STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION AUGUSTA, MAINE 04333-0017

DEPARTMENT ORDER

Maine Woods Pellet Company, LLC,
Athens Capital Holdings, LLC &
Athens Energy LLC
Somerset County
Athens, Maine
A-989-77-4-A

Departmental
Findings of Fact and Order
New Source Review
NSR #4

FINDINGS OF FACT

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

I. REGISTRATION

A. Introduction

FACILITY	Maine Woods Pellet Company, LLC, Athens Capital Holdings, LLC & Athens Energy LLC
LICENSE TYPE	06-096 C.M.R. ch. 115, Minor Modification
NAICS CODES	321999
NATURE OF BUSINESS	Wood Pellet Manufacturer
FACILITY LOCATION	164 Harmony Rd, Athens, Maine

B. NSR License Amendment Description

Maine Woods Pellet Company, LLC (MWP), along with co-applicants Athens Capital Holdings, LLC and Athens Energy LLC, previously licensed the installation and operation of a cogeneration facility and additional pellet processing equipment in support of the facility's pellet processing operation (A-989-71-E-A dated May 13, 2015).

The cogeneration facility is powered by Furnace #1, a 149 MMBtu/hr biomass-fired furnace. In order for the project to be considered a minor modification, an annual operating limit of 8,200 hours per year (hr/year) was imposed on Furnace #1. MWP has proposed replacing this restriction with an equivalent limit on heat input of 1,221,800 MMBtu/year.

C. Emission Equipment

The following equipment is addressed in this NSR license:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate (ton/hr)	Fuel Type, % sulfur	Date of Manuf.	Stack #
Furnace #1	149	16.6	biomass, negligible	2015	3

Process Equipment

Equipment	Production Rate	Pollution Control Equipment	Stack #
Pre-Dryer #1	6.5 ODT/hr	multi-cyclone	3

D. Definitions

Biomass means any biomass-based solid fuel that is not a solid waste. This includes, but is not limited to, wood residue; wood products (*e.g.,* trees, tree stumps, tree limbs, bark, lumber, sawdust, sander dust, chips, scraps, slabs, millings, and shavings); animal manure, including litter and other bedding materials; vegetative agricultural and silvicultural materials, such as logging residues (slash), nut and grain hulls and chaff (*e.g.,* almond, walnut, peanut, rice, and wheat), bagasse, orchard prunings, corn stalks, coffee bean hulls and grounds. This definition also includes wood chips and processed pellets made from wood or other forest residues. Inclusion in this definition does not constitute a determination that the material is not considered a solid waste. MWP should consult with the Department before adding any new biomass type to its fuel mix.

Shutdown of Furnace #1 means a period of time commencing when the biomass walking floor is turned off and ending when the combustion fan is turned off. (Note: The ID fan is sometimes left on for many additional hours to fully cool all boiler refractory and provide fresh air for workers. However, fire cannot be sustained in the combustion chamber without the combustion fan running.) The total duration of each shutdown period shall not exceed seven (7) hours.

Startup of Furnace #1 means a period of time commencing when the combustion fan is turned on and ending when the ESP is engaged. The total duration of each startup period shall not exceed four (4) hours.

E. Application Classification

All rules, regulations, or statutes referenced in this air emission license refer to the amended version in effect as of the issued date of this license.

The application for MWP does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing, or recordkeeping requirements.

The requested changes do not involve any physical change to equipment. An increase in the hours of operation is not considered a change in the method of operation per 40 C.F.R. § 52.01(d)(2)(ii). Therefore, the proposed change does not meet the definition of "modification" under New Source Review (NSR) regulations. However, this application does seek to modify an existing Best Available Control Technology (BACT) analysis performed under NSR. Therefore, this application is being processed as a minor modification under *Minor and Major Source Air Emission License Regulations,* 06-096 C.M.R. ch. 115. An application to incorporate the requirements of this NSR license into the Part 70 air emission license shall be submitted no later than 12 months from commencement of the requested operation.

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 C.M.R. ch. 100. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

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

B. Furnace #1 and Pre-Dryer #1

1. Equipment Description

MWP operates a cogeneration facility consisting of a 149 MMBtu/hr biomass-fired furnace (Furnace #1) and a direct-contact rotary drum dryer (Pre-Dryer #1).

Furnace #1 heats thermal oil that provides the energy to run a net 8 megawatt (MW) Organic Rankin Cycle (ORC) electrical generation turbine. Thermal oil is heated in Furnace #1's three convection heater sections. Heat from the thermal oil is then transferred to the ORC turbine's working fluid (cyclopentane) via a non-contact heat exchanger. The cyclopentane is expanded in a turbine, driving a generator to produce electricity.

Exhaust gases from Furnace #1 pass through a dry electrostatic precipitator (ESP) to remove particulate matter prior to entering a directly connected rotary drum dryer (Pre-Dryer #1). Waste heat in the combustion exhaust gas from Furnace #1 may be utilized by Pre-Dryer #1 to dry wood chips from approximately 45% moisture to 30-35% moisture. The moisture-laden exhaust from Pre-Dryer #1 then passes through multicyclones to remove particulate matter that may become entrained in the exhaust gases during the drying process. Furnace #1 may also operate without any chips in Pre-Dryer #1. In such cases, the emissions from Furnace #1 follow the same exhaust path, but without any wood chips present in Pre-Dryer #1.

MWP has the ability to increase the heat of the exhaust from Furnace #1 (and therefore the heat sent to Pre-Dryer #1) by bypassing the thermal oil around the last of the three convection heater sections (Heater Section 3).

2. Requested Changes

Short-term emission limits determined to be BACT for Furnace #1 and Pre-Dryer #1 were established in NSR license A-989-71-E-A issued May 13, 2015.

Additionally, Furnace #1 was limited to 8,200 hr/year of operation. The combination of short-term emission limits and limited annual operating hours limited this project to below significant emission levels for all pollutants except CO. Therefore, the project was determined to be a major modification for CO and a minor modification for all other pollutants.

a. Replacement of Annual Operating Hours Limit

MWP has proposed replacing the annual operating hours limit with the equivalent limit on annual heat input to Furnace #1 of 1,221,800 MMBtu/year.

Measuring the heat input to Furnace #1 can be accomplished through monitoring of the heat transferred from Furnace #1 to the thermal oil. Based on the furnace manufacturer's mass and energy calculations, 106.4 MMBtu of hot oil output is generated for each 149 MMBtu of heat input. Since MWP continuously monitors

the heat output to the thermal oil, the associated fuel input can be calculated based on this known ratio of 1.4 MMBtu of heat input per MMBtu of hot oil generated.

However, this conversion factor does not apply when the bypass damper for Heater Section 3 is open. When the bypass damper for Heater Section 3 is open, more energy is sent to Pre-Dryer #1 and less heat is extracted from the flue gas into the thermal oil. To date, the bypass damper for Heater Section 3 has only been used to help reduce heat to the turbine during system shutdown. It has not been used during normal operation, and MWP does not intend to use it during normal operation for the foreseeable future.

MWP has proposed demonstrating compliance with an annual heat input limit to Furnace #1 of 1,221,800 MMBtu/year by continuously monitoring the heat output to the thermal oil and calculating the heat input to Furnace #1 using a conversion factor of 1.4 MMBtu of heat input per MMBtu of hot oil generated. Additionally, MWP shall continuously monitor the bypass damper for Heater Section 3 which shall be operated at 0% (closed) except for periods of startup and shutdown (see Definitions section). The Department agrees and the annual heat input limit and monitoring as described above is determined to represent BACT for Furnace #1 and Pre-Dryer #1.

b. NO_x Emission Limits

In order to maintain the original project's minor modification status, MWP has proposed a performance-based NO_x emission limit of 0.16 lb/MMBtu from Furnace #1. (No additional NO_x emissions are expected from Pre-Dryer #1.) This limit is equivalent to the short-term emission limit at maximum load.

23.8 lb/hr ÷ 149 MMBtu/hr = 0.16 lb/MMBtu

Results from performance testing conducted in May 2017 showed NO_x emissions from Furnace #1 were 0.13 lb/MMBtu, confirming MWP's ability to comply with the proposed limit.

This change results in an annual potential to emit (PTE) of NO_x from Furnace #1 of 97.7 tpy. This allows the project described in A-989-71-E-A to continue to be limited to below significant emissions levels and therefore a minor modification for NO_x.

The Department has determined that an additional performance-based emission limits of 0.16 lb/MMBtu for NO_x shall be included as BACT for Furnace #1 and

Pre-Dryer #1. Compliance shall be demonstrated through performance testing by December 31, 2020, and every three calendar years thereafter.

c. VOC Emission Limits

In order to maintain the original project's minor modification status, MWP has proposed lowering the short-term VOC emission limit for Furnace #1 and Pre-Dryer #1 combined from 12.0 lb/hr to 11.23 lb/hr. Results from performance testing conducted in May 2017 showed VOC emissions from Furnace #1/Pre-Dryer #1 were less than 25% of the current limit. This confirms MWP's ability to comply with the proposed lower limit. This change results in an annual PTE of VOC from Furnace #1/Pre-Dryer #1 of 49.2 tpy. This allows the project described in A-989-71-E-A to continue to be limited to below significant emissions levels and therefore a minor modification for VOC.

The Department has determined that an emission limit of 11.23 lb/hr shall be included as BACT for Furnace #1 and Pre-Dryer #1. Compliance shall be demonstrated by performance testing upon request by the Department.

C. Incorporation Into the Part 70 Air Emission License

Per *Part 70 Air Emission License Regulations*, 06-096 C.M.R. ch. 140 § 1(C)(8), for a modification at the facility that has undergone NSR requirements or been processed through 06-096 C.M.R. ch. 115, the source must apply for an amendment to their Part 70 license within one year of commencing the proposed operations, as provided in 40 C.F.R. Part 70.5. An application to incorporate the requirements of this NSR license into the Part 70 air emission license has been submitted to the Department.

D. Annual Emissions

The table below provides an estimate of facility-wide annual emissions for the purposes of calculating the facility's annual air license fee. Only licensed equipment is included, i.e. emissions from insignificant activities are excluded. Similarly, unquantifiable fugitive particulate matter emissions are not included.

- Firing 1,221,800 MMBtu/year in Furnace #1;
- Operation of Pre-Dryer #1 for 8,760 hr/year;
- Operation of Dryer #1 at full capacity for 7,950 hr/year;
- Operation of the Cyclone Baghouse for 7,950 hr/year;
- Operation of the Fire Pump Engine, Thermal Oil Backup, and Generator #1 for 100 hr/year each; and
- Firing 20,000 gal/year of fuel in the Screen Engine.

Please note, this information provides the basis for fee calculation only and should not be construed to represent a comprehensive list of license restrictions or permissions. That information is provided in the Order section of this license.

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
Dryer #1	33.8	50.9	50.9	20.3	19.9	60.0	49.7
Cyclone Baghouse	2.0	2.0	2.0	–	–	–	–
Furnace #1 & Pre-Dryer #1	73.6	73.6	73.6	16.2	97.7	260.2	49.2
Fire Pump Engine	–	–	–	–	0.3	0.1	–
Screen Engine	0.2	0.2	0.2	0.7	6.0	1.3	0.5
Thermal Oil Backup	–	–	–	–	0.2	–	–
Generator #1	–	–	–	–	0.4	0.1	–
Total TPY	**109.6**	**126.7**	**126.7**	**37.2**	**124.5**	**321.7**	**99.4**

Pollutant	Tons/year
Single HAP	9.9
Total HAP	24.9

III. AMBIENT AIR QUALITY ANALYSIS

MWP previously submitted an ambient air quality analysis demonstrating that emissions from the facility (A-989-71-E-A), in conjunction with all other sources, do not violate ambient air quality standards. An additional ambient air quality analysis is not required for this NSR 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,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants New Source Review License A-989-77-4-A pursuant to the preconstruction licensing requirements of 06-096 C.M.R. ch. 115 and subject to the specific conditions below.

Severability. The invalidity or unenforceability of any provision of this License or part thereof 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.

SPECIFIC CONDITIONS

The following shall replace Condition (22)(B) of Air Emission License A-989-71-E-A.

(22) **Furnace #1 and Pre-Dryer #1**

B. MWP shall not exceed an annual limit of 1,221,800 MMBtu/year heat input to Furnace #1. Compliance shall be demonstrated by:

1. Operating the bypass damper for Heater Section 3 at 0% (i.e., closed) except during periods of startup and shutdown; and
2. Calculation of the monthly and 12-month rolling total heat input to Furnace #1 based on a conversion factor of 1.4 MMBtu of heat input per MMBtu of hot oil generated.

[06-096 C.M.R. ch. 115, BACT]

The following shall replace Condition (22)(E) of Air Emission License A-989-71-E-A.

(22) **Furnace #1 and Pre-Dryer #1**

E. Emissions shall not exceed the following [06-096 CMR 115, BACT]:

Emission Unit	Pollutant	lb/MMBtu	Origin and Authority
Furnace #1	PM	0.030	40 C.F.R. Part 60, § 60.43b(h)(1)
	NO_x	0.16	06-096 C.M.R. ch. 115, BACT

The following shall replace Condition (22)(F) of Air Emission License A-989-71-E-A.

(22) **Furnace #1 and Pre-Dryer #1**

F. Emissions from Furnace #1 and Dryer #1 (combined) shall not exceed the following:

Pollutant	lb/hr	Origin and Authority
PM	16.80	06-096 C.M.R. ch. 115, BACT (A-989-71-E-A, 11/5/18)
PM_{10}	16.80	06-096 C.M.R. ch. 115, BACT (A-989-71-E-A, 11/5/18)
$PM_{2.5}$	16.80	06-096 C.M.R. ch. 115, BACT (A-989-71-E-A, 11/5/18)
SO_2	3.70	06-096 C.M.R. ch. 115, BACT (A-989-71-E-A, 11/5/18)
NO_x	23.80	06-096 C.M.R. ch. 115, BACT (A-989-71-E-A, 11/5/18)
CO	59.40	06-096 C.M.R. ch. 115, BACT (A-989-71-E-A, 11/5/18)
VOC*	11.23	06-096 C.M.R. ch. 115, BACT

*Expressed as propane

Condition (22)(J) of Air Emission License A-989-71-E-A and Conditions (1)(B) and (C) of Air Emission License A-989-77-3-A are deleted and replaced with the following.

(22) **Furnace #1 and Pre-Dryer #1**

J. Periodic Monitoring

MWP shall operate, record data, and maintain records from the following periodic monitors for Furnace #1 and Pre-Dryer #1:

1. Amount of wood (tons) fired in Furnace #1 on a monthly basis. [40 C.F.R. § 60.49b(d)(2)]
2. Setting of the bypass damper on Heater Section 3 (i.e., percent open) monitored and recorded continuously. [06-096 C.M.R. ch. 115, BPT]
3. Heat output to the thermal oil monitored and recorded continuously. [06-096 C.M.R. ch. 115, BPT]
4. Secondary voltage on the ESP monitored continuously and recorded at least once per 8-hour shift whenever Furnace #1 is in operation. [06-096 C.M.R ch. 115, BPT]

5. Records of maintenance activities performed on Furnace #1, Pre-Dryer #1, the ESP, and all facility cyclones/multiclones.
   [06-096 C.M.R. ch. 115, BPT]
6. Records documenting startups, shutdowns, and malfunctions for Furnace #1 and its associated control equipment including:
   a. Dates, times, and duration of each startup, shutdown, and malfunction;
   b. Records of pre-startup inspections of the ESP and ESP dust collection system;
   c. Time the ESP was engaged during startup; and
   d. Time the ESP was disengaged during shutdown.
   [06-096 C.M.R. ch. 115, BPT]
7. During all startups/shutdowns, MWP shall continuously monitor the following items. MWP shall record the monitored value at least once per hour. The records of hourly readings shall be included in the startup/shutdown record.
   a. Thermal oil temperature;
   b. ESP exit gas oxygen content; and
   c. Secondary voltage on each field of the ESP.
   [06-096 C.M.R. ch. 115, BPT]

The following is a New Condition.

(1) MWP shall demonstrate compliance with the NO_x emission limit for Furnace #1 through performance testing conducted by December 31, 2020, and every three calendar years thereafter. [06-096 C.M.R. ch. 115, BPT]

DONE AND DATED IN AUGUSTA, MAINE THIS 13th DAY OF September , 2019.

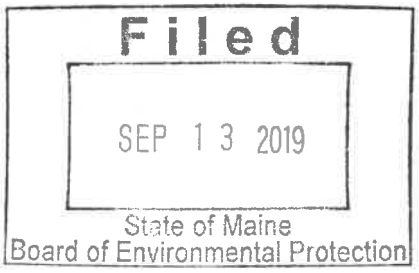
DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____
GERALD D. REID, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 2/22/19
Date of application acceptance: 2/25/19

Date filed with the Board of Environmental Protection:



This Order prepared by Lynn Muzzey, Bureau of Air Quality.