TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Green Circle Bio Energy, Inc.
2500 Green Circle Parkway
Cottondale, Florida 32431

Madison Site
Facility ID No. 0790025

PROJECT

Project No. 0790025-002-AC
Application for Initial Air Construction Permit
Wood Pelleting Plant

COUNTY

Madison, 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

July 15, 2014

1. GENERAL PROJECT INFORMATION

Air Pollution Regulations

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.

In addition, 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.

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.

Facility Description and Location

Green Circle Bio Energy, Inc., proposes to construct a new Wood Pelleting Plant, which is categorized under Standard Industrial Classification Code No. 2499. The facility will be located in Madison County at the Eastside of SR 53, approximately 0.5 miles south of Harvey Green Drive in Madison, Florida. The UTM coordinates of the new facility are Zone 17, 269.5 km East, and 3370.8 km North. 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).

Facility Regulatory Categories

- 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.

Project Description

Initial Air construction permit, which authorizes the construction of a Wood Pelleting Plant which will consist of a dust burner/dryer, hammer mills, silos, storage bins, pellet mills, pellet cooler, pellet sieve, pellet load-out, fire pump and two emergency generators.

2.0. Process Description:

Green Circle Bio Energy Inc. (Green Circle) is proposing to construct a wood pelleting plant in Madison County, Florida. The facility will be built on a 160-acre greenfield site located south of the town of Madison on the east side of State Road 53 south of the railroad tracks. A facility location map is included as Attachment GC-Fl-CC1 of the attached permit application. The facility will receive chipped virgin hardwood and softwood (green wood), both hardwood and softwood saw mill chips/saw dust, and dry wood shavings. The facility will have the capacity to produce a maximum of 743,000 short tons per year (TPY) of wood pellets for transport via rail to the Port of Jacksonville.

2.1. Wood Receiving, Storage, Transfer and Processing:

Green Circle will receive green chipped hardwood, green chipped softwood, saw mill chips, saw dust, and dried wood shavings via truck delivery. Truck dumps will be used to empty trucks of these raw materials. Radial conveyor slackers will be used to transfer chipped wood from the truck dump to separate hardwood and softwood storage piles. Dried shavings will be conveyed to a separate storage silo.

Chipped hardwood and softwood will be reclaimed from their respective storage piles by front-end loaders and placed in designated reclaim hoppers. The reclaim hoppers feed chip conveyors with variable speed drives so that the proper mix of hardwood and softwood can be metered together. Ferrous metals will be removed from the chip mix before it is further processed by a thickness screen. Oversized materials from the thickness screen will be sent to a re-chipper. Wood chips passing through the thickness screen will be transferred to a small silo which will serve as buffer storage and the metering device for the dryer. Dried shavings will be introduced into the process after the dryer, but before the hammer mill area of the facility.

2.2. Dryer:

Green Circle will feed metered amounts of hardwood and softwood into the dryer. Typically, hardwood contains approximately 30 percent of the voc found in softwood. Green Circle will employ this characteristic of hardwood to limit voc emissions from the dryer. Under normal operations, Green Circle plans to feed equal weights of hardwood and softwood into the dryer. To limit voc emissions from the dryer and other downstream process equipment (e.g., hammer mills and pellet mills, pellet mill coolers}, the amount of softwood fed into the dryer will be metered to maintain voc compliance throughout the facility. Wood chips will be dried to a moisture content of approximately 6.5 percent weight.

Heat for the dryer, which is direct-fired, will be provided by a wood dust burner with a projected maximum heat input rate of 240 million British thermal units per hour (MMBtu/hr). Fuel for the dust burner will be collected from the hammer mill and pellet mill dust collection systems, cooler cyclones, and the vibrating screen pellet sieve. Prior to introduction into the dust burner, this material will be further processed though a hammer mill with a dust collector. The exhaust from this dust collector will be vented directly to the dust burner. Natural gas will be used as a supplemental fuel for initial start-up of the dust burner.

The exhaust gases from the dryer will be vented to a wet electrostatic precipitator (WESP) for PM control and then to a regenerative thermal oxidizer (RTO) for VOC, CO, and HAP control. Dried wood chips from the dryer will be conveyed to the hammer mills for further processing.

2.3. Hammer Mills:

Wood chips from the dryer will be conveyed to the Grinding Building. Additionally, dried wood shavings may be introduced to the process between the dryer and Grinding Building. In the Grinding Building, hammer mills will be used to grind the wood chips and shavings into a form suitable for further processing in the pellet mills. A dust collection system will be used to remove fines from the grinding process. Consequently, this system may remove moisture and voc. Any moisture, PM, or VOC removed by the hammer mill dust collection system will be vented to the fuel system for the dust burner where it will be thermally treated in the dust burner itself and eventually exhausted from the dryer to the WESP and RTO. Ground wood from the hammer mills will be stored in a storage silo before it is transferred to the Pelleting Building.

2.4. Pellet Mills:

Wood chips from the dryer will be conveyed to the Grinding Building. Additionally, dried wood shavings may be introduced to the process between the dryer and Grinding Building. In the Grinding Building, hammer mills will be used to grind the wood chips and shavings into a form suitable for further processing in the pellet mills. A dust collection system will be used to remove fines from the grinding process. Consequently, this system may remove moisture and VOC. Any moisture, PM, or VOC removed by the hammer mill dust collection system will be vented to the fuel system for the dust burner where it will be thermally treated in the dust burner itself and eventually exhausted from the dryer to the WESP and RTO. Ground wood from the hammer mills will be stored in a storage silo before it is transferred to the Pelleting Building.

Ground wood from the storage silo will be conveyed to the Pelleting Building. Pellet mills will be used to process the ground wood into wood pellets. The pellet mills force ground wood through forged alloy dies. The heat of friction during the pelletizing process is sufficient to liquefy the lignin in the wood and bind the ground wood into a pellet without the addition of other binders. A dust collection system, similar to that used for the hammer mills, will be used to remove PM, moisture, and VOC from the pelletizing process. In a manner similar to the hammer mill dust collection system, moisture, PM, and VOC (captured by the pellet mill dust collection system) will be vented to the fuel system for the dust burner and similarly processed by the dust burner itself, WESP, and RTO.

Four counter-current air coolers will be used to reduce the temperature of the wood pellets produced by the pellet mills. Cyclones will be used to separate dust and fines from the wood pellets in the air stream. The exhaust from the coolers cyclones may contain PM and VOC which will be vented to the atmosphere. Any wood dust collected by the cyclones will be transferred to the fuel system for the dust burner.
From the coolers, the wood pellets will proceed to pellet sieves consisting of vibrating screens. Reject material from the vibrating screens will be transferred to the fuel system for the dust burner. Pellets leaving the sieves will be conveyed to the Bulk Load-Out System.

2.5. Bulk Load-Out System:

The Bulk Load-Out System will directly load trucks and/or railcars for transport of wood pellets to the port. As this loading will occur inside a structure and wood pellets will be transferred to an enclosed railcar or truck, no significant PM emissions are expected from the Bulk Load-Out System.

2.6. Support Equipment:

Green Circle is proposing to install two 300 kilowatt-electric (KWe) emergency generators and a fire pump at the Madison facility (see Appendix B). The emergency generators will be manufactured by Blue Star Power Systems (Model No. NG300-01) or the equivalent and will be natural gas-fired. The fire pump will be a diesel fuel-fired unit manufactured by John Deere (Model No. JUAH-UF58) or an equivalent unit. The selected fire pump will be certified by the National Fire Protection Association which requires that it meet U.S. Environmental Protection Agency (EPA) requirements.

3.0. Emissions Inventory

3.1 Criteria and Hazardous Air Pollutants

Green Circle's proposed wood pelleting facility includes five exhaust stacks associated with production of wood pellets – the RTO stack and four pellet cooler stacks three additional exhaust stacks associated with two emergency generators and a diesel fuel-fire fire pump. Emissions from the RTO stack include products for combustion from the dust burner and the supplemental firing of natural gas in the RTO, and PM and VOC (including some hazardous air pollutants [HAPs]) from the wood drying process. Emissions from the cooler stacks include PM and VOCs released during cooling of the pellets. No significant PM emissions are anticipated for the Bulk Load-out System. Emission estimates from each of these sources are detailed in the following sections.

3.1.2. Pellet Coolers

Green Circle will employ four counter-current air coolers to reduce the temperature of the newly formed pellets prior to transferring them to the Bulk Load-Out System. Cyclones will be used to separate the wood pellets and some entrained PM from the cooling air. The exhaust from cyclones contain PM and VOC and will be exhausted directly to the atmosphere.

VOC emissions from the cooler cyclones are based on testing performed at Green Circle's facility located in Cottondale, Florida. Operation of the pellet mill coolers at the Cottondale facility is identical to the proposed operation of the pellet mill coolers at the proposed Madison facility with one notable exception – the Cottondale facility primarily processes only softwood. Generally, the VOC content of hardwood is only about 30 percent that of softwood. To reduce VOC emissions from the Madison facility, Green Circle is proposing to limit annual softwood chip usage to no more than 50 percent of total wood usage. VOC emission rate calculations for the Pellet Coolers are presented in Table 3-3.

Green Circle is proposing to use Model No. 3H43 HI-TECH Cyclones manufactured by LMM, or the equivalent, on each pelletizing line. PM emission rate calculations for each cyclone, as provided by LMM, are presented in Appendix A and are a function of the maximum pellet production rate, the fines content entrained with the pellets, and PM control efficiency. Using a maximum pellet production rate of 32 tons per hour (TPH), a worst-case fines content of 10 percent, and a PM control efficiency for the cyclone of 92 percent, a maximum PM emission rates for each cyclone was calculated by LMM to be 5.1 pounds per hour (lb/hr) or 22 TPY, assuming 8,760 hours of annual operation. The total annual PM emission rate from all four pellet cooler stacks will be 89 TPY. PM emission calculations for the cooler cyclones are presented in Table 3-4.

The coolers are also sources of HAP emissions. HAP emission estimates for the coolers are based on emission factors provided by Rajeev Gupta of the Mississippi Department of Environmental Quality for the Enviva wood pellet production facility located in Wiggins, Mississippi which uses a similar mix of hardwoods and softwoods. These emission factors were used to permit Green Circle's facility in Lucedale, Mississippi and are currently the only known source of HAP emission factors for wood pellet coolers. Estimates of HAP emissions from the pellet coolers are presented in Table 3-5.

3.1.3. Support Equipment – Fire Pump and Two Emergency Generators

Emission estimates for the proposed fire pump and emergency generators are presented in Tables 3-6 and 3-7, respectively.

3.2. Greenhouse Gas Emissions

Sources of GHG emissions at the proposed facility are wood firing in the dust burner, natural gas-firing as a supplemental fuel in the RTO, natural gas-firing in the two proposed emergency generators, and diesel fuel-firing in the fire pump. GHG emission calculations for the dust burner are presented in Table 3-8. As shown in Table 3-8, total annual GHG emissions from the RTO stack, due to both biogenic and non- biogenic fuels, are estimated to be 205,970 TPY of CO_2e. The majority of the CO_2e emissions, from the RTO stack, 200,430 TPY CO_2e, are from the dust burner, which fires wood dust, a biogenic fuel. Non- biogenic GHG emissions from the RTO are only 5,539 TPY CO_2e. ***{Biogenic and non-biogenic GHG emissions were not considered separately in the technical evaluation of the PSD applicability.}***

GHG emission calculations for the two proposed emergency generators and fire pump and presented in Table 3-9. These calculations are based on 500 hours of annual operation for these units.

A discussion of the regulatory implications of potential GHG emissions from the facility is presented in Section 4.1.

3.3. Facility-Wide Emissions

A summary of potential facility-wide annual emission rates is presented in Table 3-10. As shown in Table 3-10, potential 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. A discussion of the regulatory implications of these emission rates with regard to PSD applicability is presented in Section 4.1.

Table 3-10 shows potential facility-wide GHG emissions from the facility are in excess of 100,000 CO_2e, however the Supreme Court vacated the CO2 emissions trigger for PSD applicability on July 7, 2014. The applicant does supply discussion of the implications of GHG emission rates in Section 4.1.

As indicated by Table 3-10, potential annual emissions of all criteria pollutants emitted by the facility are above 100 TPY, the Title V Air Operation applicability threshold for criteria pollutants. However, total and individual HAP emissions are below the Title V applicability thresholds of 25 and 10 TPY, respectively. A discussion of the implication of these HAP emission rates is presented in Section 4.2.

{While the application discusses a biogenic deferral (which does not currently exist), the Supreme Court vacated the Prevention of Significant Deterioration (PSD) determination based solely on CO_2e emissions as a trigger for Title V applicability in July 2014.}

Table 3-1. Summary of Criteria Pollutant Emission Rates for the RTO Stack

Pollutant	Hourly Emission Rate (lb/hr)	Annual Emission Rate[c] (TPY)
Particulate Matter	4.3[a]	18.8
Sulfur Dioxide	5.5[b]	24.1
Nitrogen Oxides	56.0[a]	245
Carbon Monoxide	37.6[a]	165
Volatile Organic Compounds	9.5[a]	41.6

a As provided by the Megtec, a potential vendor of the WESP and RTO, based on information provided to them from the manufacturer of the dryer and dust burner.

b An emission factor of 0.025 lb/MMBtu was used to estimate SO_2 emissions from wood combustion in the dust burner used to heat the dryer. The source of this emission factor was AP-42, Compilation of Air Pollutant Emission Factors, Section 1.6, Wood Residue Combustion in Boilers. The maximum firing rate of the dust burner is 28,700 lb/hr of wood.

A heat content of wood of 16.73 MMBtu/ton was used to estimate the maximum heat input rate of 240 MMBtu/hr.

c Assumes 8,760 hr/yr of operation.

Table 3-2. Summary of Hazardous Air Pollutants Emission Rates for the RTO Stack

Pollutant	Hourly Emission Rate (lb/hr)		Annual Emission Rate[b] (TPY)
Formaldehyde	1.7	a	7.4
Acetaldhyde	1.2	a	5.3
Total Hazardous Air Pollutants	2.9		12.7

Notes:

a As provided by the Megtec, the vendor of the WESP and RTO, based on information provided to them from the manufacturer's of the dryer and dust burner (see Appendix A).

b Assumes 8,760 hr/yr of operation.

Table 3-3. Summary of Volatile Organic Compound Emission Rates for all Four Pellet Mill Cooler Stacks Combined

	Maximum Hourly Pellet Production (TPH)	Maximum Annual Pellet Production (TPY)	VOC Emission Factor (lb/ton pellets produced)	Maximum Hourly VOC Emission Rate (lb/hr)	Annual VOC Emission Rate (TPY)
Dried Softwood Chips	128	299,000	0.77[a]	98.6	115.1
Hardwood/Softwood Shavings (not processed through the dryer)	128	145,000	0.77[a]	98.6	55.8
Dried Hardwood Chips	128	299,000	0.23[b]	29.6	34.5
Total	128[c]	743,000		96.6[d]	205.5

NOTES:

a. Based on stack test results and current Air Construction Permit for Green Circle's facility located in Cottondale, Florida.

b. Assumes the typical VOC content of hardwood is 30 percent that of softwood.

c. Maximum hourly production from the Pelleting Lines is 128 TPH which could be entirely hardwood, softwood, or shavings for any given hour, although a mlx will typically be used.

d. Worst-case hourly emission rate.

Table 3-4. Summary of Particulate Matter Emission Rates for the Four Pellet Cooler Stacks

Pollutant	Hourly Emission Rate (lb/hr)	Annual Emission Rate" (TPY)
Particulate Matter	20.4 [a]	89

Notes:

a. Based on a 5.1 lb/hr PM emission rate for each cooler stack as provided by LMM, the manufacturer of the cooler cyclone and 4 pellet coolers. See Appendix A, Abnormal Case (10% fines), maximum throughput of 32 TPH per cooler, and a 92 percent control efficiency.

b. Assumes 8,760 hr/yr of operation.

Table 3-5. Summary of HAP Emission Rates for all Four Pellet Mill Cooler Stacks Combined

	Maximum Hourly Pellet Production[a] (TPH)	Maximum Annual Pellet Production[b] (TPY)	HAP Emission Factor[c] (lb/oven dried ton pellets produced)	Maximum Hourly HAP Emission Rate (lb/hr)	Annual HAP Emission Rate (TPY)
Methanol	121.6	705,850	0.003	0.36	1.06
Acetaldehyde	121.6	705,850	0.005	0.61	1.76
Acrolein	121.6	705,850	0.009	1.09	3.18
Formaldehyde	121.6	705,850	0.005	0.61	1.76
Propionaldehyde	121.6	705,850	0.002	0.24	0.71
Total				2.9	8.5

Notes:

a Based on a maximum hourly pellet production rate of 128 TPH at a moisture content of 5o/o, oven dried to a moisture content of Oo/o. 128 TPH x (1-0.05) = 121.6 TPH dry.

b Based on a maximum annual pellet production rate of 743,000 TPY at a moisture content of 5o/o, oven dried to a moisture content of Oo/o. 743,000 TPY x (1-0.05) = 705,850 TPY dry.

[0] As based on emission factors submitted to the Mississippi Department of Environmental Quality by Enviva in December 2013 for a high efficiency cooler cyclone located at their facility in Wiggins, Mississippi.

Table 3-6. Calculation of Criteria Pollutant Emission Rates for the Stationary Fire Pump

Regulated Pollutant	Emission Factor (g/hp-hr)	Ref.	Activity Factor (hp)	Hours of Operation (hours)	Hourly Emissions (lb/hr)	Annual Emissions (TPY)
Particulate Matter (PM_{10})	0.22	1	110	500	0.053	0.013
Particulate Matter ($PM_{,2.5}$)	0.22	1	110	500	0.053	0.013
Sulfur Dioxide (SO_2)	--	2	--	500	0.027	0.0068
Nitrogen Oxides (NO_x)	3.00	1	110	500	0.73	0.18
Carbon Monoxide (CO)	0.87	3	110	500	0.21	0.053
Volatile Organic Compounds (VOC)	0.16	3	110	500	0.04	0.010

References:

1. Based on NSPS Subpart IIII, Table 4.

2. Based on a diesel fuel usage rate of 3.8 gal/hr, a diesel fuel density of 7.05 lb/gal, and a sulfur content of 0.05% by wt., $S0_2$ emissions are calculated to be 3.8 gal/hr x 7.05 lb/gal x 0.05 lb S/100 lb diesel fuel x 64 lb SO_2/32 lb S = 0.027 lb/hr

3. Based on emission data report provided by Clarke Fire Protection.

Table 3-7. Calculation of Criteria Pollutant Emission Rates for the Emergency Generators

Regulated Pollutant	Emission Factor (g/hp-hr)	Ref.	Activity Factor (hp)	Hours of Operation (hours)	Hourly Emissions (lb/hr)	Annual Emissions (TPY)
EMERGENCY GENERATOR NO. 1						
Particulate Matter (PM_{10})	1.15E-02	1	459	500	1.16E-02	2.91 E-03
Particulate Matter	1.15E-02	1	459	500	1.16E-02	2.91 E-03
($PM_{2.5}$) Sulfur Dioxide	6.79E-04	1	459	500	6.87E-04	1.72E-04
($S0_2$)	2.00	2	459	500	2.02	0.51
Nitrogen Oxides (NO_x)	2.00	3	459	500	2.02	0.51
Carbon Monoxide (CO)	0.70	3	459	500	0.71	0.18
Volatile Organic Compounds (VOC)						
EMERGENCY GENERATOR NO. 2	1.15E-02	1	459	500	1.16E-02	2.91 E-03
Particulate Matter (PM_{10})	1.15E-02	1	459	500	1.16E-02	2.91 E-03
Particulate Matter ($PM_{2.5}$)	6.79E-04	1	459	500	6.87E-04	1.72E-04
Sulfur Dioxide (SO_2)	2.00	2	459	500	2.02	0.51
Nitrogen Oxides (NO_x)	2.00	3	459	500	2.02	0.51
Carbon Monoxide (CO)	0.70	3	459	500	0.71	0.18
Volatile Organic Compounds (VOC)						

References:

1. **Based on the following emission factors from AP-42, Chapter 3.2, Natural Gas Fired Reciprocating Engines (4-Stroke Lean Burn),** July 2000:

   PM"(filterable): 7.71E-05 lb/MMBtu = 8.90E-05 glhp-hr

   PM_{10} (Condensible): 9.91E-03 lb/MMBtu = 1.14 E-02 g/hp-hr

   Total: 9.99E-03 lb/MMBtu = 1.15E-02 g/hp-hr

   $PM_{2.5}$ assumed = to PM_{10}

   SO_2: 5.88E-04 lb/MMBtu = 6.79E-04 g/hp-hr

   A factor of 1.155 was used to convert emission factors from lb/MMBtu to g/hp-hr.

   1 lb/MMBtu x 1 MMBtu/10^6 BTU x 2.547 Btu/hp-hr x 453.59 g/lb = 1.155 g/hp-hr

2. **Based on NSPS Subpart JJJJJ.**

3. **Based on Certificate of Conformity Emission Standards, EPA Certificate No. DPWRB14.6NGP-004, Issued to Power Solutions International, 12/20/2013.**

Table 3-8. Potential Greenhouse Gas Emissions

Pollutant	Emission Factor [a] (kg/MMBtu)	Emission Factor [a] (lb/MMBtu)	Activity Factor[a]	Hourly Emissions (lb/hr)	Annual Emissions (TPY)[b]
Wood Dust Burner (Biogenic)			26,300 lb/hr wood		
-- Carbon Dioxide (CO_2)	9.38E+01	2.07E+02	218.369 MMBtu/hr	45,157	197,789
-- Methane (CH_4)	7.20E-03	1.59E-02	218.369 MMBtu/hr	3.47	15
-- Nitrogen Oxide (N_2O)	3.60E-03	7.94E-03	218.369 MMBtu/hr	1.73	8
-- Greenhouse Gases (mass basis) c	9.38E+01	2.07E+02	218.369 MMBtu/hr	45,162	197,811
-- Greenhouse Gases (CO_2e basis) c	9.51 E+01	2.10E+02	218.369 MMBtu/hr	45,760	200,430
- RTO Natural Gas (Non-Biogenic)			10,526 scf/hr		
-- Carbon Dioxide (CO_2)	5.31E+01	1.17E+02	10.8 MMBtu/hr	1,263	5,533
-- Methane (CH_4)	1.00E-03	2.20E-03	10.8 MMBtu/hr	0.02	0
-- Nitrogen Oxide (N_2O)	1.00E-04	2.20E-04	10.8 MMBtu/hr	0.00	0
-- Greenhouse Gases (mass basis)c	5.31E+01	1.17E+02	10.8 MMBtu/hr	1,263	5,534
-- Greenhouse Gases (CO_2e basis)c	5.31E+01	1.17E+02	10.8 MMBtu/hr	1,265	5,539
			Facility Total		
			Carbon Dioxide (CO_2)	46,421	203,322
			Methane (CH_4)	3.49	15
			Nitrogen Oxide (N_2O)	1.74	8
			Greenhouse Gases (mass basis) [c]	46,426	203,345
			Greenhouse Gases (CO_2e basis) [c]	47,025	205,970

NOTES:

[a] Based on 40 CFR 98, Subpart C, Tables C-1 and C-2 for wood/wood residuals and natural gas. Standard heating values are 17.48 MMBtu/ton from dry wood/wood residuals and 1,028 MMBtu/10^6 ft^3 natural gas. To correct heat content for moisture content inwood, the standard formula is used: HHVw = ((100 - M)/100) • HHVd, where HHVw is the wet heating value, HHVd is the dry healing value (17.48 MMBtu/ton), and M is the moisture content (50%). The result is a value for HHVw of 16.61 MMBtulton.

[b] Based on 8,760 hr/yr operation.

[c] Greenhouse Gases (mass basis) = sum of emission rates of CO_2,CH_4, and N_2O on a mass basis.

Greenhouse Gases (CO_2e basis) = sum of emission rates of CO_2, CH_4, and N_2O using global warming potentials (GWP).

GWP: CO_2 = 1, CH_4 = 25, and N_2O = 298. GHG = $CO_2 + CH_4 + N_2O$, $CO_2e = CO_2 + 25*CH_4 + 298*N_2O$.

Processing Schedule

07/1/2014 Received the application for an air pollution construction permit.

2. PSD APPLICABILITY

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.

PSD Applicability for Project

Pollutant	RTO Stack (TPY)	Pellet Mill Cooler Stacks (TPY)	Fire Pump (TPY)	Generators (TPY)	Total (TPY)
Particulate Matter	19	89	0.01	0.005819	108
Sulfur Dioxide	24		0.01	0.00034	24
Nitrogen Oxides	245	-	0.18	1.01	246
Carbon Monoxide	165	-	0.05	1.01	166
Volatile Organic Compounds	42	205	0.01	0.35	247
Formaldehyde	7.4	1.8		-	9.2
Acetaldhyde	5.3	1.8	-	-	7.1
Methanol	-	1.1	-		1.1
Acrolien		3.2	-		3.2
Propionaldehyde		0.7	-		0.7
Total Hazardous Air Pollutants	13	8			21
Greenhouse Gas ($C0_2e$)	205,970		22	188	206,180

3. APPLICATION REVIEW

Discussion of Emissions

The application states that the facility wants to limit the annual softwood chip usage to no more than 50% of the total wood usage in order to reduce the VOC emissions from the plant.

Greenhouse Gases (GHG) CO_2e: Total emissions are 206,180 TPY.

<u>Facility-Wide (NO_x) and (VOC)</u>. The Permittee shall not discharge or cause the discharge into the atmosphere from the entire facility, any emissions which contain **Nitrogen Oxides (NO_x) or Volatile Organic Compounds (VOC)** in excess of **250** tons during any twelve consecutive months.

[Rules 62-4.070(3) and 62-210.200(PTE), F.A.C., and Permit Application No. 0790025-002-AC Avoidance of PSD]

Maximum Annual Production (EUs 001-004). The maximum annual production rate of wood pellets shall not exceed 743,000 TPY as determined for each consecutive 12-month period on a rolling monthly basis. **The Pellet Mill will have a softwood chip limit to no more than 50% of total wood usage to reduce VOC emissions.**

Green Hardwood Chips- 660,592 TPY,
Green Softwood Chips- 660,592 TPY, and
Dried shavings- 145,000 TPY.[1]

[1]These limits are reflective of the wood needed for the 743,000 TPY maximum production rate of wood pellets.

[Rules 62-4.070(3), and 62-210.200(PTE), F.A.C., and Application No. 0790025-002-AC to escape PSD]

State Requirements

Rules 62-4.070(3), 62-210.200(PTE) and 62-297, F.A.C.

EU001 Wood fiber receiving and storage area, **EU003** Pellet Lines and **EU004** Load-Out Area:

Rule 62-296.320(4)(b)1., F.A.C.

EU002 Dust Burner/ Dryer:

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

Federal NSPS Provisions

EU005 Fire Pump:

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

EU006 Emergency Generators:

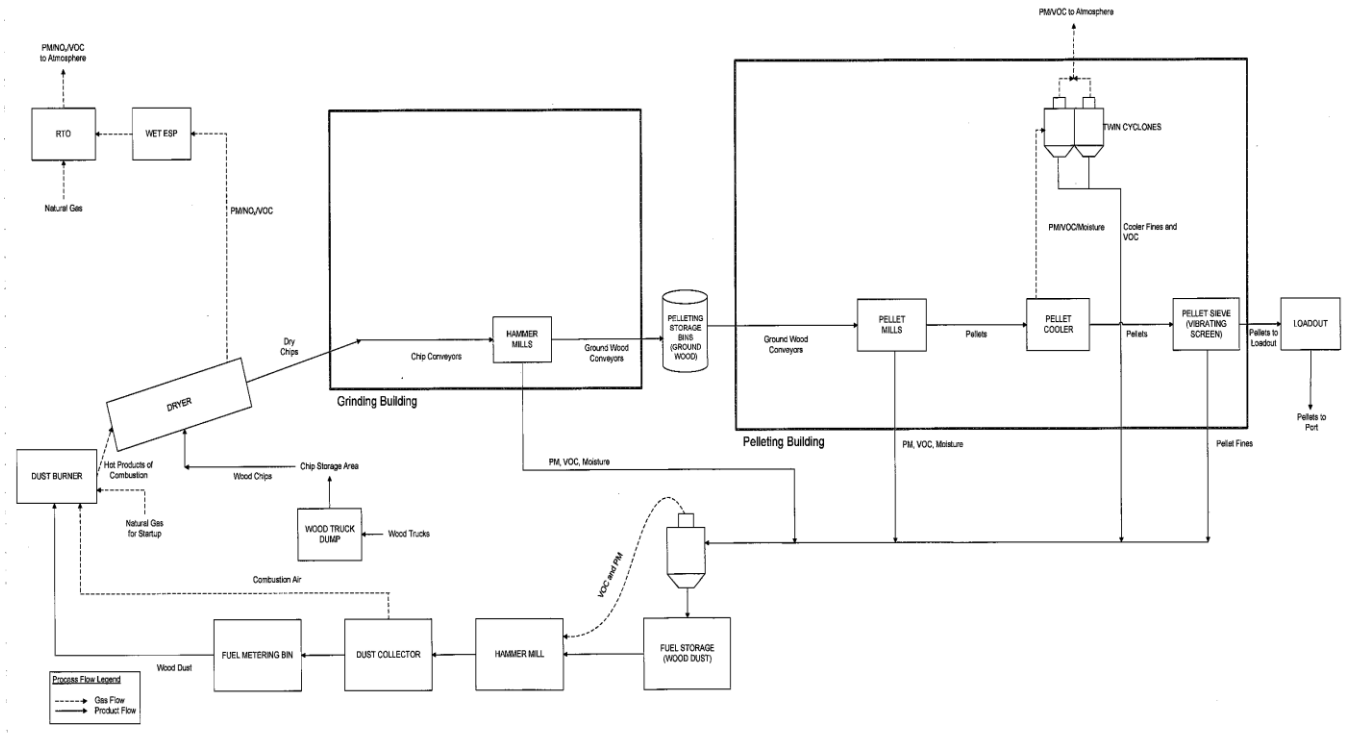
40 CFR 60, Subpart JJJJ- Standards of Performance for Stationary Spark Ignition Internal Compression Engines.

Federal NESHAP Provisions

EU005 Fire Pump and EU006 Emergency Generators 1 and 2:

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

Preliminary Process Flow Diagram – Madison, FL



4. 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. Leslie Maybin 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 Program, 8800 Baymeadows Way West, Suite 100, Jacksonville, Florida 32256.