**F.E. Wood - Natural Energy LLC**
**Cumberland County**
**West Baldwin, Maine**
**A-1106-71-A-N (SM)**

**Departmental**
**Findings of Fact and Order**
**Air Emission License**

## FINDINGS OF FACT

After review of the air emissions license application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 Maine Revised Statutes Annotated (M.R.S.A.), §344 and §590, the Maine Department of Environmental Protection (Department) finds the following facts:

## I. REGISTRATION

### A. Introduction

F.E. Wood - Natural Energy LLC (F.E. Wood) has applied for an Air Emission License to construct and operate a pellet mill facility. The proposed facility will produce natural softwood pellets.

The equipment addressed in this license is to be located in West Baldwin, Maine.

### B. Emission Equipment

The following equipment is addressed in this air emission license:

**Fuel Burning Equipment**

| Equipment | Maximum Capacity (MMBtu/hr) | Maximum Firing Rate | Fuel Type | Date of Manuf. | Stack # |
|---|---|---|---|---|---|
| Dryer Burner | 55 | 6.3 tons/hr | Wood bark, chips, sawdust | TBD | 1 |
| Regenerative Thermal Oxidizer | 3.5 | 39.0 gal/hr | Propane | TBD | 1 |

**Process Equipment**

| Equipment | Raw Material Process Rate | Maximum Finished Material Process Rate | Pollution Control Equipment | Stack # |
|---|---|---|---|---|
| Dryer (direct fired rotary drum) | 40 tons/hr | 195,000 tons pellets/yr (dried, 10% moisture content) | Wet Electrostatic Precipitator (WESP) and Regenerative Thermal Oxidizer (RTO) | 1 |

C. Application Classification

A new source is considered a major source based on whether or not total licensed annual emissions exceed the "Significant Emission" levels as defined in the Department's *Definition Regulation*, 06-096 CMR 100 (as amended).

| Pollutant | Total Licensed Annual Emissions (TPY) | Significant Emission Levels |
|---|---|---|
| PM* | 11.5 | 100 |
| $PM_{10}$* | 11.5 | 100 |
| $PM_{2.5}$* | 11.5 | 100 |
| $SO_2$ | 1.2 | 100 |
| $NO_x$ | 49.1 | 100 |
| CO | 69.8 | 100 |
| VOC | 28.1 | 50 |
| $CO_2e$ | < 100,000 | 100,000 |

Table note:

* To determine if the source is major, emissions estimates were calculated for the Dryer Burner/Dryer (10.5 tpy) and the process equipment (1.0 tpy). However, the process emissions will be regulated in the license through opacity limits rather than mass emission limits.

The Department has determined the facility is a minor source and the application has been processed through *Major and Minor Source Air Emission License Regulations*, 06-096 CMR 115 (as amended). With the control equipment requirements, the facility is licensed below the major source thresholds for criteria pollutants and is considered a synthetic minor. The facility is also licensed below the major source thresholds for hazardous air pollutants (HAP) and is considered an area source of HAP.

## II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). Separate control requirement categories exist for new and existing equipment.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. Process Description

The pellet facility proposed by F.E. Wood will produce up to 195,000 tons/year of softwood pellets at approximately 10% moisture content. The facility will be located in West Baldwin, Maine and will have a forested buffer at least 200 feet wide around the site.

Raw logs will be delivered, stored on-site, and transported to a debarker via a front-end loader. The bark will be conveyed to an open air fuel storage area. A 'truck dumper' will also be located adjacent to the storage area to allow for delivery of other sources of forest wood residue. A front-end loader will load the wood fuel into a fuel infeed structure from which it will be conveyed to the wood fired burner (Dryer Burner). The Dryer Burner will generate heat for the rotary drum dryer (Dryer).

The debarked logs will be conveyed to a chipper building where they will be chipped. The chipper building will not include direct vents to the atmosphere. Chips will then be conveyed to an open air chip storage facility and fed into a wood chip infeed structure via front-end loader. Conveyed to the wet hammermill building, the chips will be processed to a specific size range. The wet hammermills will have fabric filter controls. Following the hammermill process, the wood chips will be conveyed to the Dryer inlet.

The direct–fired rotary drum dryer will consist of a dryer section and a burner firing bark and other wood waste at approximately 50% moisture content to produce heat for the Dryer. Emissions from the Dryer will be controlled by a wet electrostatic precipitator (WESP) followed by a regenerative thermal oxidizer (RTO).

Dried chips will be conveyed from the Dryer to a dry chip silo, which will have a fabric filter. From the dry chip silo, the chips will be conveyed to the dry hammermill building, housing the dry hammermills and controlled with fabric filters. From the dry hammermill building, the pellets will be conveyed to the pellet production building for pelletization. Fabric filters will control the dust from the pellet production building.

Once pelletized, the pellets will be conveyed to two silos, controlled by fabric filters. The pellets will be augured and conveyed from the silos to the bagging plant to be bagged and loaded onto trucks. The bagging plant vents will be controlled with fabric filters.

There are no on–site power generation or emergency back-up generating units proposed at this time.

C. Dryer Burner/Dryer

The Dryer proposed by F.E. Wood is a direct-fired rotary drum dryer with a 55 MMBtu/hr maximum design heat input capacity burner. The Dryer Burner shall fire wood bark, chips, and sawdust. Based on wet wood at 50% moisture with a heat content of 4375 Btu/lb, the Dryer Burner firing rate is approximately 6.3 tons/hr. It is expected that the Dryer Burner will operate continuously and will only be taken offline periodically for maintenance.

The Dryer input is rated at 40 tons/hr. F.E. Wood initially expects to process 100% softwood, although this could vary in the future. Annual production is estimated to be 195,000 tons/year of wood pellets produced at 10% moisture content (equivalent to 175,500 oven dried tons (ODT)/year).

The Dryer's normal operating inlet temperature is expected to be approximately 840°F and the outlet temperature is expected to be approximately 280°F. The proposed add-on controls for the Dryer Burner/Dryer are a wet electrostatic precipitator (WESP) to control PM, $PM_{10}$, $PM_{2.5}$, and particulate HAPS, followed by a regenerative thermal oxidizer (RTO) to control CO, gaseous HAPs, and VOC emissions.

The RTO shall fire propane and has a burner with a maximum design heat input capacity of 3.5 MMBtu/hr (39.0 gal/hr). Emissions from the RTO are included in the total emissions from stack #1.

The Dryer Burner/Dryer exhaust gases will be routed through the WESP and RTO to Stack #1. The height of Stack #1 is proposed at 126 feet above ground level, which is 60% Good Engineering Practice (GEP) stack height. Structure geometries were used in EPA's Building Profile Input Program (BPIP – Prime, version 04274) to calculate the GEP height.

The Dryer Burner/Dryer is not subject to the New Source Performance Standards (NSPS) 40 CFR Part 60, Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*, for units greater than 10 MMBtu/hr manufactured after June 9, 1989, since the Dryer Burner/Dryer can be classified as a process heater, not a steam generating unit. The following definitions are included in 40 CFR Part 60, Subpart Dc, §60.41c:

- "*Process heater* means a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst."
- "*Steam generating unit* means 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."

The Dryer Burner/Dryer is not subject to 40 CFR Part 63, Subpart JJJJJJ, the *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources* since the Dryer Burner/Dryer does not meet the following boiler definition included in 40 CFR Part 63, Subpart JJJJJJ, §63.11237:

- "*Boiler* means 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…"

1. BACT Findings

F.E. Wood submitted a Best Available Control Technology (BACT) analysis addressing emissions and controls for PM, $PM_{10}$, $PM_{2.5}$, $NO_X$, $SO_2$, CO, VOCs, and HAPs. EPA's AP-42 Emission database and permits for facilities in the northeast with similar equipment were reviewed.

The BACT procedure consists of a five step process: identify control technologies, eliminate technically infeasible options, rank remaining control technologies by control effectiveness, evaluate the most effective controls and document results, including case-by-case consideration of energy, environmental, and economic impacts, and an evaluation of the next most effective control option if the top option is not selected as BACT, and select BACT, the most effective control option not rejected.

The following table contains the results of the review of a number of pellet manufacturing systems recently permitted in Maine, New Hampshire, and Vermont:

## Summary of Similar Pellet Facilities Review

| Facility | State | Capacity (ODT/hr) | Control Methods | Emission Limits | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Particulate matter | $NO_X$ | $SO_2$ | CO | VOC |
| Queston Wood Pellets | VT | 5.0 | Cyclone | 8.0 lb/ODT PM, 6.0 lb/ODT $PM_{2.5}$ | 2.7 lb/ODT | - | 5.3 lb/ODT | 4.7 lb/ODT |
| Corinth Wood Pellets, LLC | ME | 18 | Cyclone and Baghouse | 27.0 lb/hr and 1.5 lb/ODT (PM, $PM_{10}$, and $PM_{2.5}$ each) | 9.18 lb/hr, and 0.51 lb/ODT | 1.13 lb/hr and 0.06 lb/ODT | 70.2 lb/hr and 3.9 lb/ODT | 18.0-79.2 lb/hr and 1.1-4.4 lb/ODT |
| Geneva Wood Fuels, LLC | ME | 16.4 | High Efficiency Multiclone | 12.5 lb/hr (PM and $PM_{2.5}$ each) | 10.8 lb/hr | 1.88 lb/hr | 10.8 lb/hr | 9.66 lb/hr |
| Maine Woods Pellet Company | ME | 14.4 | Wet Scrubber and Baghouses | 8.5 lb/hr (PM and $PM_{10}$, each) | 5.0 lb/hr | 5.1 lb/hr | 15.1 lb/hr | 12.5 lb/hr |
| New England Wood Pellet | NH | 2.5 | Cyclone | 6.64 lb/ODT $PM_{10}$ | 1.07 lb/ODT | 1.35 lb/ODT | 0.65 lb/ODT | 0.60 lb/ODT |
| Beaverwood Energy | VT | 7.0 | Baghouse | 0.2 lb/ODT $PM_{10}$ | 0.35 lb/MMBtu | 0.05 lb/MMBtu | 0.35 lb/MMBtu | 0.69 lb/MMBtu |

The data obtained from similar sources permitted in Maine, New Hampshire, and Vermont, along with information on the economic impact, technical feasibility, and environmental impact of various control options, was used to determine the available control technologies and corresponding levels of control for the emissions from the proposed facility.

The following summarizes the BACT findings for the Dryer Burner/Dryer:

a. Identification of Inherently Lower-Emitting Practices

In addition to add-on control equipment, inherently lower-emitting practices can be used to reduce emissions of all pollutants, depending on when and how they are used. F.E. Wood identified the following best management practices as potential process methods to obtain emission reductions from the Dryer Burner/Dryer:

i. Good Combustion Conditions – appropriately high combustion temperatures combined with sufficient burner residence time and the correct mix of air to fuel ratios result in good combustion conditions.

ii. Equipment Sensors – internal sensors providing real-time information on the process to an automated control system allow the systems to self-regulate and run efficiently. Examples of sensors include temperature sensors for the Dryer Burner and Dryer, WESP voltage sensors, and RTO temperature sensors.

iii. Automated Operating Controls – automated controls provide the ability to optimize fuel, air and temperature management.

iv. Proper Operation and Maintenance – provides for the equipment to be run properly when it is operated and maintained in accordance with the manufacturer's recommendation.

v. Tune-Ups – involves comprehensive inspection of the burner, dryer, and pollution control systems so that adjustments and improvements can be performed as needed.

vi. Visual Observations – both plume and site observations can confirm good operating and storage practices.

vii. Recordkeeping – procedures for recordkeeping ensures proper equipment maintenance and equipment monitoring occurs.

b. Identification and Evaluation of Add-On Controls

F.E. Wood identified and evaluated the following add-on controls to reduce emissions from the Dryer Burner/Dryer:

i. $PM/PM_{10}/PM_{2.5}$

Particulate matter (PM) emissions from direct-fired dryers can be generated through evaporation of moisture which contains particulates and through incomplete combustion of fuel, as well as non-combustible material in the fuel. PM emissions can also be formed due to condensation.

Add-on control options identified for particulate matter emissions from the Dryer Burner/Dryer included mechanical collectors, electrostatic precipitators (ESPs), fabric filters, and wet scrubbers.

Mechanical collectors utilize centripetal force to separate particles from gas streams. Cyclones, multicyclones, high efficiency multicyclones, and Core Separators™ are all considered mechanical collectors. Mechanical collectors have relatively low capital cost, low operating costs, and no moving parts. They work best when operating at their design pressure drop, which is directly proportional to the exhaust gas flow rate. At full load with a high exhaust flow rate, the mechanical collectors are most efficient. At lower load, the efficiency is reduced. Cyclones and multicyclones remove a large percentage of particles, sized $PM_{10}$ and larger (approximately 70%) and remove a smaller percentage of particles $PM_{2.5}$ and smaller (estimated at less than 10%). High efficiency multiclones make use of a higher pressure drop resulting in higher collection efficiencies, but this also results in a higher energy demand. The Core Separator™ maintains a relatively high pressure drop at all operating loads. The use of mechanical collectors as pollution control equipment has been determined to be feasible, but was not considered one of the best control options on an efficiency basis, especially for very small particles.

Electrostatic Precipitators (ESPs) consist of utilizing high voltage to charge particles in the exhaust stream and to oppositely charge collection surfaces. As the charged exhaust stream goes through the ESP, the particles are attracted to the collection surfaces where they accumulate, are removed by a rapping process, and are collected in hoppers. Wet ESPs (WESPs) utilize an exhaust stream pre-quench step to cool and saturate the gases prior to entering the ESP. WESPs are often used in wood drying operations to prevent issues occurring with high moisture content exhaust streams, but a liquid waste slurry is produced. WESP technology is highly efficient, estimated between 90%-99%, and has been determined to be feasible. A WESP has been selected as part of the BACT strategy for the proposed F.E. Wood facility.

Fabric filters (baghouses) collect particulate matter on the surface of filter bags. The bags are then periodically cleaned or replaced. Collection efficiencies can be greater than 99%, depending on the size range of the particulate matter, the filter material, and air flow. Fabric filters can theoretically control PM emissions from wood dryers, but moisture and

condensable organic matter can have a detrimental impact on performance, resulting in caking on the bag walls and clogging of the control equipment. Based on the high levels of moisture and condensable organics in the Dryer exhaust, F.E. Wood did not consider fabric filters further for the control of PM from the Dryer Burner/Dryer.

Wet scrubbers utilize particle inertia, condensation, and absorption to transfer particles from the gas stream to a liquid stream. The exhaust is routed through a wet spray and solid and gaseous pollutants are absorbed into the liquid droplets of the spray. Wet scrubbers result in a significant wastewater stream and if the exhaust stream contains a large amount of condensable or non-soluble particles, the packing in the scrubbers can become fouled. Although up to approximately 90% efficient, F.E. Wood did not consider wet scrubbers further as a control option, given the efficiency and environmental factors associated with scrubber operations.

Based on the assessment of control technologies determined to be feasible for reducing particulate matter emissions from the proposed project, WESPs have higher, more consistent control efficiencies than high-efficiency multicyclones, core separators, conventional multicyclones, and single cyclones. The project's control strategy includes a WESP.

ii. $SO_2$

Sulfur dioxide ($SO_2$) is formed from the combustion of fuel with a sulfur content, resulting in oxidation of the sulfur compounds to sulfur oxides. Control options for $SO_2$ include removing sulfur in the flue gas by installing add-on controls such as a wet scrubber, restricting the sulfur content of the fuel, or using low sulfur fuel. The wood fuel fired in the Dryer Burner/Dryer is inherently a very low sulfur fuel. F.E. Wood did not consider a wet scrubber further for the control of $SO_2$ emissions from the Dryer Burner/Dryer.

iii. $NO_X$

Nitrogen oxide ($NO_X$) is formed by several mechanisms, including fuel $NO_X$ and thermal $NO_X$. Fuel $NO_X$ is produced by oxidation of nitrogen in the fuel source, with higher nitrogen content fuel capable of producing greater amounts of $NO_X$. Thermal $NO_X$ is formed from nitrogen ($N_2$) and oxygen ($O_2$) at temperatures above 3600°F.

Add-on control options identified for $NO_X$ emissions from the Dryer Burner/Dryer included selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR).

SNCR consists of injecting urea or ammonia at a location where the exhaust gases are at a temperature of 1600°F-2100°F to reduce $NO_X$ to $N_2$ under consistent, high temperatures. SCR is similar to SNCR, but includes utilizing a catalyst to allow the reaction to occur at temperatures of 575°F-800°F.

Add-on SCR and SNCR controls are primarily used on large industrial and utility boilers with a continuously hot exhaust stream and additional particulate matter control options prior to the $NO_X$ control to prevent particulate emissions from inhibiting the chemical reaction to $N_2$.

Neither SCR nor SNCR was identified on any existing sources similar in size and operation to the F.E. Wood project. F.E. Wood did not consider SNCR or SCR further for the control of $NO_X$ emissions from the Dryer Burner/Dryer. Reduction of $NO_X$ emissions can be accomplished through good combustion practices and combustion control techniques, such as regulating combustion temperature.

iv. CO

Carbon monoxide (CO) emissions are a result of incomplete combustion. This can result from insufficient residence time or limited oxygen availability.

Add-on control options identified for CO emissions from the Dryer Burner/Dryer included oxidation catalysts and thermal oxidizers.

An oxidation catalyst lowers the activation energy needed for CO to react with available oxygen in the exhaust to produce $CO_2$. To prevent particulate contamination, additional particulate matter control options prior to the CO control are necessary. Exiting the PM control, the process exhaust gas would then need to be preheated prior to contact with the catalyst bed.

A thermal oxidizer can reduce CO emissions in the flue gas; however, a thermal oxidation system is normally not utilized for CO control alone.

An oxidizer catalyst was not identified on any existing sources similar in size and operation to the F.E. Wood project. F.E. Wood did not consider an oxidizer catalyst further for the control of CO emissions from the Dryer Burner/Dryer. The project does include the use of a regenerative thermal oxidizer. The RTO, along with the use of good combustion practices, will result in reduction of CO emissions.

v. VOC

VOCs are generated primarily through evaporation of the naturally occurring VOCs in the wood. The heavy organics may be emitted as condensables, with

this condensable fraction counted as VOC or particulate matter, or both, depending on the measurement method and the flue gas conditions.

Add-on control options identified for VOC emissions from the Dryer Burner/Dryer included thermal oxidization, an oxidation catalyst, and a venturi scrubber.

Thermal oxidation consists of combusting the exhaust gas at high temperature to oxidize both volatile and semi-volatile (i.e. consdensable) organic compounds. Use of an oxidation catalyst allows the combustion of the exhaust gases at a lower temperature, due to the catalyst, to oxidize the VOCs. However, the oxidation catalyst can become fouled by impurities in the exhaust. A venturi scrubber utilizes a liquid sprayed within a chamber to absorb VOCs, transferring the VOC from a gas phase to a liquid stream. The scrubbing media does need to be replaced or replenished periodically and not all VOCs are reactive enough or have the properties needed for effective scrubbing.

Based on the assessment of control technologies determined to be feasible for reducing VOC emissions from the proposed project, thermal oxidizers have higher consistent control efficiency than the other reviewed add-on VOC controls. The project's control strategy includes a regenerative thermal oxidizer (RTO). An RTO utilizes heat recovered from the incineration exhaust gases to preheat the inlet emission stream. The inlet emission stream then passes through preheated beds packed with ceramic media and is further heated with a gas burner in a combustion chamber to complete combustion. The combustion gases pass through a cooled ceramic bed transferring heat to the bed which preheats the gases to be treated when the flow through the beds is reversed.

vi. HAPs

Hazardous air pollutants can occur in particulate (both filterable and condensable) and gaseous form.

HAPs can be controlled by the same methods used to control PM and VOC.

Add-on controls for HAP emissions have been determined to be the use of the WESP for the control of particulate HAPS in addition to primarily controlling particulate matter and the use of the RTO for the control of gaseous HAPs in addition to primarily controlling VOCs. Controlling CO with good combustion practices will also minimize gaseous HAP emissions.

vii. Greenhouse Gases

Greenhouse gases (GHGs) are the aggregate group of the following gases: carbon dioxide ($CO_2$), nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. At this time, there are no add-on controls utilized at similar facilities for the control of GHGs.

The Environmental Protection Agency (EPA) has released two recent documents on biogenic $CO_2$ emissions: the November 19, 2014 EPA memo titled *Addressing Biogenic Carbon Dioxide Emissions from Stationary Sources* and the November 2014 *Framework for Assessing Biogenic $C0_2$ Emissions from Stationary Source*. Biogenic $CO_2$ emissions are defined as $CO_2$ emissions related to the natural carbon cycle, as well as those resulting from the production, harvest, combustion, digestion, fermentation, decomposition, and processing of biologically based materials. EPA plans to propose revisions to the Prevention of Significant Deterioration (PSD) rules to include an exemption from the BACT requirement for GHGs from waste-derived feedstocks and from non-waste biogenic feedstocks derived from sustainable forest or agricultural practices. The Dryer Burner/Dryer raw materials and fuels could be considered biogenic for the purposes of $CO_2$ emissions, and therefore, may be exempt from BACT requirements in the future.

c. BACT Selection

i. BACT for F.E. Wood has been determined to be the following. The emission limit is from stack #1, which includes the Dryer Burner/Dryer exhaust routed through the WESP and RTO:

| Pollutant | Pollution Control Reduction Strategy | Emission Limit Basis | Emission Limit (lb/hr) |
|---|---|---|---|
| PM | - wet ESP,<br>- firing natural wood waste in the burner,<br>- good combustion practices such as automated operating controls, equipment sensors, tune-ups, and proper operation and maintenance | 0.12 lb/ODT, calculated from AP-42, Table 10.6.1-1 uncontrolled (4.1 lb/ODT), with a 97% control efficiency for the wet ESP | 2.4<br><br>(filterable only) |
| $PM_{10}$ | same as PM | 0.12 lb/ODT, calculated from AP-42, Table 10.6.1-1 uncontrolled (2.5 lb/ODT filterable + 1.5 lb/ODT condensable), with a 97% control efficiency for the wet ESP | 2.4<br><br>(filterable and condensable total) |
| $PM_{2.5}$ | same as PM | same as PM | 2.4<br><br>(filterable and condensable total) |
| $SO_2$ | - firing natural wood waste in the burner | 0.014 lb/ODT, calculated from AP-42, Table 10.6.1-2 controlled RTO hardwood (all others ND) | 0.28 |
| $NO_X$ | - good combustion practices such as automated operating controls, equipment sensors, tune-ups, and proper operation and maintenance | 0.56 lb/ODT, manufacturer information | 11.2 |
| CO | - RTO,<br>- good combustion practices such as automated operating controls, equipment sensors, tune-ups, and proper operation and maintenance | 0.80 lb/ODT, calculated from AP-42, Table 10.6.1-2 uncontrolled (5.3 lb/ODT), with a 85% control efficiency for the RTO | 15.9 |
| VOC | - RTO,<br>- wet ESP,<br>- good combustion practices such as automated operating controls, equipment sensors, tune-ups, and proper operation and maintenance | 0.32 lb/ODT, calculated from AP-42, section 10.6.1-3 uncontrolled (8.1 lb/ODT), with a 96% control efficiency for the RTO | 6.4 |

Table Note: The production rate of 175,500 ODT/yr at 100% load was used for calculation purposes (equivalent to 195,000 dried ton/yr at 10% moisture content).

BACT for HAPs is an RTO for gaseous HAPs, a WESP for particulate HAPs, and good combustion practices. Calculations were performed using 0.07 lb/ODT total HAPs, based on AP-42, Table 10.6.1-3 with RTO (0.068 lb/ODT total) and AP-42 Table 1.6-4 (0.04 lb/ODT total) with an additional 97% control efficiency for the WESP. Total HAP emissions were calculated to be 1.4 lb/hr, with maximum annual emissions of 6.0 tpy total. This is under the major source thresholds of 10 tpy for a single HAP or 25 tpy for total HAPs. There will be no specific HAP emission limits licensed at this time, since the proposed operations will reduce HAPs below the major source thresholds and the $PM_{10}$, CO, and VOC emission limits are indicative of controlled HAPs.

BACT for greenhouse gases is good combustion practices such as automated operating controls, equipment sensors, tune-ups, and proper operation and maintenance. No additional emission limits are required at this time to address the biogenic $CO_2$ emissions from F.E. Wood. Per EPA November 2014 guidance, biogenic $CO_2$ emissions may be exempt from BACT requirements in the future.

Visible emissions from the Dryer Burner/Dryer stack shall not exceed 20% opacity on a 6-minute block average, except for no more than one 6-minute block average in a 1-hour period per 06-096 CMR 115, BACT.

ii. Additional BACT Requirements, including monitoring and recordkeeping

A temperature monitoring system shall be installed, operated, maintained, and calibrated on the Dryer in accordance with the manufacturer's recommendation.

F.E. Wood shall demonstrate proper WESP operation by monitoring appropriate parameters, potentially including secondary voltage, quench inlet temperature, and WESP outlet temperature.

F.E. Wood shall demonstrate proper RTO operation with a temperature monitoring system to insure the control equipment is minimizing emissions.

Within 180 days of commencing operation, F.E. Wood shall perform stack testing on Stack #1 for $PM_{10}$, $NO_X$, and VOC to determine compliance with the licensed emission limits.

Within 90 days of performing the required stack testing, F.E. Wood shall submit the following to the Department:

- Documentation of Dryer operating temperature parameter values and monitor details, including the frequency of collected data points and recordkeeping. The operating temperature parameters shall ensure proper operating conditions of the Dryer.
- A plan detailing control equipment parameter values and monitoring and recordkeeping frequency to the Department for approval for the following:
  - the RTO, including combustion chamber temperature, and
  - the WESP, with potential parameters to include secondary voltage, quench inlet temperature, and WESP outlet temperature.

After the Department's review of the submitted plans and documentation, F. E. Wood shall submit a license application to incorporate the specifics of the Dryer's operating temperature parameters and the RTO and WESP parameter requirements into the license.

2. Periodic Monitoring

Periodic monitoring for the Dryer Burner/Dryer and the RTO shall include the following recordkeeping:

a. Dryer production records shall be maintained on a monthly and 12-month rolling total basis. The calculations may be based on either Dryer input metering and the appropriate conversion or Dryer output metering, along with moisture content.

b. Fuel records shall be maintained on the Dryer Burner to document wood fuel use both on a monthly and 12 month rolling total basis.

c. Fuel records shall be maintained on the RTO burner to document propane fuel use both on a monthly and 12 month rolling total basis.

D. Miscellaneous Process Equipment

The process proposed by F.E. Wood includes various production exhaust points with the potential to release particulate matter. The point sources are the wet hammermill building, the dry hammermill building, the pellet production building, the dry chip and pellet storage silos, and bagging plant vents.

F.E. Wood has proposed the use of fabric filters to control particulate matter from these sources. Fabric filters are recognized as one of the most effective particulate matter control systems for these types of processes.

BACT for particulate matter control of the miscellaneous production process exhaust points shall be the use of fabric filters on the following: the wet hammermill building,

the dry hammermill building, the pellet production building, the dry chip and pellet storage silos, and the bagging plant vents. Visible emissions from each of the fabric filters shall not exceed 10% opacity on a 6-minute average basis, except for no more than one 6-minute block average in a 1-hour period. The facility shall take corrective action if visible emissions from the fabric filters exceed 5% opacity. The opacity limit is based on 06-096 CMR 101 for baghouses.

The fabric filters shall be properly maintained and pressure drop shall be monitored and recorded minimally once per shift. Compliance records shall be kept documenting routine and unplanned maintenance on the fabric filters, including dates, times, and tasks performed.

E. Fugitive Emissions

Fugitive emissions may result from the wet wood chip storage area (material which has been through the debarker and chipper, but not yet dried), the fuel storage area (mostly wet bark and lesser amounts of other natural wood waste), the log storage area (unloading and storage of logs), and internal roadways at the site.

BACT for the minimization of dust from the storage areas includes equipment and building buffers, a natural forest buffer surrounding the site, and the high moisture content of the wood, resulting in heavier chips and dust which are less prone to become airborne. BACT for the minimization of fugitive emissions from roadways includes paving the driveway and internal roads with asphalt or concrete.

Visible emissions from a fugitive emission source (including stockpiles and roadways) shall not exceed an opacity of 20%, except for no more than five (5) minutes in any 1-hour period. Compliance shall be determined by an aggregate of the individual fifteen (15)-second opacity observations which exceed 20% in any one (1) hour. The opacity limit is based on 06-096 CMR 101 for fugitive emissions sources.

F. General Process Emissions

Visible emissions from any general process source not specifically addressed in this license shall not exceed an opacity of 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 1-hour period, based on 06-096 CMR 101.

G. Annual Emissions

1. Total Annual Emissions

F.E. Wood shall be restricted to the following annual emissions, based on operating the control equipment and production occurring 8760 hr/year:

**Total Licensed Annual Emissions for the Facility**
**Tons/year**
(used to calculate the annual license fee)

| | PM | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | $NO_x$ | CO | VOC |
|---|---|---|---|---|---|---|---|
| Stack #1 emissions (Dryer Burner/Dryer, WESP, RTO) | 10.5 | 10.5 | 10.5 | 1.2 | 49.1 | 69.8 | 28.1 |
| **Total TPY** | **10.5** | **10.5** | **10.5** | **1.2** | **49.1** | **69.8** | **28.1** |

HAP emissions shall be below 10 tpy of any single HAP and 25 tpy of total HAPs.

2. Greenhouse Gases
Greenhouse gases are considered regulated pollutants as of January 2, 2011, through 'Tailoring' revisions made to EPA's *Approval and Promulgation of Implementation Plans,* 40 CFR Part 52, Subpart A, §52.21, *Prevention of Significant Deterioration of Air Quality* rule. Greenhouse gases, as defined in 06-096 CMR 100 (as amended), are the aggregate group of the following gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. For licensing purposes, greenhouse gases (GHG) are calculated and reported as carbon dioxide equivalents ($CO_2e$).

The quantity of $CO_2e$ emissions from this facility is less than 100,000 tons per year, based on the following:

- the facility's operating scenario;
- worst case emission factors from the following sources: U.S. EPA's AP-42, the Intergovernmental Panel on Climate Change (IPCC), and 40 CFR Part 98, *Mandatory Greenhouse Gas Reporting*; and
- global warming potentials contained in 40 CFR Part 98.

No additional licensing actions to address GHG emissions are required at this time.

## III. AMBIENT AIR QUALITY ANALYSIS

The level of ambient air quality impact modeling required for a minor source shall be determined by the Department on a case-by case basis. In accordance with 06-096 CMR 115, an ambient air quality impact analysis is not required for a minor source if the total licensed annual emissions of any pollutant released do not exceed the following levels and there are no extenuating circumstances:

| Pollutant | Tons/Year |
|---|---|
| $PM_{10}$ | 25 |
| $PM_{2.5}$ | 15 |
| $SO_2$ | 50 |
| $NO_x$ | 50 |
| CO | 250 |

The total licensed annual emissions for the facility are below the emission levels contained in the table above and there are no extenuating circumstances; therefore, an ambient air quality impact analysis is not required as part of this license.

## ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards, and
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-1106-71-A-N subject to the following conditions.

Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

## STANDARD CONDITIONS

(1) Employees and authorized representatives of the Department shall be allowed access to the licensee's premises during business hours, or any time during which any emissions units are in operation, and at such other times as the Department deems necessary for the purpose of performing tests, collecting samples, conducting inspections, or examining and copying records relating to emissions (38 M.R.S.A. §347-C).

(2) The licensee shall acquire a new or amended air emission license prior to commencing construction of a modification, unless specifically provided for in Chapter 115. [06-096 CMR 115]

(3) Approval to construct shall become invalid if the source has not commenced construction within eighteen (18) months after receipt of such approval or if construction is discontinued for a period of eighteen (18) months or more. The Department may extend

this time period upon a satisfactory showing that an extension is justified, but may condition such extension upon a review of either the control technology analysis or the ambient air quality standards analysis, or both. [06-096 CMR 115]

(4) The licensee shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction, or operation which may result in fugitive dust, and shall submit a description of the program to the Department upon request. [06-096 CMR 115]

(5) The licensee shall pay the annual air emission license fee to the Department, calculated pursuant to Title 38 M.R.S.A. §353-A. [06-096 CMR 115]

(6) The license does not convey any property rights of any sort, or any exclusive privilege. [06-096 CMR 115]

(7) The licensee shall maintain and operate all emission units and air pollution systems required by the air emission license in a manner consistent with good air pollution control practice for minimizing emissions. [06-096 CMR 115]

(8) The licensee shall maintain sufficient records to accurately document compliance with emission standards and license conditions and shall maintain such records for a minimum of six (6) years. The records shall be submitted to the Department upon written request. [06-096 CMR 115]

(9) The licensee shall comply with all terms and conditions of the air emission license. The filing of an appeal by the licensee, the notification of planned changes or anticipated noncompliance by the licensee, or the filing of an application by the licensee for a renewal of a license or amendment shall not stay any condition of the license. [06-096 CMR 115]

(10) The licensee may not use as a defense in an enforcement action that the disruption, cessation, or reduction of licensed operations would have been necessary in order to maintain compliance with the conditions of the air emission license. [06-096 CMR 115]

(11) In accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department, the licensee shall:

A. perform stack testing to demonstrate compliance with the applicable emission standards under circumstances representative of the facility's normal process and operating conditions:

1. within sixty (60) calendar days of receipt of a notification to test from the Department or EPA, if visible emissions, equipment operating parameters, staff inspection, air monitoring or other cause indicate to the Department that equipment may be operating out of compliance with emission standards or license conditions; or
2. pursuant to any other requirement of this license to perform stack testing.

B. install or make provisions to install test ports that meet the criteria of 40 CFR Part 60, Appendix A, and test platforms, if necessary, and other accommodations necessary to allow emission testing; and
C. submit a written report to the Department within thirty (30) days from date of test completion.

[06-096 CMR 115]

(12) If the results of a stack test performed under circumstances representative of the facility's normal process and operating conditions indicate emissions in excess of the applicable standards, then:

A. within thirty (30) days following receipt of such test results, the licensee shall re-test the non-complying emission source under circumstances representative of the facility's normal process and operating conditions and in accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department; and
B. the days of violation shall be presumed to include the date of stack test and each and every day of operation thereafter until compliance is demonstrated under normal and representative process and operating conditions, except to the extent that the facility can prove to the satisfaction of the Department that there were intervening days during which no violation occurred or that the violation was not continuing in nature; and
C. the licensee may, upon the approval of the Department following the successful demonstration of compliance at alternative load conditions, operate under such alternative load conditions on an interim basis prior to a demonstration of compliance under normal and representative process and operating conditions.

[06-096 CMR 115]

(13) Notwithstanding any other provisions in the State Implementation Plan approved by the EPA or Section 114(a) of the CAA, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any statute, regulation, or Part 70 license requirement. [06-096 CMR 115]

(14) The licensee shall maintain records of malfunctions, failures, downtime, and any other similar change in operation of air pollution control systems or the emissions unit itself that would affect emissions and that is not consistent with the terms and conditions of the air emission license. The licensee shall notify the Department within two (2) days or the next state working day, whichever is later, of such occasions where such changes result in an increase of emissions. The licensee shall report all excess emissions in the units of the applicable emission limitation. [06-096 CMR 115]

(15) Upon written request from the Department, the licensee shall establish and maintain such records, make such reports, install, use and maintain such monitoring equipment, sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such a manner as the Department shall prescribe), and provide other information as the

Department may reasonably require to determine the licensee's compliance status. [06-096 CMR 115]

## SPECIFIC CONDITIONS

### (16) Dryer Burner/Dryer

A. Fuel

1. The Dryer Burner is licensed to fire wood, including wood bark, chips, and sawdust.

2. Fuel records shall be maintained on the Dryer Burner to document fuel use both on a monthly and 12 month rolling total basis.

[06-096 CMR 115, BACT]

B. Control Requirements

1. Dryer Burner/Dryer

   a. A temperature monitoring system shall be installed, operated, maintained, and calibrated on the Dryer in accordance with the manufacturer's recommendation.
   b. Emissions from the Dryer Burner/Dryer shall be directed through the WESP and RTO, exhausting out Stack #1.

   [06-096 CMR 115, BACT]

2. WESP

   Temperature and secondary voltage monitoring systems shall be installed, operated, maintained, and calibrated on the WESP in accordance with the manufacturer's recommendation. [06-096 CMR 115, BACT]

3. RTO

   a. A temperature monitoring system shall be installed, operated, maintained, and calibrated on the RTO in accordance with the manufacturer's recommendation.
   b. The RTO shall fire propane fuel. Fuel records shall be maintained on the RTO to document propane use both on a monthly and 12 month rolling total basis.

   [06-096 CMR 115, BACT]

C. Emissions from Stack #1 shall not exceed the following [06-096 CMR 115, BACT]:

| Pollutant | Stack #1 (post WESP and RTO) |
|---|---|
| PM (filterable) | 2.4 lb/hr |
| $PM_{10}$ (total: filterable and condensable) | 2.4 lb/hr |
| $PM_{2.5}$ (total: filterable and condensable) | 2.4 lb/hr |
| $SO_2$ | 0.28 lb/hr |
| $NO_X$ | 11.2 lb/hr |
| CO | 15.9 lb/hr |
| VOC | 6.4 lb/hr |

D. Visible emissions from Stack #1 shall not exceed 20% opacity on a six (6) minute block average, except for no more than one (1) six (6) minute block average in a continuous 1-hr period. [06-096 CMR 115, BACT]

E. Dryer Production Records

Dryer production rate records shall be maintained on a monthly and 12-month rolling total basis. The production rate shall be calculated based on either Dryer input metering and the appropriate conversion or Dryer output metering, adjusting for moisture content.

[06-096 CMR 115, BACT]

F. Stack Height

Stack #1 shall be at least 126 feet above ground level. [06-096 CMR 115, BACT]

G. Stack Testing

Within 180 days of commencing operation, F.E. Wood shall perform stack tests on Stack #1 for $PM_{10}$, $NO_X$, and VOC to determine compliance with the licensed emission limits using the EPA stack test methods specified in the table below, or other methods approved by the Department. [06-096 CMR 115, BACT]

| Pollutant | EPA Test Method |
|---|---|
| $PM_{10}$ | Method 5, Method 201 or 201A, 202 |
| $NO_X$ | Method 7E |
| VOC | Methods 18 & 25A |

H. Submittals

1. Within 90 days of performing the required stack testing, F. E. Wood shall submit the following to the Department:

   a. Documentation of the Dryer operating temperature parameter values and monitor details, including the frequency of collected data points and recordkeeping. The operating temperature parameters shall ensure proper operating conditions of the Dryer.

   b. A plan detailing control equipment parameter values, monitoring frequency and recordkeeping methods to the Department for approval for the following:
      i. the RTO, including combustion chamber temperature, and
      ii. the WESP, with potential parameters to include secondary voltage, quench inlet temperature, and WESP outlet temperature.

2. Following the submittal of the plans required in Condition 16(H)(1), above, and after notification from the Department, F.E. Wood shall submit a license application to incorporate the specifics of the Dryer's operating temperature parameters and the RTO and WESP parameter requirements into the license, as appropriate.

[06-096 CMR 115, BACT]

(17) **Miscellaneous Process Equipment**

A. The wet hammermill building, the dry hammermill building, the pellet production building, the dry chip and pellet storage silos, and bagging plant vents shall be controlled with fabric filters. [06-096 CMR 115, BACT]

B. Visible emissions from each of the fabric filters shall not exceed 10% opacity on a 6-minute average basis, except for no more than one 6-minute block average in a 1-hour period. The facility shall take corrective action if visible emissions from the fabric filters exceed 5% opacity. [06-096 CMR 101]

C. The fabric filters shall be properly maintained and pressure drop shall be monitored and recorded minimally once per shift. Compliance records shall be kept documenting routine and unplanned maintenance on the fabric filters, including dates, times, and tasks performed. [09-096 CMR 115, BACT]

(18) **Fugitive Emissions**

Visible emissions from a fugitive emission source (including stockpiles and roadways) shall not exceed an opacity of 20%, except for no more than five (5) minutes in any 1-hour period. Compliance shall be determined by an aggregate of the individual fifteen

(15)-second opacity observations which exceed 20% in any one (1) hour. [06-096 CMR 101]

(19) **General Process Sources**

Visible emissions from any general process source not specifically addressed in this license shall not exceed an opacity of 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 1-hour period. [06-096 CMR 101]

(20) **Annual Emission Statement**

In accordance with *Emission Statements*, 06-096 CMR 137 (as amended), the licensee shall annually report to the Department the information necessary to accurately update the State's emission inventory by means of either:

1) A computer program and accompanying instructions supplied by the Department; or
2) A written emission statement containing the information required in 06-096 CMR 137.

The emission statement must be submitted as specified by the date in 06-096 CMR 137.

(21) F.E. Wood shall notify the Department within 48 hours and submit a report to the Department on a quarterly basis if a malfunction or breakdown in any component causes a violation of any emission standard (38 M.R.S.A. §605).

DONE AND DATED IN AUGUSTA, MAINE THIS 3 DAY OF March , 2015.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Maria Allen Robert Cove for
PATRICIA W. AHO, COMMISSIONER

**The term of this license shall be ten (10) years from the signature date above.**

[Note: If a complete renewal application, as determined by the Department, is submitted prior to expiration of this license, then pursuant to Title 5 MRSA §10002, all terms and conditions of the license shall remain in effect until the Department takes final action on the renewal of the license.]

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: December 8, 2014
Date of application acceptance: December 8, 2014

Date filed with the Board of Environmental Protection:
This Order prepared by Kathleen E. Tarbuck, Bureau of Air Quality.

Filed
MAR 04 2015
State of Maine
Board of Environmental Protection