from 40 CFR Part 98, Table C-2 for petroleum fuels.
4 CO_2e is calculated using Global Warming Potentials (GWPs) from 40 CFR Part 98, Subpart A, Table A-1 effective January 1, 2014. GWPs used for CO_2, CH_4, and N_2O are

CO_2	1
CH_4	25
N_2O	298

5. Short-term emissions are calculated as follows:
Emissions (lb/hr) = Emission Factor (lb/hp-hr) * Engine Capacity (hp).
6. Annual emissions are calculated as follows:
Annual Emissions (tpy) = Hourly Emissions (lb/hr) * Annual Operation (hr/yr) / 2,000 (lb/ton).

APPENDIX D. TOXIC AIR POLLUTANT IMPACT ASSESSMENT