REVISED TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Vulcan Renewables, LLC
2020 County Road 214
St. Augustine, Florida 32084

Indianhead Biomass Services
Facility ID No. 1090463

PROJECT

Project No. 1090463-001-AC

Application for Initial Air Construction Permit
Wood Pelletizing Plant

COUNTY

St. Johns, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Northeast District Office
Waste and Air Resource Management Program
8800 Baymeadows Way West, Suite 100
Jacksonville, Florida 32256

January 7, 2015

REVISED: February 6, 2015

1. APPLICATION INFORMATION

1.1. Applicant Name and Address

Vulcan Renewables, LLC
2020 County Road 214
St. Augustine, Florida 32084

Authorized Representative: Mr. Joseph Williams, Operations Manager

1.2. Processing Schedule

10/09/2014	Department received the Application for Air Permit – Long Form.
11/06/2014	Request for Additional Information
12/04/2014	Additional Information received
01/07/2015	Draft Permit Issued
1/09/2015	Public Notice Published by Applicant
1/12/2015	Comments on Draft Permit submitted by Applicant
1/16/2015	Comments on Draft Permit submitted by Applicant
2/06/2015	Revised application and supplemental information document received

1.3. Glossary of Common Terms

Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of this permit.

1.4. Facility Description and Location

Vulcan Renewables, LLC proposes to construct in St. Johns County, Indianhead Biomass Services, a new Wood Pelletizing Plant, with a Standard Industrial Classification Code of 2493, (Reconstituted Wood Products). The facility is partially constructed, but not in operation.

The facility's address is 2020 County Road 214 (rural site east of I-95 and north of SR 214) in St. Augustine, Florida. The Universal Transverse Mercator (UTM) coordinates of the facility are Zone 17, 462.47 km East, and 3304.84 km North. The location of St. Johns County is shown in **Figure** 1 while a satellite view of the facility is shown in **Figure 2**. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to state and federal Ambient Air Quality Standards (AAQS).

Figure 1: Location t. Johns County, Florida

Figure 2: Satellite view of Indianhead Biomass Services

1.5. Project and Process Description:

Vulcan Renewables, LLC is proposing to construct Indianhead Biomass Services, a new wood (softwood) pelletizing plant located in St. Johns County, Florida. The facility ~~will~~ shall be located on approximately 9.5 acres in a rural area isolated from the surrounding property owners at a borrow pit, and yard waste and land clearing debris recycling site. The facility is partially constructed, but not in operation. The applicant states that some preliminary equipment testing has been conducted but the facility ~~will~~ shall not be operational until the final design is completed and the air construction permit is issued by the FDEP so that final construction can commence. The facility ~~will~~ shall have a production capacity of no more than 62,000 tons per year in order to maintain its VOC emissions below a requested 208 ton per year emissions cap in order to avoid PSD major source classification and review. The facility ~~will~~ shall consist of a wood receiving, storage and transfer area, a wood burner, a direct-fired triple-pass rotary dryer, two hammer mills, a wood screener, a storage bin, ~~twelve~~ thirteen pellet mills ~~(two of which will remain on standby)~~, a pellet cooler, a pellet screener, and a pellet product load-out and storage area.

a. Wood Receiving, Storage, Transfer and Processing:

The facility ~~will~~ shall receive yellow pine wood chips (green softwood). The chips are received from an outside source and delivered by truck delivery to a covered storage structure. The covered storage structure is open at both ends and allows the delivery truck to drive through and dump the load of chips. It is expected that the covered structure ~~will~~ shall act as a wind break to prevent unconfined particulate matter emissions from chip handling.

In addition to the received chips, the facility also proposes to chip yellow pine received from land-clearing activities with a 3 ton/hr electric chipper onsite.

b. Primary Hammer Mill and Screening:

Wood chips ~~will~~ shall be removed from the storage piles by front-end loader and loaded directly into a primary hammer mill that operates at a maximum design rate of 10 tons per hour output, followed by a wood screener before being conveyed to the dryer. The primary hammer mill causes the pine chips to heat slightly and breaks up the wood fibers releasing pinenes and terpenes (both high boiler point condensable VOC). The VOC and the wood dust are vented to the combustion air fan of the furnace to control the PM and VOC emissions. The oversized chips from the wood screener are collected in a bin before being added back into the wood chip supply for processing in the primary hammer mill.

c. Wood Cyclonic Burner and Triple-pass Rotary Dryer:

From the screener, the wood chips are conveyed by auger to the triple-pass rotary dryer. The rotary dryer is a Baker-Rullman Model SD125-42 rated at 18 tons/hr; 36,000 pounds of green wood chips ~~will~~ shall be loaded per hour into the rotary dryer producing 20,000 lb/hr of dried wood (10 ton/hr) and 16,000 lb/hr of water vapor. This dryer ~~will~~ shall produce 10 tons/hr of oven dried wood chips (ODT) with a moisture content of approximately 10% by weight.

Heat for the dryer, which is direct-fired, ~~will~~ shall be provided by a wood cyclonic-type burner that is similar in design to a Dutch-style furnace with a maximum design heat input rate of 25 million British thermal units per hour (MMBtu/hr).

The burner is fired with clean woody biomass that is brought into the facility primarily as shredded material or as chips from contractors that trim trees along roads, transmission lines and easements. This wood is chipped by the contractors in-situ using a trailer mounted chipper and ~~will~~ shall be delivered directly to the pelletizing plant in the covered storage structure. This clean woody biomass ~~will~~ shall represent 90-95% of the fuel for the wood furnace and could be 99% of the fuel source. This is preferred by the applicant since it reduces the labor necessary to fuel the furnace.

The facility receives clean wood waste in many forms, including whole trees, cut logs, branches, trimmings and root balls. Oak and other hardwoods are the desired source of supplemental fuel. These hard woods can be cut into logs using a handheld portable chainsaw then split using a portable hydraulic log splitter. Small (approximately 0.5-3 foot long) split logs are used to fire the furnace. These logs are used to start the furnace from a cold start and to supplement the fuel when more heat is desired.

The clean woody biomass used to fire the furnace is in two forms: chipped or split logs. No other processing was considered by the applicant or deemed necessary.

The log splitter is estimated to be used about 80 hours/year. It is equipped with a 72 hp diesel motor that operates a hydraulic pump and is subject to 40 CFR 63 Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

The facility proposes to also operate the 3 ton/hr electric wood chipper to provide wood chips as a fuel supplement for the wood cyclonic burner when the purchased clean woody biomass described above is in low supply.

The clean woody biomass to fire the furnace ~~will~~ shall not come from or be sourced from residential waste pickup in order to avoid being considered municipal solid waste and subjecting the burner and dryer to regulation as a municipal waste combustion unit (federal NSPS standards of 40 CFR 60 Subpart AAAA).

The furnace is refractory lined and combusts clean woody biomass with a high moisture on a sloped hearth with forced air being introduced tangentially into the combustion chamber to form a cyclonic air flow, similar in some ways to a Dutch oven. Hot air from the furnace is used as a source of direct heat for the triple-pass rotary dryer. The heat of combustion directly contacts the wood chips to drive off moisture at an inlet temperature of around 700 º F while the exit of the dryer is around 100º F.

Diesel ~~will~~ may be used as a supplemental fuel for initial start-up of the wood burner. The facility ~~will~~ shall not install any piping for any auxiliary fuel.

The exhaust gases from the dryer along with the dried wood chips ~~will~~ shall be blown into a cyclone that separates the wood chips and particulate matter. It is noted that the applicant is using this cyclone is used for product recovery and not as a PM control device. As such, the applicant has not included a reduction in PM emissions estimates from the cyclone since it is not being used as a PM control device.

The air from the burner, dryer and cyclone is released to the atmosphere through a blower rated at 72,000 acfm. Engineering design data indicate this fan ~~will~~ shall be operated at around 53,000 acfm. This air will contain PM, volatile organic compounds (VOC) and other combustion products from the burning of clean woody biomass. This emissions point ~~will~~ shall be tested for PM, CO, NO_x and VOC.

d. Secondary Hammer Mill and Ground Wood Storage Bin:

Wood chips from the dryer (dry wood chips) ~~will~~ shall be conveyed to the secondary hammer mill at a rate of no more than ~~at~~ 10 tons per hour. The secondary hammer mill ~~will~~ shall be used to grind the wood chips into a particle size (2 mm or less) suitable for further processing in the pellet mills.

The ground dried wood particles are pneumatically conveyed to a 20 ton ground wood storage bin that will be equipped with a bin-vent dust collector via a 12,000 acfm blower. The applicant states that engineering design data indicates that this fan ~~will~~ shall operate at 5,000 acfm. The dust collector is cartridge-style consisting of a 5,000 acfm Camfil-Farr Gold Series® pulse-jet dust collector. Emissions of PM and possibly VOC may be released to the atmosphere from this emissions point. As such, this emissions point ~~will~~ shall be tested for these pollutants.

e. Pellet Mills, Pellet Cooler, and Pellet Screener:

Ground wood from the storage bin ~~will~~ shall be conveyed to the indoor pellet mills where the wood pellets are formed. There will be 12 pellet mills that are each rated at 1 ton per hour, and one rated at 6 tons per hour. ~~Ten~~ The pellet mills ~~will~~ shall be ~~in simultaneous operation~~ simultaneously operated in a manner such that ~~thus having~~ a maximum ~~design capacity~~ of no more than 10 tons per hour of pellet production is reached. The remaining ~~2~~ pellet mills ~~will~~ shall be used as standby units during periods of maintenance. In each pellet mill, the dry ground wood (2 mm or less in diameter) from the storage bin is pressed through forged alloy dies. The heat of friction generated this process is sufficient to liquefy the lignin in the wood and bind the ground wood into a pellet without the addition of other binders. This heat also causes some of the organic compounds in the wood to volatilize. The most common VOCs being pinene, terpene, benzaldehyde and the hazardous air pollutant, methanol.

The formed pellets will then pass through a pellet air-cooler where the temperature of the wood pellets are reduced. From the cooler, the formed pellets are sent to a pellet screener and then conveyed to the product storage area. The air from the pellet screener, containing particulate matter (wood dust), will be vented to the 20 ton ground wood storage bin.

The air from the pellet mills and the pellet cooler, which contains VOC emissions, ~~will~~ shall be vented to the furnace's combustion air blower where it will be combusted by the burner.

Reject material and pellets from the pellet screener ~~will~~ shall be transferred back to the ground wood storage bin and used to make pellets.

f. Product Storage Area:

The final wood pellet product is pneumatically conveyed to a pellet storage bin (103 tons capacity) and truck loading area via a 12,000 acfm blower (emission point 03).

The applicant states that some PM emissions may exit this blower but are expected to be negligible. The applicant also believes that VOC is not an expected pollutant at this emission point as the pellets are very compacted at this stage and the VOC should be bound up in the cooled wood pellets.

g. Support Equipment:

The facility operates the following Engines onsite:

- 6 HP Gasoline Engine, Model EX17, Family Number: 3FJXS.1691GA manufactured by Subaru. It is used to run a centrifugal water pump. The engine/pump is mounted on the back of a water truck. The truck remains on the property full-time and is used to water the roads. The model year is 2003.

- 23 HP Gasoline Engine, Model CH23S, manufactured by Kohler. It is RICE welding machine/portable generator. It is used in the maintenance shop, stays on-site and is on wheels. The manufacture date is 12/04/2007.
- 72 HP Diesel Engine, Model V3300-ES, manufactured by Kubota. It is on a log splitter that remains on-site and supports the pellet plant. The manufacture date is 2004.
- One pickup truck-mounted portable gasoline generator that is part of a welding machine. The portable welder/engine is mobile and does not remain on site. It is not subject to 40 CFR 60 or 63 RICE NSPS or NEHSAP.

These engines meet the categorical exemption criteria of Rule 62-210.300(3)(a)35., F.A.C., and are not required to have an air construction permit for their installation. Because the 6 HP Gasoline Engine, the 23 HP Gasoline Engine, and the 72 HP Diesel Engine, are subject to a federal NSPS and/or NESHAP, and located at a Title V Source, they are to be included in the Title V Operation Permit for the facility as regulated emissions units.

h. Portable Nonmetallic Mineral Crushing Operation:

A portable concrete crusher is brought on-site by Environmental Land Services who owns the concrete and leases space from the property owner. The crusher operates under a general air permit with a Facility ID of 7770023. The crushed concrete is not part of the Indianhead Exploration, LLC/Indianhead Biomass Services recycling activity and is not used to support the Vulcan Renewables, LLC pellet production plant. The SIC code for concrete crushing and recycling is 4953. This code is applicable to material recycling facilities (MRF). Concrete is temporarily stored in bulk at this site and the portable crusher is brought on site to crush the large pieces of concrete into a usable and sellable product.

The crusher is not included as an Emissions Unit of the Vulcan Renewables, LLC permit as it and the concrete is owned and operated by a separate company.

1.6. Process Flow Diagram

Figure 3, provided by the applicant, is a process flow diagram of the proposed facility.

1.7. Facility Emission Units

Table 1 indicates the emissions units (EU) at the facility as a result of this project.

TABLE 1. EMISSION UNITS AT THE INDIANHEAD BIOMASS SERVICES FACILITY.

Facility ID No. 1090463	
ID No.	**Emission Unit Description**
001	Wood chip receiving and storage area
002	Wood Cyclonic Burner/ Triple-pass Rotary Dryer
003	Secondary Hammer mill and Ground Wood Storage Bin
004	Pellet Mills, Pellet Cooler, and Pellet Screener
005	Product Storage and Load-out Area

Emissions Units/Activities exempt from an air construction permit

The following emissions units/activities are exempt from the requirement to obtain an air construction permit:

ID No.	Emissions unit/Activity	Rule
006	Subaru. 6 HP Gasoline Engine, Model EX17, Family Number: 3FJXS.1691GA. *The engine is a four-stroke cycle, 1-cylinder, spark ignition, gasoline engine with a total displacement of 169 cubic centimeters. It is used to run a centrifugal water pump. The engine/pump is mounted on the back of a water truck. The truck remains on the property full-time and is used to water the roads. The model year is 2003.* *The engine is subject to 40 CFR 63 40 CFR 63 Subpart ZZZZ National Emissions Standards For Hazardous Air Pollutants For Stationary Reciprocating Internal Combustion Engines. In accordance with the definitions of this subpart, the engine is an existing, non-emergency, stationary RICE.*	62-210.300(3)(a)35., F.A.C.
007	Kohler. 23 HP Gasoline Engine, Model CH23S. *The engine is a four-stroke cycle, 2 cylinder, spark ignition, gasoline engine with a total displacement of41.0 cubic inches. It is RICE welding machine/portable generator. It is used in the maintenance shop, stays on-site and is on wheels. The manufacture date is 12/04/2007.* *The engine is subject to 40 CFR 63 40 CFR 63 Subpart ZZZZ National Emissions Standards For Hazardous Air Pollutants For Stationary Reciprocating Internal Combustion Engines. In accordance with the definitions of this subpart, the engine is an existing, non-emergency, stationary RICE.*	62-210.300(3)(a)35., F.A.C.
008	Kubota. 72 HP Diesel Engine, Model V3300-ES. *The engine is a four-stroke cycle, 4-cylinder, compression ignition, gasoline engine with a total displacement of 202 cubic inches. It is on a log splitter that remains on-site and supports the pellet plant. The manufacture date is 2004.* *The engine is subject to 40 CFR 63 40 CFR 63 Subpart ZZZZ National Emissions Standards For Hazardous Air Pollutants For Stationary Reciprocating Internal Combustion Engines In accordance with the definitions of this subpart, the engine is an existing, non-emergency, stationary RICE.*	62-210.300(3)(a)35., F.A.C.

---	Liquid storage tanks/vessels for diesel fuel for heavy equipment	62-210.300(3)(b)1., F.A.C.
---	Portable gas powered emergency generators and other small self-powered equipment	62-210.300(3)(b)1., F.A.C.
---	Fire and safety equipment to include fire extinguishers and water tanker gas driven pump	62-210.300(3)(a)15., F.A.C.
---	Welding equipment	62-210.300(3)(a)13., F.A.C.
---	Surface coating operations using less than 3 gallons per year	62-210.300(3)(a)27., F.A.C.
---	Equipment used for surface coating	62-210.300(3)(a)27., F.A.C.
---	Lubrication operations of equipment on a semi-annual basis	62-210.300(3)(a)16., F.A.C.
---	Plant maintenance and upkeep activities (e.g., grounds keeping, general repairs, cleaning, welding).	62-210.300(3)(b)1., F.A.C.
---	Application of herbicide and or pesticide	62-210.300(3)(a)17., F.A.C.
---	Vehicle refueling operations for diesel operated equipment	62-210.300(3)(a)19., F.A.C.
---	Air compressors and pneumatically operated hand tools	62-210.300(3)(b)1., F.A.C.
---	Use of environmentally safe degreasers for parts cleaning	62-210.300(3)(a)23., F.A.C.
---	Air-conditioning and ventilating units used for human comfort that do not exhaust air pollutants into the ambient air from any industrial process	62-210.300(3)(b)1., F.A.C.
---	Consumer use of office equipment and products	62-210.300(3)(b)1., F.A.C.
---	Janitorial services and consumer use of janitorial products	62-210.300(3)(b)1., F.A.C.
---	Bathroom/toilet vents emissions	62-210.300(3)(b)1., F.A.C.
---	Electric Wood Chipper *(associated potential PM emissions)*	62-210.300(3)(b)1., F.A.C.

009	**Tub Grinder RICE – 500 HP Diesel Engine** *Applicant believes the engine is subject to 40 CFR 63 40 CFR 63 Subpart ZZZZ National Emissions Standards For Hazardous Air Pollutants For Stationary Reciprocating Internal Combustion Engines In accordance with the definitions of this subpart, the engine is an existing, non-emergency, stationary RICE.* ***Indianhead Exploration LLC, (d.b.a., Indianhead Biomass Services) owns and operates a diesel powered tub grinder at the wood recycling operation that is on the same contiguous property as Vulcan Renewables, LLC. This tub grinder does not support the pellet production operation, but because the two businesses share common ownership, the potential HAP emissions were included in the facility-wide emissions for Vulcan Renewables for Part 63 and Title V applicability.***	62-210.300(3)(a)35., F.A.C.

1.8. Facility Regulatory Category Summary

- The facility **is not** a major source of hazardous air pollutants (HAP).
- The facility **has no** units subject to the acid rain provisions of the Clean Air Act.
- The facility **is** a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility **is not** a major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.
- This facility contains emissions units that are subject to Chapter 62-204.800, F.A.C. for National Emissions Standards for Hazardous Air Pollutants (NESHAP) under Section 112 of the Clean Air Act.

2.0. Emissions Inventory

The applicant used AP-42 emission factors, the emission factors recommended by the Georgia Department of Natural Resources Environmental Protection Division (GDNREPD) for wood pellet manufacturing, and process knowledge in order to determine the potential emissions for this proposed facility. A copy of the GDNREPD emission factors are attached.

The applicant has requested a pellet production limitation of no more than 62, 000 tons per any consecutive 12-month period in order to avoid being a PSD Major source and the application being subject to PSD review. The potential emissions are based on this limitation.

2.0.1. Primary Hammer Mill

TABLE 2 -Emission Factors used by Applicant to Estimate Primary Hammer Mill Emissions

Pollutant		Emission Factor	Source
Criteria	**PM total**	[a]	[a]
	PM condensable	[a]	[a]
	VOC	2.5 lb/ODT	Georgia Facility Testing[b,c]
Hazardous Air Pollutant	**Acetaldehyde**	0.004 lb/ODT	Georgia Facility Testing[b,c]
	Formaldehyde	0.008 lb/ODT	Georgia Facility Testing[b,c]
	Methanol	0.004 lb/ODT	Georgia Facility Testing[b,c]

[a] Air from the primary hammer mill will be vented through the furnace and combusted along with the clean woody biomass. PM emissions are accounted for in the combustion emission calculations for the wood cyclonic burner.

[b] GDNREPD recommended emission factor.

[c] Per the GDNREPD recommended emission factors, if emissions are routed to the dryer (furnace) there is a 90% reduction for VOC and volatile HAP emissions.

2.0.2. Wood Cyclonic Burner and Triple-pass Rotary Dryer:

TABLE 3- Emission Factors used by Applicant to Estimate Burner & Dryer Emissions

Pollutant		Emission Factor	Source
Criteria	**PM total**	2.2 lb/ODT	AP-42 Table 10.6.2-1*
	PM condensable	1.1 lb/ODT	AP-42 Table 10.6.2-1*
	NO_x	2.7 lb/ODT	AP-42 Table 10.6.2-2*
	SO_2	0.025 lb/MMBtu	AP-42 Table 1.6-2
	CO	5.3 lb/ODT	AP-42 Table 10.6.1-2*
	VOC	6.0 lb/ODT	AP-42 Table 10.6.2-3*
Hazardous Air Pollutant	**Acetaldehyde**	0.11 lb/ODT	AP-42 Table 10.6.2-3*
	Formaldehyde	0.14 lb/ODT	AP-42 Table 10.6.2-3*
	Methanol	0.11 lb/ODT	AP-42 Table 10.6.2-3*
	HCL	0.019 lb/MMBtu	AP-42 Table 1.6-3*

*Consistent with GDNREPD recommended emission factors.

Figure 3, Process Flow Diagram of Vulcan Renewables, LLC d/b/a Indianhead Biomass Services

2.0.3. Secondary Hammer Mill, Pellet Screener, and Ground Wood Storage Bin

The wood chips from the Triple-pass Rotary Dryer ~~will~~ shall be conveyed to a Secondary Hammer Mill where they will be ground to a particle size that is suitable for further processing in the pellet mills. From the Secondary Hammer Mill, the ground dried wood particles are pneumatically conveyed to a 20 ton Ground Wood Storage Bin that ~~will~~ shall be equipped with a bin-vent dust collector via a 12,000 acfm blower. The dust collector is cartridge-style consisting of two (2) 5,000 acfm Camfil-Farr Gold Series® pulse-jet dust collectors in series for PM control. Air from the pellet screener will also be vented to this ground wood storage bin. The applicant states that there are not available emission factors for this type of process, but estimated emissions based on process knowledge.

A total of 62,000 ton of coarse wood particles (2 mm) ~~will~~ shall pass from the second hammer mill through the ground wood storage bin. Of this, it was assumed that 99.99% ~~will~~ shall be processed as pellets. It was also assumed that a loading of the finer wood dust ~~will~~ shall be controlled by the bin vent dust collector. The dust collector is 99.995% efficient for particle greater than 0.5 microns. As a conservative measure a control efficiency of 99.9% was used in the PM emission calculations as follows;

(62,000 ton wood processed/yr)(1-0.9999) = 6.2 tons/yr of wood loading to the bin vent dust collector.

(6.2 ton PM/yr)(1-0.999) = 0.0062 ton PM/yr

(0.0062 ton PM/yr)(2,000 lb/ton) / (6,200 hr/yr) = 0.002 lb PM/hr

2.0.4. Pellet Mills and Pellet Cooler

TABLE 4 – Emission Factors used by Applicant to Estimate Pellet Mills & Pellet Cooler Emissions

Pollutant		Emission Factor	Source
Criteria	**PM total**	[a]	[a]
	PM condensable	[a]	[a]
	VOC	0.5 lb/ODT[d]	Georgia Facility Testing[b,c]
Hazardous Air Pollutant	**Acetaldehyde**	0.001 lb/ODT[d]	Georgia Facility Testing[b,c]
	Formaldehyde	0.002 lb/ODT[d]	Georgia Facility Testing[b,c]
	Methanol	0.001 lb/ODT[d]	Georgia Facility Testing[b,c]

[a] Air from the pellet mills and the pellet cooler ~~will~~ shall be vented through the furnace and combusted along with the clean woody biomass. PM emissions are accounted for in the combustion emission calculations for the wood cyclonic burner.

[b] GDNREPD recommended emission factor.

[c] Per the GDNREPD recommended emission factors, if emissions are routed to the dryer (furnace) there is a 90% reduction for VOC and volatile HAP emissions.

[d] Emission factor for pelletizing and cooling without steam injection.

2.0.5. Pellet Storage and Load-Out Area

TABLE 5-Emission Factors used by Applicant to Estimate Pellet Storage & Load-Out Emissions

Pollutant		Emission Factor	Source
Criteria	**VOC**	0.4 lb/ODT	Georgia Facility Testing[a,b]
Hazardous Air Pollutant	**Acetaldehyde**	0.001 lb/ODT	Georgia Facility Testing[a]
	Formaldehyde	0.002 lb/ODT	Georgia Facility Testing[a]
	Methanol	0.001 lb/ODT	Georgia Facility Testing[a]

[a] GDNREPD recommended emission factor.

[b] As stated by GDNREPD, emission factor based on the testing results of a facility that utilizes an air sweep/aspiration air over the conveyors which cool the pellets exiting the pellet coolers prior to the storage silo. This stream is vented to a baghouse for fine dust control. Emissions were tested at the outlet of the baghouse.

2.0.6. Greenhouse Gas Emissions

Sources of GHG emissions at the proposed facility are clean woody biomass firing in the wood cyclonic burner, diesel and gasoline firing in the three (3) RICE engines. GHG emission calculations for the wood cyclonic burner are presented in the below table. As shown, total annual GHG emissions due to both biogenic and non-biogenic fuels, are estimated to be 17,926 TPY of CO_2e.

TABLE 6- Applicant's Estimated Greenhouse Gas Emissions

Source	Pollutant	Emission Factor[a] lb/MMBtu	Activity Factor		Hourly Emissions lb/hr	Annual Emissions TPY
Wood Cyclonic Burner	Carbon Dioxide (CO_2)	207	25 MMBtu/hr	6,6200 H/Y	5175	16,043
	Methane (CH_4)	0.159	25 MMBtu/hr	6,200 H/Y	0.4	1.24
	Nitrogen Oxide (N_2O)	0.0794	25 MMBtu/hr	6,200 H/Y	1.99	6.17
	GHG Mass Basis					16,050[b]
	GHG CO_2e Basis[c]					17,913
6 HP Subaru RICE	CO_2e	154	0.112 MMBtu/hr	22.4 MMBTU/yr	0.00862	1.72
23 HP Kohler RICE	CO_2e	154	0.28 MMBtu/hr	56 MMBTU/yr	0.022	4.3
72 HP Kubota RICE	CO_2e	164	0.42 MMBtu/hr	84.15 MMBTU/yr	0.035	6.9
	CO_2e total due to RICE					12.92
	CO_2e Wood Cyclonic Burner & RICE					17,925.92

[a] Based on 40 CFR 98, Subpart C
[b] GHG (mass basis) = sum of emission rates of CO_2, CH_4, and N_2O on a mass basis.
[c] GHG (CO2e basis) = sum of emission rates of CO_2, CH_4, and N_2O using global warming potentials: CO_2=1, CH_4 = 25, NO_x =298.
GHG (CO2 basis) = (16043 TPY x 1)(25 x 1.24 TPY)(298 x 6.17 TPY) = 17,913 TPY CO2e

2.0.7. Facility-Wide Emissions

A summary of estimated facility-wide annual emission rates is presented in **Table 7**. As shown, the estimated facility-wide annual emission rates for all criteria pollutants are below 250 TPY, the threshold that triggers new source review (NSR) under PSD regulations for this type of facility. **Table 7** also shows that the potential facility-wide GHG emissions are below 100,000 CO_2e. A discussion of the regulatory implications of these emission rates with regard to PSD applicability is presented in Section 3.0.

Estimated annual emissions of CO, and VOCs are above 100 TPY, the Title V Air Operation applicability threshold for criteria pollutants and individual and total HAP emissions are below the Title V applicability thresholds of 25 and 10 TPY, respectively. A discussion of the implication of these emission rates are presented in Sections 3.1 and 3.2.

TABLE 7- Applicant's Estimated Facility-wide Emissions

Pollutant (TPY)	Primary Hammer Mill	Wood Cyclonic Burner and Triple-pass Rotary Dryer	Ground Wood Storage Bin [a]	Pellet Mills and Pellet Cooler	Pellet Storage and Load-out Area	RICE (3) and Electric Wood Chipper[i]	Tub Grinder (Indianhead Exploration, LLC)	Total
PM – total	[b]	68.2	0.0062	[b]	[c]	0.314	N/A[g]	68.22
PM Condensable	[b]	34.1				N/D	N/A[g]	34.1
NO_x	---	83.7	---	---	---	0.27	N/A[g]	83.97
SO_2	---	1.94	---	---	---	0.021	N/A[g]	1.96
CO	---	164.3	---	---	---	0.08	N/A[g]	164.38
VOC	7.75	186.0	12.4[d,e]	1.55	---[f]	0.1	N/A[g]	207.8
Acetaldehyde	0.012	3.41	0.03[d,e]	0.003	---	---	---	3.46
Formaldehyde	0.025	4.34	0.06[d,e]	0.0062	---	0.0058	---	4.436
Methanol	0.012	3.41	0.03[e]	0.003	---	---	---	3.46
HCl	---	1.47	---	---	---	---	---	1.47
Total HAPs	0.049	12.63	0.12	0.0122	---	0.0058	0.07	12.83
GHG Mass[h]	---	16,050	---	---	---	---	---	19,674
GHG CO_2e	---	17,913	---	---	---	12.9	---	17,926

[a] Air from the secondary/dry material hammer mill and the pellet screener ~~will~~ shall be vented the blower to the Ground Wood Storage Bin-– See **Figure 3**.

[b] Air from the primary hammer mill, the pellet mills (including the hot pellet conveyor and pellet elevator 1 – See **Figure 3**), and the pellet cooler ~~will~~ shall be vented through the furnace and combusted along with the clean woody biomass. PM emissions are accounted for in the combustion emission calculations for the wood cyclonic burner.

c Not Determined by applicant. The applicant believes that any PM emitted at the blower exit ~~will~~ shall be negligible due to the pellets being compacted at this stage.

[d] The applicant believes the, "second hammer mill (secondary/dry material hammer mill) to be a minor source of VOC emissions because the wood particles do not heat up during this process. The temperature of the wood and air is about 90-100 ºF at the entrance to the second hammer mill (secondary/dry material hammer mill). Terpenes are tar-like compounds with vaporization temperatures above 350 ºF. Pinenes are lighter organic compounds with a boiling point of ~150 º C (302 ºF). Most of the pinenes will volatilize in the dryer (Triple-pass Rotary Dryer). The remaining terpenes are a desirable fuel source and the goal is to retain these in the final product."

[e] Exhaust from the pellet screener is routed to the ground wood storage bin. The potential emissions from the pellet storage and handling are placed under this emissions unit. Estimated emissions are based on the GDNREPD recommended emission factor for storage and handling of wood pellet product.

[f] The applicant does not expect VOC emissions at the blower exit due the belief that VOC is bound up in the cooled wood pellets.

[g] Tub grinder located at Indianhead Exploration, LLC, HAP PTE included for Part 63 classification in this application due to common control with Vulcan Renewables, LLC

[h] From combustion of biogenic fuels only

i Engines: based on maximum hours of operation of 200 hours per year of each engine. No limitation on hours during emergency operation. Wood Chipper: based on a maximum of 2000 hours of operation per year.

3.0 PSD APPLICABILITY

3.0.1. General PSD Applicability

For areas currently in attainment with the state and federal AAQS or areas otherwise designated as unclassifiable, the Department regulates major stationary sources of air pollution in accordance with Florida's PSD preconstruction review program as defined in Rule 62-212.400, F.A.C. Under preconstruction review, the Department first must determine if a project is subject to the PSD requirements ("PSD applicability review") and, if so, must conduct a PSD preconstruction review. A PSD applicability review is required for projects at new and existing major stationary sources. In addition, proposed projects at existing minor sources are subject to a PSD applicability review to determine whether potential emissions *from the proposed project itself* will exceed the PSD major stationary source thresholds. A facility is considered a major stationary source with respect to PSD if it emits or has the potential to emit:

- 250 tons per year or more of any regulated air pollutant; or
- 100 tons per year or more of any regulated air pollutant and the facility belongs to one of the following 28 PSD-major facility categories: fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, coal cleaning plants (with thermal dryers), Kraft pulp mills, portland cement plants, primary zinc smelters, iron and steel mill plants, primary aluminum ore reduction plants, primary copper smelters, municipal incinerators capable of charging more than 250 tons of refuse per day, hydrofluoric, sulfuric, and nitric acid plants, petroleum refineries, lime plants, phosphate rock processing plants, coke oven batteries, sulfur recovery plants, carbon black plants (furnace process), primary lead smelters, fuel conversion plants, sintering plants, secondary metal production plants, chemical process plants, fossil fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour heat input, petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels, taconite ore processing plants, glass fiber processing plants and charcoal production plants.

Once it is determined that a project is subject to PSD preconstruction review, the project emissions are compared to the "significant emission rates" defined in Rule 62-210.200, F.A.C. for the following pollutants: carbon monoxide (CO); nitrogen oxides (NO_X); sulfur dioxide (SO_2); particulate matter (PM); particulate matter with a mean particle diameter of 10 microns or less (PM_{10}); volatile organic compounds (VOC); lead (Pb); fluorides (Fl); sulfuric acid mist (SAM); hydrogen sulfide (H_2S); total reduced sulfur (TRS), including H_2S; reduced sulfur compounds, including H_2S; municipal waste combustor organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans; municipal waste combustor metals measured as particulate matter; municipal waste combustor acid gases measured as SO_2 and hydrogen chloride (HCl); municipal solid waste landfills emissions measured as non-methane organic compounds (NMOC); and mercury (Hg). In addition, significant emissions rate also means any emissions rate or any net emissions increase associated with a major stationary source or major modification which would construct within 10 kilometers of a Class I area and have an impact on such area equal to or greater than 1 $\mu g/m^3$, 24-hour average.

If the potential emission exceeds the defined significant emissions rate of a PSD pollutant, the project is considered "significant" for the pollutant and the applicant must employ the Best Available Control Technology (BACT) to minimize the emissions and evaluate the air quality impacts. Although a facility or project may be *major* with respect to PSD for only one regulated pollutant, it may be required to install BACT controls for several "significant" regulated pollutants.

3.0.2. Stationary Source Determination

Vulcan Renewable, LLC operates on the same site as another business that shares a common owner. As such, a determination has to be made whether these businesses are considered a single stationary source for air permitting purposes.

Indianhead Exploration, LLC, (d.b.a. Indianhead Biomass Services) operates a yard waste and wood recycling operation under SIC Code 5093 (recyclable scrap and waste material). Indianhead Exploration LLC is owned 100% by Dr. Roy Hinman. Dr. Hinman owns all of the land these operations house.

Vulcan Renewable, LLC operates under SIC Code 2493 (reconstituted wood products) on the same site as several other businesses with similar management but under different ownership. Vulcan Renewables, LLC is owned 51% by Dr. Hinman and 49% by Christopher Kim and operates on the same contiguous property as Indianhead Biomass Services.

To determine whether the Indianhead Exploration, LLC and Vulcan Renewable, LLC are a single stationary source instead of two separate stationary sources, the Department must consult Rule 62-210.200(174)(d) of the F.A.C where a "Stationary Source" is defined. Per Rule 62-210.200(174)(d) a "Stationary Source" is:

"For purposes of this definition, a stationary source is all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person or persons under common control, except the activities of any vessel; which emit or may emit a PSD pollutant. Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same Major Group, or have the same first two digit code, as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement."

Therefore, as indicated in the preceding paragraph there are three criteria all of which must be met for two facilities to be considered a single stationary source. Each of these criteria are discussed below.

1. Common Control: The first criterion is whether or not the facilities are under common control. Common control is not defined, however EPA Guidance exists which discusses the term and establishes general criteria for consideration in determining common control.
    1. *Ownership*: Dr. Hinman owns 100% of Indianhead Exploration, LLC and majority ownership of Vulcan Renewable, LLC.
    2. *Decision making authority (can the managing entity of one facility make decisions that affect the other facility)*: There were no representations in the application regarding decision making authority of the two businesses.

    The common control criterion is, however, met, as Dr. Hinman directly owns and controls both facilities.

2. Contiguous or Adjacent Facilities: The second criterion is whether or not the two facilities are located on one or more contiguous or adjacent properties. **This criterion is met as Indianhead Exploration, LLC and Vulcan Renewable, LLC are located adjacent to each other.**

3. Dependency Relationship: The third criterion is whether Indianhead Exploration, LLC and Vulcan Renewable, LLC have a dependency relationship, i.e., sharing of intermediates, products, byproducts, manufacturing equipment, contractual arrangements for providing goods and services thereby providing interdependency between the facilities.

1. The Indianhead Exploration, LLC is under SIC No. 5093-Scrap and Waste Materials and NAICS Code 423930- Recyclable Material Merchant Wholesalers. Vulcan Renewable, LLC is under SIC 2493- Reconstituted Wood Products and NAICS Code 32129– Reconstituted Wood Product Manufacturing. The two facilities do not share the same SIC or NAICS codes.
2. Vulcan Renewable, LLC ~~will~~ shall not use the wood chips generated from Indianhead Exploration, LLC at in its pellet production plant. Vulcan Renewable LLC receives 90-99% of its fuel needs from the wood chips from easement contractors.

There appears to be no significant dependency between the two facilities and thus this criterion is not met.

In summary, the facilities are contiguous or adjacent and are under common control. The facilities do not, however, share the same SIC or NAICS code, and do not appear to be dependent upon one another in any meaningful way such that Vulcan Renewable, LLC could be considered to function as a "support facility" for Indianhead Exploration, LLC.

Based on the above analysis, the Department has determined that Indianhead Exploration, LLC and Vulcan Renewable, LLC are not a single stationary source for the purposes of PSD applicability, but instead are two separate stationary sources.

It should be noted, however, that this determination is for this particular case only. All such future determinations ~~will~~ shall be made on a case-by-case basis and ~~will~~ shall be based upon the degree to which each case meets or does not meet the determining criteria discussed above.

Indianhead Exploration, LLC, (d.b.a. Indianhead Biomass Services) owns and operates a diesel powered tub grinder for reducing the volume of wood at the wood recycling operation As part of the yard waste and wood recycling operation. The tub grinder ~~will~~ shall not be used to support the pelletizing plant at Vulcan Renewables, LLC.

For PSD applicability purposes, the potential criteria pollutant emissions from this unit are not included with the criteria potential emissions from the sources at Vulcan Renewables, LLC.

3.0.3. PSD Applicability for Project

This facility is not within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. As such, the facility is subject to the 250 ton per year of any PSD pollutant applicability threshold. For sources that are not on the list of the 28 Major Facility Categories, fugitive emissions are not required to be considered when calculating potential emissions for PSD applicability.

The facility would not be a major PSD source due to greenhouse gases. It is noted that on June 23, 2014, the Supreme Court issued a decision addressing the application of stationary source permitting requirements to greenhouse gases in *Utility Air Regulatory Group (UARG) v. Environmental Protection Agency (EPA)*, No. 12-1146. The Supreme Court said that EPA may not treat greenhouse gases as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V Permit.

TABLE 8

	CO (tons)	NO_x (tons)	SO_2 (tons)	$PM/PM_{10}/PM_{2.5}$ (tons)	VOC (tons)	HAP	CO_2e
Facility Potential Emissions in TPY[a]	164.38	83.97	1.96	68.22/34.1	207.8	4.4/ 12.8	17,926[b]
PSD Applicability Threshold	250	250	250	250	250		---[c]
Title V Applicability Threshold	100	100	100	100	100	10/25	
Pollutant triggers PSD Review?	No	No	No	No	No		No
Pollutant triggers Title V Applicability?	Yes	No	No	No	Yes	No	

[a] Based on limited wood pellet production of 62,000 tons per any consecutive 12-month period.

[b] From combustion of biogenic fuels in the Wood Cyclonic burner and non-biogenic fuels in the three (3) RICE.

[c] According to 40 CFR 52.21, six greenhouse gases (GHG), are also subject to regulation at new stationary sources that will emit or have the potential to emit 100,000 tons/year or more expressed as the carbon dioxide equivalent emissions (CO_2e). On June 23, 2014, the Supreme Court issued a decision addressing GHG as a pollutant for PSD or Title V applicability.

As shown in the above tables, total project emissions are not equal to or exceed the PSD applicability thresholds; therefore, the project is not subject to PSD preconstruction review.

3.0.4. PSD Applicability – Future Project

It is noted that the facility (or another company with possible common ownership) has discussed with the Department the possibility of a future project at this site location, an operation that will set up and test engines prior to shipping them offsite for potential customers located in the islands. These engines would be tested with possibly syngas generated from a wood gasifier that will be located onsite, natural gas or diesel fuel. At the time of application, a thorough PSD applicability analysis ~~will~~ shall be required.

3.1 Title V Applicability for Project

To determine whether the Indianhead Exploration, LLC and Vulcan Renewable, LLC are a single "Major Source of Air Pollution" or "Title V Source" due to potential emissions of hazardous air pollutants instead of two separate sources, the Department must consult Rule 62-210.200(173)(b) of the F.A.C. where a "Major Source of Air Pollution," "Major Source," or "Title V Source" due to hazardous air pollutants is defined. Per Rule 62-210.200(173)(b):

(173) "Major Source of Air Pollution," "Major Source," or "Title V Source" – A facility containing an emissions unit, or any group of emissions units, which is or includes any of the following:

(b) An emissions unit or group of emissions units, all belonging to the same two-digit Major Group as described in the Standard Industrial Classification Manual, 1987, that directly emits or has the potential to emit, 100 tons per year or more, except as otherwise provided for in 40 CFR 70 as adopted and incorporated by reference at Rule 62-204.800, F.A.C., of any regulated air pollutant….

Therefore, as indicated in the preceding paragraph, the Department must also consult Rule 62-210.200(121), F.A.C. where "Facility" is defined. Per Rule 62-210.200(121), F.A.C.:

(121) "Facility" – All of the emissions units which are located on one or more contiguous or adjacent properties, and which are under the control of the same person (or persons under common control).

As previously discussed in Section 3.0.2. Stationary Source Determination, Indianhead Exploration, LLC and Vulcan Renewable, LLC are contiguous or adjacent and are under common control. Therefore they meet the definition of a facility. However, as previously discussed they operate under different SIC or NAICS codes. As such, they are separate facilities for the purposes of Title V applicability due to criteria pollutants pursuant to Rule 62-210.200(173)(b), F.A.C.

Based on the information submitted for Vulcan Renewables, LLC, estimated CO, and VOC emissions are greater than 100 tons per year, therefore Vulcan Renewables, LLC is classified as a Title V Source.

3.2 Hazardous Air Pollutants

To determine whether the Indianhead Exploration, LLC and Vulcan Renewable, LLC are a single "Major Source of Air Pollution" or "Title V Source" due to potential emissions of *hazardous air pollutants* instead of two separate sources, the Department must consult Rule 62-210.200(173)(a) of the F.A.C. where a "Major Source of Air Pollution," "Major Source," or "Title V Source" due to hazardous air pollutants is defined. Per Rule 62-210.200(173)(a):

(173) "Major Source of Air Pollution," "Major Source," or "Title V Source" – A facility containing an emissions unit, or any group of emissions units, which is or includes any of the following:

(a) For pollutants other than radionuclides, any emissions unit or group of emissions units that emits or has the potential to emit, in the aggregate, 10 tons per year or more of any one hazardous air pollutant (HAP), 25 tons per year or more of any combination of HAPs, or any lesser quantity of a HAP as established through EPA rulemaking. Notwithstanding the preceding sentence, HAP emissions from any oil or gas exploration or production well (with its associated equipment) and HAP emissions from any pipeline compressor or pump station shall not be aggregated with HAP emissions from other similar units, whether or not such units are in a contiguous area or under common control, to determine whether such units or stations are Title V sources.

As previously discussed Indianhead Exploration, LLC and Vulcan Renewable, LLC meet the definition of facility since they are contiguous or adjacent and are under common control. In accordance with Rule 62-210.200(173)(a), F.A.C., for the purposes of potential HAP emissions, Indianhead Exploration, LLC and Vulcan Renewable, LLC are looked as a single facility.

The potential HAP emissions from the diesel powered tub grinder that reduces the volume of wood at the wood recycling operation (owned and operated by Indianhead Exploration, LLC) were included with the potential HAP emissions from the sources at Vulcan Renewables, LLC. Emissions were determined based on 8,760 hours of operation.

At the suggested by the Division (email correspondence dated December 1, 2014), the applicant ~~will~~ shall include this engine as a regulated emissions unit in the Vulcan Renewables, LLC future Title V Operation Permit.

Based on the information submitted, estimated individual hazardous air pollutants are less than 10 tons per year, and any combination of hazardous air pollutants are less than 25 tons per year; therefore, the facility is classified as an area source of HAP emissions.

The applicant has stated that the engine for the tub grinder is subject to the standards of 40 CFR 63 Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

Pursuant to Rule 62-210.200(173)(f)4., F.A.C., the facility is not subject to Title V Permitting because the facility is subject to an area source standard promulgated under 40 CFR Part 63 adopted and incorporated by reference at Rule 62-204.800, F.A.C. that does not specifies that a Title V Permit is required.

(f) An emissions unit or group of emissions units with one (1) or more emissions units subject to standards or regulations promulgated under 40 C.F.R. Part 60, 61 or 63, adopted and incorporated by reference at Rule 62-204.800, F.A.C., however, such emissions unit or group of emissions units is not a Title V source solely because:

1. It is subject to a reporting requirement;

2. It is subject to 40 C.F.R. Part 61, Subpart M – National Emission Standard for Asbestos Section 61.145, Standard for Demolition and Renovation, adopted and incorporated by reference at Rule 62-204.800, F.A.C.;

3. It is subject to a standard or regulation promulgated under 40 C.F.R. Part 60, adopted and incorporated by reference at Rule 62-204.800, F.A.C., unless such standard or regulation specifies that the emission unit or group of emissions units requires a Title V permit; or

4. It is subject to an area source standard or regulation promulgated under 40 C.F.R. Part 61 or 63, adopted and incorporated by reference at Rule 62-204.800, F.A.C., unless such standard or regulation specifies that the emission unit or group of emissions units requires a Title V permit.

4.0. FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) REVIEW

4.0.1. Federal Regulation Applicability (NSPS and NESHAP)

The U. S. Environmental Protection Agency (EPA) establishes air quality regulations in Title 40 of the Code of Federal Regulations (CFR). Part 60 specifies New Source Performance Standards (NSPS) for numerous industrial categories. Part 61 specifies National Emission Standards for Hazardous Air Pollutants (NESHAP) based on specific pollutants. Part 63 specifies NESHAP based on the Maximum Achievable Control Technology (MACT) for numerous industrial categories. The Department adopts these federal regulations on a quarterly basis in Rule 62-204.800, F.A.C.

4.0.1.1. NSPS Applicability

40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

Pursuant to 40 CFR 60.40c, this Subpart applies to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h).

The Subpart defines (40 CFR 60.41c) a *steam generating unit* to mean, "a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium. This term includes any duct burner that

combusts fuel and is part of a combined cycle system. This term does not include process heaters as defined in this subpart."

Based on the information provided, the wood cyclonic burner/triple-pass rotary dryer does not produce steam or heat water, therefore it does not meet the definition of a steam generating unit and is not subject to the Subpart.

40 CFR 60 Subpart AAAA - Standards of Performance for Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 or for Which Modification or Reconstruction is Commenced After June 6, 2001.

Pursuant to 40 CFR 60.1010 and 60.1015, this regulation applies to municipal waste combustion units that commence construction after August 30, 1999 and have the capacity to combust at least 30 tons per day but no more than 250 tons per day of municipal solid waste or refuse-derived fuel.

The Subpart defines (40 CFR 60.1465) a *municipal waste combustion unit* to mean, "any setting or equipment that combusts solid, liquid, or gasified municipal solid waste including, but not limited to, field-erected combustion units (with or without heat recovery), modular combustion units (starved-air or excess-air), boilers (for example, steam generating units), furnaces (whether suspension-fired, grate-fired, mass-fired, air curtain incinerators, or fluidized bed-fired), and pyrolysis/combustion units…"

The subpart defines (40 CFR 60.1465) *municipal solid waste to mean, "*household, commercial/retail, or institutional waste; and household, commercial/retail, and institutional waste includes yard waste and refuse-derived fuel."

The subpart defines (40 CFR 60.1465) *Yard waste* to mean, "grass, grass clippings, bushes, shrubs, and clippings from bushes and shrubs. They come from residential, commercial/retail, institutional, or industrial sources as part of maintaining yards or other private or public lands."

This regulation does not apply to the Wood cyclonic burner as the fuel to be received, handled, and stored for the purposes of burning in the wood cyclonic burner and triple-pass rotary dryer furnace being proposed by the applicant is listed below:

Fuel Type	**Description**
In-forest residue and slash	Tops, limbs, whole tree material and other residues from soft and hardwoods that result from traditional silvicultural harvests.
Mill residue	Saw dust, bark, shavings and kerf waste from cutting/milling whole green trees; fines from planning kiln-dried lumber; wood waste material generated by primary wood products industries such as roundoffs, end cuts, sticks, pole ends; and reject lumber as well as residue material from the construction of wood trusses and pallets.
Pre-commercial tree trimmings and understory clearings	Tops, limbs, whole tree material and other residues that result from the cutting or removal of certain, smaller trees from a stand to regulate the number, quality and distribution of the remaining commercial trees; and forest understory which includes smaller trees, bushes and saplings.
Storm, fire and disease debris	Tops, limbs, whole tree material and other residues that are damaged due to storms, fires or infectious diseases.
Urban wood waste	Trees and other clean, woody matter generated by landscaping contractors or power line/roadway clearance contractors that have been cut down for land development, right-of-way clearing or general landscape management purposes.

Recycled industrial Wood	Wood derived from used pallets packing crates; and clean wood dunnage (not chemically treated) disposed by commercial or industrial users
Supplementary fuel material	Clean agricultural residues (i.e., rice hulls, straw, etc.; no animal wastes or manure); and whole tree chips and pulpwood chips.

The facility has prepared a preliminary Best Management Practices for Land Clearing Debris and Yard Waste Management to ensure that residential yard waste received from municipalities at Indianhead Exploration, LLC d/b/a/ Indianhead Biomass Services ~~will~~ shall be kept separate from the clean woody biomass from land clearing debris and easement maintenance that ~~will~~ shall be used by Vulcan Renewables, LLC. All "yard" waste is staged in one location on the site (see Figure 4 below). The BMP ~~will~~ shall be updated and finalized and approved by the Department prior to the startup of the facility.

Vulcan Renewables, LLC ~~will~~ shall also put the following steps in place to ensure that the yard waste/trash or wood chips generated from yard waste/trash that are temporarily stored at Indianhead Exploration, LLC d/b/a/ Indianhead Biomass Services ~~will~~ shall be kept separate from and not burned in the wood cyclonic burner/ triple-pass rotary dryer furnace or used at Vulcan Renewables, LLC. These steps ~~will~~ shall include the following:

- Trained employees
- Load inspection
- Site map for drivers
- Signage at the storage site
- Storing wood chips from easement contractors at the pellet plant
- Separate drop areas for clean woody biomass and yard waste/trash
- The use of a 3 ton/hr electric wood chipper dedicated to the pellet plant

Figure 4, Land Clearing Debris Areas – Vulcan Renewables, LLC d/b/a/ Indianhead Biomass Services

40 CFR 60 Subpart IIII- Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

Pursuant to 40 CFR 60.4200, this regulation applies to owners and operators of stationary compression ignition internal combustion engines as specified in the paragraphs of (1) through (4) of this section of the Subpart.

The 72 HP Diesel Engine, Model V3300-ES appears to have been manufactured prior to the applicability date for owners or operators as stated in §60.4200(a)(2) of the Subpart.

40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

Pursuant to 40 CFR 60.4230, this regulation applies to owners and operators of stationary spark-ignition internal combustion engines as specified in the paragraphs of (a)(1)-(6) of this section of the Subpart.

The subpart defines (40 CFR 60.4248), a stationary internal combustion engine to mean, "any internal combustion engine, except combustion turbines, that converts heat energy into mechanical work and is not mobile. Stationary ICE differ from mobile ICE in that a stationary internal combustion engine is not a nonroad engine as defined at 40 CFR 1069.30 (excluding paragraph (2)(ii) of that definition), and is not used to propel a motor vehicle, air craft, or a vehicle used solely for competition. Stationary ICE include reciprocating ICE, rotary ICE, and other ICE, except combustion turbines."

A non-road engine, as defined in 1068.30 includes engines that are portable, meaning capable of being carried or moved from one location to another. Indications of mobility include, but are not limited to, wheels, skids, carrying handles, dolly, trailer or platform.

Under paragraph (2)(iii) of this definition, an engine that otherwise meets the definition of a non-road engine will no longer be classified as a non-road engine if it remains or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any single site at a building, structure, facility, or installation. Any engine (or engines) that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full annual operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e., at least two years) and that operates at that single location approximately three months (or more) each year. See §1068.31 for provisions that apply if the engine is removed from the location.

On December 5, 2008, EPA further clarified that a portable engine would still meet the nonroad engine definition if it moved within different locations within the confines of a facility so long as it was not at one location for a period of more than 12 months. [EPA Determination: http://cfpub.epa.gov/adi/pdf/adi-mact-m090038.pdf]

The portable gas powered emergency generators associated engines ~~will~~ shall not be subject to 40 CFR 60 Subpart JJJJ as this Subpart is applicable to stationary internal combustion engines.

The 6 HP Gasoline Engine, Model EX17 and the 23HP Gasoline Engine, Model CH23S appear to have been manufactured prior to the applicability date for owners or operators as stated in §60.4230(a)(4) of the Subpart. The Subpart ~~will~~ shall not become applicable to these engines unless they are modified or reconstructed.

4.0.1.2. NESHAP Applicability

40 CFR 63 Subpart DDDD—National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products

Pursuant to 40 CFR 63.2231, this Subpart applies to owners or operators of a PCWP manufacturing facility that is located at a major source of HAP emissions.

A PCWP manufacturing facility is a facility that manufactures plywood and/or composite wood products by bonding wood material (fibers, particles, strands, veneers, etc.) or agricultural fiber, generally with resin under heat and pressure, to form a structural panel or engineered wood product. Plywood and composite wood products manufacturing facilities also include facilities that manufacture dry veneer and lumber kilns located at any facility. Plywood and composite wood products include, but are not limited to, plywood, veneer, particleboard, oriented strandboard, hardboard, fiberboard, medium density fiberboard, laminated strand lumber, laminated veneer lumber, wood I-joists, kiln-dried lumber, and glue-laminated beams.

The proposed facility is not a major source of HAP emissions therefore the Subpart is not applicable.

40 CFR 63 Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

Pursuant to 40 CFR 63.6585, this Subpart applies to owner or operators of stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

The portable gas powered emergency generators associated engines ~~will~~ shall not be subject to this Subpart is applicable to stationary internal combustion engines.

The facility has one (1) pickup truck-mounted portable gas generator that is part of a welding machine. Is it not subject to the Subpart requirements because it is considered to be a non road engine as defined in 40 CFR 1068.30.

The following three (3) engines are subject to this Subpart standards. In accordance with Subpart definitions, the engines are existing, non-emergency, stationary RICE.

6 HP Subaru Gasoline Engine, Model EX17
23 HP Kohler Gasoline Engine, Model CH23S
72 HP Kubota Diesel Engine, Model V3300-ES

They are required to:

1. Operate and maintain engine and control device per the manufacturer's instructions or owner-developed maintenance plan. (these engines are not equipped with catalysts)
2. May use oil analysis program instead of prescribed oil change frequency. This frequency is 1,000 hours (or annually) for the compression ignition diesel engine and 1,440 hours (or annually) for the spark injection gasoline engines and includes inspecting spark plugs, hoses and belts

40 CFR 63 Subpart DDDDD—National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters

Pursuant to 40 CFR 63.7480, this Subpart applies to owners or operators of an industrial, commercial, or institutional boiler or process heater as defined in §63.7575 of the Subpart that is located at, or is part of, a major source of HAP.

The proposed facility is not a major source of HAP emissions therefore the Subpart is not applicable.

In addition, the applicant states that the proposed equipment does not meet the Subpart definitions of a boiler or process heater.

The unit's primary purpose is not to recover energy in the form of steam or hot water nor is it to transfer heat indirectly to a process material (liquid, gas, or solid) or to a heat transfer material (e.g., glycol or a mixture of glycol and water) for use in a process unit, instead of generating steam. The heat of combustion from the refractory lined furnace directly contacts the wood chips to drive off moisture.

40 CFR 63 Subpart JJJJJJ—National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources

Pursuant to 40 CFR 63.11193, this Subpart applies to owners or operators of an industrial, commercial, or institutional boiler as defined in §63.11237 of the Subpart that is located at, or is part of, an area source of HAP.

40 CFR 63.11237 defines a *Boiler* to mean, "an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/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.

The applicant has stated that the unit does not meet the definition of a boiler, as such the Subpart is not applicable.

4.0.2. State Rule Applicability

Projects at stationary sources with the potential to emit air pollution are subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The statutes authorize the Department of Environmental Protection (Department) to establish regulations regarding air quality as part of the Florida Administrative Code (F.A.C.), which includes the following applicable chapters: 62-4 (Permits); 62-204 (Air Pollution Control – General Provisions); 62-210 (Stationary Sources – General Requirements); 62-212 (Stationary Sources – Preconstruction Review); 62-213 (Operation Permits for Major Sources of Air Pollution); 62-296 (Stationary Sources - Emission Standards); and 62-297 (Stationary Sources – Emissions Monitoring). Specifically, air construction permits are required pursuant to Rules 62-4, 62-210 and 62-212, F.A.C.

4.0.2.1. Chapter 62-4, F.A.C.

<u>Rule 62-4.070(1), F.A.C., Standards for Issuing or Denying Permits; Issuance; Denial.</u>

This rule applies to all permitting decisions:

- A permit shall be issued to the applicant upon such conditions as the Department may direct, only if the applicant affirmatively provides the Department with reasonable assurance based on plans, test results, installation of pollution control equipment, or other information, that the construction, expansion, modification, operation, or activity of the installation will not discharge, emit, or cause pollution in contravention of Department standards or rules

4.0.2.2. Rule 62-210.200 (PTE), F.A.C.

The applicant has requested a facility-wide VOC emissions cap of 208.0 tons per year in order to avoid PSD Major source classification and PSD review.

- The applicant proposes to demonstrate compliance with this emissions cap by limiting the maximum pellet production to no more than 62,000 tons per any consecutive 12-month period ~~as well as hours of operation to no more than 6, 200 per any 12-month consecutive period~~.

4.0.2.3. Rule 62-210.300, F.A.C., Permits Required

Unless exempted, the owner or operator of any facility or emissions unit which emits or can reasonably be expected to emit any air pollutant shall obtain appropriate authorization from the Department prior to undertaking any activity at the facility or emissions unit for which such authorization is required.

4.0.2.4. Rule 62-210.700, F.A.C. – Excess Emissions

This rule applies to all air permitting decisions. Only the key provisions potentially affecting this project are listed.

- Excess emissions resulting from startup, shutdown or malfunction of any emissions unit shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for longer duration.
- Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown, or malfunction shall be prohibited.
- Considering operational variations in types of industrial equipment operations affected by this rule, the Department may adjust maximum and minimum factors to provide reasonable and practical regulatory controls consistent with the public interest.

4.0.2.5. Rule 62-212.300, F.A.C. - General Preconstruction Review Requirements

This rule generally applies to the construction or modification of air pollutant emitting facilities in those parts of the state in which the state ambient air quality standards are being met.

4.0.2.6. Rule 62-212.400, F.A.C., PSD.

This rule does not apply because the project is not a major stationary (PSD) source.

4.0.2.7. Chapter 62-213, F.A.C.

Because the facility is a Title V source, the applicant ~~will~~ shall be required to apply for and obtain an initial Title V operation permit in accordance with the applicable provisions of Chapter 62-213, subsequent to the construction authorized by the air construction permit, and demonstration of compliance with the conditions of the air construction permit.

4.0.2.8. Rule 62-296.320, F.A.C. – General Pollutant Emission Limitation Standards

- This rule prohibits the discharge of air pollutants which cause or contribute to an objectionable odor;
- This rule specifies a visible emissions standard of 20 percent (%) opacity; and
- The rule prohibits emissions of unconfined PM provisions without taking reasonable precautions to prevent such emissions.

4.0.2.9. Rule 62-296.406, F.A.C., Fossil Fuel Steam Generators with Less than 250 MMBtu/hr Heat Input

- The wood cyclonic burner and combustion furnace does not meet the Department's definition of fossil fuel steam generator at Rule 62-210.200(129), F.A.C. which is, "A furnace or boiler which produces steam by combustion of oil, coal, or gas of fossil origin."

4.0.2.10. Rule 62-296.401, F.A.C., Incinerators

- The Department's definition of "incinerator" at Rule 62-210.200(147), F.A.C. is "a combustion apparatus designed for the ignition and burning of solid, semi-solid, liquid or gaseous combustible wastes". The fuel proposed by the applicant for the cyclonic wood burner/triple-pass rotary dryer furnace does not constitute waste or municipal solid waste according to the Department's rules. As such, term the term "incinerator" nor Rule 62-296.401, F.A.C. applies to this project.

4.0.2.11. Rule 62-296.410, F.A.C. - Carbonaceous Fuel Burning Equipment

- The clean woody biomass meets the Department's definition of carbonaceous fuel at Rule 62-210.200(61), F.A.C., which is "solid materials composed primarily of vegetative matter such as tree bark, wood waste, or bagasse."
- The wood cyclonic burner meets the Department's definition of carbonaceous fuel burning equipment at Rule 62-210.200(62), F.A.C. which is, "A firebox, furnace or combustion device which burns carbonaceous and fossil fuels for the primary purpose of producing steam or to heat other liquids or gases. The term includes bagasse burners, bark burners, and waste wood burners, but does not include teepee or conical wood burners or incinerators."
- This rule requires of burners of a capacity less than 30 MMBtu per hour total heat input that visible emissions not exceed 20% opacity except that 27% opacity is permissible for not more than 1- 6 minute period in any one-hour period.

4.0.2.12 Chapter 62-297, F.A.C.

This rule establishes general compliance test requirements as well as standards for persons engaged in visible emissions observations.

4.0.3. EMISSIONS CONTROLS

The proposed facility ~~will~~ shall utilize the following pollution control equipment, measures, and techniques to control air pollutants:

- Venting the Primary Hammer Mill to the combustion air of the wood cyclonic burner of the Triple-pass Rotary Dryer;
- Venting the Pelletizers and the Pellet Cooler to the combustion air of the wood cyclonic burner of the Triple-pass Rotary Dryer;
- Venting the Pellet Screener to the Ground Wood Storage Bin to recycle wood dust back into the dried feed stock;
- Equipping the Ground Wood Storage Bin with a dust collector to control PM emissions;
- Establishing a pellet production limitation of no more than 62,000 tons of pellets per any 12-month period in order to maintain VOC emissions below 208 ton per year;
- Parametric monitoring of the Triple-pass Rotary Dryer wood burning furnace temperature for assurance of continuous VOC combustion *(location of temperature monitoring device and temperature value to be established during initial performance testing)*
- Reasonable precautions and best management practices to minimize fugitive PM emissions from receiving, handling, storage and processing of clean woody biomass.
- Where practical the use of enclosed conveyors and other reasonable precautions as described in Rule 62-296.320(4)(c), F.A.C.

4.0.4. EMISSIONS PERFORMANCE TESTING

Due to the uncertainty of the emission factors used to estimate the VOC emissions at the Triple-Pass Rotary Dryer Stack (VOC emissions from the Triple-Pass Rotary Dryer, the Primary Hammer Mill, Pellet Mills, and Pellet Cooler) initially quarterly VOC emissions testing is being required for Emissions Unit 002. The facility has the option of requesting that the Department consider waiving the fourth VOC emissions if the results of the initial three performance tests are substantially identical (i.e. +10%) and also demonstrate compliance with the VOC emissions limit in the permit. ~~If the results of all four performance tests are below the VOC limit stated in the permit for this emissions unit, the facility may then conduct~~ Subsequent VOC performance tests are to be conducted on an annual basis for Emissions Unit 002 pursuant to Rule 62-297.310(7)(a)4., F.A.C.

An initial followed by annual VOC emissions testing is being required for Emissions Unit 003 (Secondary Hammer Mill and Ground Wood Storage Bin (including storage and handling estimated emissions)).

Due to the possibility of some VOC emissions being released from the cooled pellets in the load-out area, an initial VOC emissions test is being required at Emissions Unit 005 (Product Storage and Loud-out Area).

Compliance with the 208.0 tons per year VOC emissions cap ~~will~~ shall be demonstrated from actual emissions from the facility determined on a 12-month rolling basis from monthly calculated emissions. The monthly emissions ~~will~~ shall be calculated for Emissions Unit 002 (Triple-Pass Rotary Dryer, the Primary Hammer Mill, Pellet Mills, and Pellet Cooler), 003 (Secondary Hammer Mill, Ground Wood Storage Bin, and storage and handling estimated emissions) and 005 (Product Storage and Loud-out Area) using VOC emission factors determined for each Emissions Unit. The emission factors ~~will~~ shall be determined from the required valid performance test results in a per unit of input, or output, whichever is appropriate. The emission factors ~~will~~ shall be multiplied by the actual, monthly operational data (the appropriate input, output value) for each emission unit to calculate the monthly emissions. The monthly emissions shall be summed for each emissions unit to determine the total monthly VOC emissions for the Vulcan Renewables, LLC facility. The latest total monthly emissions shall be added to the emissions from the previous 11 consecutive months in order to demonstrate site emissions on a 12-month rolling basis.

Initially, an initial and annual NO_x emissions testing is being required for Emissions Unit 002. If the results of the two performance tests are below the NO_x limit stated in the permit for this emissions unit, the facility may then forego the NO_x performance tests for the next 3 years. A performance test is then required in Year 5 prior to

application for an operation permit renewal. Thereafter, NO_x performance tests ~~will~~ shall be required on a 5 year basis, prior to operation permit renewal pursuant to Rule 62-297.310(7)(a)3., F.A.C.

Initially, an initial and annual PM emissions testing is being required for Emissions Unit 002. If the results of the two performance tests are below the PM limit stated in the permit for this emissions unit, the facility may then forego the PM performance tests for the next 3 years. A performance test is then required in Year 5 prior to application for an operation permit renewal. Thereafter, PM performance tests ~~will~~ shall be required on a 5 year basis, prior to operation permit renewal pursuant to Rule 62-297.310(7)(a)3., F.A.C.

Initial and annual CO emissions testing is being required for Emissions Unit 002 pursuant to Rule 62-297.310(7)(a)4., F.A.C.

~~Initial and annual~~ Visible emissions testing is being required for the transfer or drop points that are located outdoors and uncovered at Emissions Unit 001 (Wood Chip Receiving and Storage Area), upon Department request in accordance with Rule 62-297.310(7)(b), F.A.C. – Special Compliance Tests. ~~pursuant to Rule 62-4.070, F.A.C. – Reasonable Assurance and~~ Initial and annual visible emissions testing is being required for Emissions Units 002, 003, 005 pursuant to Rule 62-297.310(7)(a)4., F.A.C.

5.0 PRELIMINARY DETERMINATION

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations as conditioned by the draft permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the draft permit. Rita Felton-Smith is the project engineer responsible for reviewing the application and drafting the permit. Additional details of this analysis may be obtained by contacting the project engineer at the Permitting Authority's Northeast District Office, ~~Waste and Air Resource Management~~ Permitting Program, 8800 Baymeadows Way West, Suite 100, Jacksonville, Florida 32256.

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Judson H. Turner, Director

MEMORANDUM

DATE: 1-29-2013

TO: Eric Cornwell- Stationary Source Permitting Manager

FROM: Manny Patel- VOC unit Manager

SUBJECT: Emission factors for Wood Pellet Manufacturing

BACKGROUND:

We are seeing a lot of wood pellet manufacturing application being submitted to GAEPD. These applications are all using different emission factors. It is GAEPD's desire to provide standardized emission factors for applicant's to use in wood pellet manufacturing application. This will make the applications consistent and aide in faster review of these applications.

GAEPD has done extensive testing at Georgia Biomass and have come to conclusion that in addition to dryers there a significant amount of VOC emissions from Hammermill, Pellet Coolers and storage and handling from wood pellet manufacturing operations.

BASIS OF RECOMMENDATION:

1. **VOC Emissions:**

   a. **Dryers:**
   It is our understanding that from the applications submitted to us that the operating temperatures of the dryer's used in pellet mill are very similar to that of particle board dryers. Additionally, the moisture content of the chips entering and exiting the pellet mill dryer and green particle board dryers are very similar. Hence, VOC emissions from the pellet mill dryers are same in amount and characteristics of particle board dryers.

   This approach was further validated when we took VOC emissions test from Georgia Biomass (May 2012, Agri Products Thomasville, GA (March 22, 2010), Agri products Fitzgerald, GA(March 19 2009), Telfair Products, Lumber City GA(August 27,2009) and compared to that of particle board dryer emissions factors from AP-42 for green wood as shown in the attached Table. Based on the comparison of different VOC emission factors we concluded that the particleboard dryers VOC emission factors from AP-42 Chapter 10, Table 10.6.2-3(SCC 3-07-006-25) are a good representation for the wood pellet dryers.

   b. **Hammermill, Pellet Cooler and Storage and Handling**

   The VOC emission factors for Hammermill, Pellet Cooler and storage were taken from May 16, 2012 testing for Georgia Biomass. This is the only current data we have so we suggest using these until more test becomes available.

2. HAP and HCl Emissions:

a. Dryers:

The emission of Formaldehyde, Acetaldehyde and Methanol from Georgia Biomass test (May 16,2012) were compared to emissions from Particle board dryers from AP-42 Chapter 10, Table 10.6.2-3(SCC 3-07-006-25) and OSB dryes from AP-42 Chapter 10, Table 10.6.1-3(SCC3-07-010-09). All of these emission factors are almost identical to each other. Hence it is suggested that HAP emission factors for Particle board dryer from AP-42 Chapter 10, Table 10.6.2-3(SCC 3-07-006-25) be used for Formaldehdye, acetaldehyde and methanol and adjusted where deemed necessary for worst case emissions.

HCl emissions from AP-42 Chapter 1, Table 1.6-3 for wood residue combustion should be used for estimating HCl emissions from wood pellet dryers.

b. Hammermill, Pellet Cooler and Storage and Handling

Georgia Biomass has performed HAP testing on the pellet cooler exhaust. We estimated the HAP emissions from the Hammermill and storage areas by taking the ratio of the VOC emissions from pellet cooler to hammer mill and storage areas and applied the same ratio to estimate HAP emissions.

3. NOX and CO and PM emissions:

a. Dryers:

Both NOx and CO are temperature dependent. OSB dryer operate at lower temperature and hence generate more CO and less NOx. While particle board dryers operate at higher temperature and hence generate less CO and more NOx. Hence, a worst case emission from both data sources is recommended for CO and NOx.

NOx emission factor from AP-42 Chapter 10 Table 10.6.2-2 for particleboard dryer (SCC3-07-007-08) should be used.

CO emission factor from AP-42 Chapter 10 Table 10.6.1-2 for OSB dryer (SCC3-07-0010-09) should be used.

b. PM Total and Condensible:

PM total and condensible should be calculated by using AP-42 Chapter 6, Table 10.6.2-1 for Particle board dryer (SCC 3-07-006-25).

GAEPD RECOMMENDED EMISSION FACTORS FOR WOOD PELLET MANUFACTURING

Emission Source	**Uncontrolled Emission Factor**	**Basis of Emission factor**	**Control Device**
Rotary Dryer Direct wood fired processing green softwood	6.0 lb/ODT for VOC	AP-42 Table 10.6.2-3 SCC 3-07-006-25 (Adjusted)	If emissions are routed to the dryer with WESP/RTO controls use 95% DRE for VOC and HAP
	5.3 lb/ODT for CO	AP-42 Table 10.6.1-2 SCC3-07-010-09	
	2.7 lb/ODT for NOx	AP-42 Table 10.6.2-2 SCC 3-07-006-25	
	2.2 lb/ODT for PM total	AP-42 Table 10.6.2-1 SCC 3-07-006-25	
	1.1 lb/ODT for PM Condensible	AP-42 Table 10.6.2-1 SCC 3-07-006-25	
	0.11 lb/ODT for Acetaldehyde	AP-42 Table 10.6.2-3 SCC 3-07-006-25 (Adjusted)	
	0.14 lb/ODT for Formaldehyde	AP-42 Table 10.6.2-3 SCC 3-07-006-25	
	0.11 lb/ODT ton for Methanol	AP-42 Table 10.6.2-3 SCC 3-07-006-25	If WESP is used for PM control use 70% removal efficiency for HCl (pH of the water needs to be monitored and maintained)
	1.9 E-02 lb/MM Btu for HCl	AP-42 Table 1.6-3	
Hammermill	2.5 lb VOC/ton product	Georgia Biomass Testing	If emissions are routed to dryer 90 % DRE for VOC and HAP
	0.004 lb/ton of product for Acetaldehyde	Georgia Biomass-prorated from Pellet Cooler testing	
	0.008 lb/ton of product for Formaldehyde	Georgia Biomass-prorated from Pellet Cooler testing	If emissions are routed to RTO use 95 % DRE for VOC and HAP. .
	0.004 lb/ton for Methanol	Georgia Biomass-prorated from Pellet Cooler testing	

Emission Source	Uncontrolled Emission Factor	Basis of Emission factor	Control Device
Pelletizer/Pellet Cooler (without Steam injection or extraction)	0.5 lb VOC/ton of Product	Georgia Biomass Testing	If emissions are routed to dryer 90 % DRE for VOC and HAP
	0.001 lb/ton of product for Acetaldehyde	Georgia Biomass Testing	
	0.002 lb/ton of product for Formaldehyde	Georgia Biomass Testing	If emissions are routed to RTO use 95 % DRE for VOC and HAP.
	0.001 lb/ton of product for Methanol	Georgia Biomass Testing	
Pelletizer/Pellet Cooler (with Steam injection)	1.3 lb VOC/ton of product	Georgia Biomass Testing	If emissions are routed to dryer 90 % DRE for VOC and HAP
	0.002 lb/ton of product for Acetaldehyde	Georgia Biomass- prorated from Pellet Cooler testing	
	0.004 lb/ton of product for Formaldehyde	Georgia Biomass- prorated from Pellet Cooler testing	If emissions are routed to RTO use 95 % DRE for VOC and HAP.
	0.002 lb/ton of product for Methanol	Georgia Biomass- prorated from Pellet Cooler testing	
Storage/Handling	0.4 lb VOC/ton of product	Georgia Biomass Testing	If emissions are routed to dryer 90 % DRE for VOC and HAP
	0.001 lb/ton of product for Acetaldehyde	Georgia Biomass- prorated from Pellet Cooler testing	
	0.002 lb/ton of product for Formaldehyde	Georgia Biomass- prorated from Pellet Cooler testing	If emissions are routed to RTO use 95 % DRE for VOC and HAP
	0.001 lb/ton of product for Methanol	Georgia Biomass- prorated from Pellet Cooler testing	

Note: These are GAEPD recommended emission factors. Use of these emission factors does not guarantee compliance with all state and federal regulations